

Ecology of Sydney plant species

Part 3: Dicotyledon families Cabombaceae to Eupomatiaceae

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Abstract

Benson, Doug and McDougall, Lyn (National Herbarium of New South Wales, Royal Botanic Gardens, Sydney, Australia 2000) 1995. Ecology of Sydney Plant Species: Part 3: Dicotyledon families Cabombaceae to Eupomatiaceae. Cunninghamia 4(2) 217-431. Ecological data in tabular form is provided on 335 plant species, 246 native and 89 exotics, mostly naturalised, occurring in the Sydney region, defined by the Central Coast and Central Tablelands botanical subdivisions of New South Wales (approximately bounded by Lake Macquarie, Orange, Crookwell and Nowra). Relevant Local Government Areas are Auburn, Ashfield, Bankstown, Bathurst, Baulkham Hills, Blacktown, Blayney, Blue Mountains, Botany, Burwood, Cabonne, Camden, Campbelltown, Canterbury, Cessnock, Concord, Crookwell, Drummoyne, Evans, Fairfield, Greater Lithgow, Gosford, Hawkesbury, Holroyd, Hornsby, Hunters Hill, Hurstville, Kiama, Kogarah, Ku-ring-gai, Lake Macquarie, Lane Cove, Leichhardt, Liverpool, Manly, Marrickville, Mosman, Mulwaree, North Sydney, Oberon, Orange, Parramatta, Penrith, Pittwater, Randwick, Rockdale, Ryde, Rylstone, Shellharbour, Shoalhaven, Singleton, South Sydney, Strathfield, Sutherland, Sydney City, Warringah, Waverley, Willoughby, Wingecarribee, Wollondilly, Wollongong, Woollahra and Wyong.

Families are Cabombaceae, Cactaceae, Callitrichaceae, Campanulaceae, Capparaceae, Caprifoliaceae, Caryophyllaceae, Casuarinaceae, Celastraceae, Ceratophyllaceae, Chenopodiaceae, Chloanthaceae, Clusiaceae, Cobaeaceae, Convolvulaceae, Crassulaceae, Cucurbitaceae, Cunoniaceae, Dilleniaceae, Dipsacaceae, Droseraceae, Ebenaceae, Elaeocarpaceae, Elatinaceae, Epacridaceae, Ericaceae, Escalloniaceae, Eucryphiaceae, Euphorbiaceae and Eupomatiaceae.

Data is derived from herbarium collections, literature and field observations. It is hoped that the many, often alarming, gaps in the information available will stimulate much-needed research into the ecology of more of the species. Information is provided so far as available to us for each plant species in the following categories:

Life History: Growth form, vegetative spread, longevity, primary juvenile period (time from germination to fruiting), reproduction, flowering and fruiting times, fruit/seed type, dispersal, establishment and growth, fire response, interaction with other organisms.

Distribution: Status/origin (native/naturalised), Botanical subregions, distribution in Sydney area, selected locations.

Habitat: Habitat, altitude, annual rainfall, typical local abundance, vegetation, substrate, exposure.

Conservation: Conservation status.

Introduction

The *Ecology of Sydney Plant Species* aims to provide ecological information on native and naturalised Sydney plants. Particular emphasis has been given to data that is relevant for ecologists and natural area managers, for people involved in bush regeneration, land rehabilitation and landscape design, for researchers in many fields and for a wide range of people who are interested in bushland and native plants. Species-specific information is also relevant to environmental impact assessment and to studies involving changes in drainage, water movement, wind exposure, nutrient conditions and fire regimes on plant species and plant communities. Information included covers growth form, flowering and fruiting times, longevity and maturation periods; pollination and seed dispersal data, distribution, habitat and plant community, as well as responses to fire and disturbance where available and is complementary to the descriptive texts in taxonomic handbooks such as the *Flora of New South Wales* (Harden 1990-93).

Part 3 of the *Ecology of Sydney Plant Species* covers Dicotyledon families alphabetically from Cabombaceae to Eupomatiaceae. Families covered are Cabombaceae, Cactaceae, Callitrichaceae, Campanulaceae, Capparaceae, Caprifoliaceae, Caryophyllaceae, Casuarinaceae, Celastraceae, Ceratophyllaceae, Chenopodiaceae, Chloanthaceae, Clusiaceae, Cobaeaceae, Convolvulaceae, Crassulaceae, Cucurbitaceae, Cunoniaceae, Dilleniaceae, Dipsacaceae, Droseraceae, Ebenaceae, Elaeocarpaceae, Elatinaceae, Epacridaceae, Ericaceae, Escalloniaceae, Eucryphiaceae, Euphorbiaceae and Eupomatiaceae.

Methods

Part 3 follows the format used in Parts 1 and 2 (Benson & McDougall 1993, 1994). The Sydney region is defined as the Central Coast and Central Tablelands botanical subdivisions (i.e. approximately bounded by Lake Macquarie, Orange, Crookwell and Nowra) (Figure 1). This is the area broadly covered by *Flora of the Sydney Region* (Carolin & Tindale 1993), with the exception that the Hunter Valley is not included here since it lies within the North Coast and Central Western Slopes subdivisions. Relevant Local Government Areas are Auburn, Ashfield, Bankstown, Bathurst, Baulkham Hills, Blacktown, Blayney, Blue Mountains, Botany, Burwood, Cabonne, Camden, Campbelltown, Canterbury, Cessnock, Concord, Crookwell, Drummoyne, Evans, Fairfield, Greater Lithgow, Gosford, Hawkesbury, Holroyd, Hornsby, Hunters Hill, Hurstville, Kiama, Kogarah, Ku-ring-gai, Lake Macquarie, Lane Cove, Leichhardt, Liverpool, Manly, Marrickville, Mosman, Mulwaree, North Sydney, Oberon, Orange, Parramatta, Penrith, Pittwater, Randwick, Rockdale, Ryde, Rylstone, Shellharbour, Shoalhaven, Singleton, South Sydney, Strathfield, Sutherland, Sydney City, Warringah, Waverley, Willoughby, Wingecarribee, Wollondilly, Wollongong, Woollahra and Wyong.

The Sydney region includes approximately 3500 plant species, both native and naturalised. To deal effectively with this number, the work has been divided into parts each of approximately 350 species based on plant families beginning with ferns, Cycads and Gymnosperms, and then Dicotyledon and Monocotyledon families. Within these groups, families, genera and species are arranged alphabetically:

- Part 1: Ferns, Fern allies, Cycads and Conifers
Dicotyledon families Acanthaceae to Asclepiadaceae
- Part 2: Dicotyledon families Asteraceae to Buddlejaceae
- Part 3: Cabombaceae to Eupomatiaceae** (*Cunninghamia* 4(2) 1995)
- Part 4: Fabaceae
- Part 5: Flacourtiaceae to Myrsinaceae
- Part 6: Myrtaceae
- Part 7: Nyctaginaceae to Rubiaceae
- Part 8: Rutaceae to Zygophyllaceae
- Part 9: Monocotyledon families
- Part 10: Monocotyledon families

For each species (and generally for subspecies) a data sheet is prepared incorporating life history, distribution and habitat data from specimens in the National Herbarium of New South Wales; this information is entered in a database together with data from literature sources both published and unpublished. References have been cited where appropriate but for unreferenced data responsibility has been assumed by the authors. A provisional compilation sheet with the available information is then prepared and distributed to interested persons for comments and additions/alterations. This compilation is then published in parts in *Cunninghamia*, with the subsequent long-term aim of producing a book at the completion of the ten parts. This will allow the incorporation of new and additional material.

Part 4, Fabaceae, is planned for publication in 1996, and any information that readers would like included should be sent to the authors by 30th June 1996.

Information categories

For each species or subspecies, information is presented under headings relating to different life-history aspects, each with further subdivisions. Emphasis has been given to understanding the species in its wild habitat. For this reason data on cultivation and artificial propagation, available in horticultural books, is generally not included. Likewise information on weed control is not given. Generally, the categories are broadly interpreted and since the project aims to stimulate further investigation, we welcome the addition of extra data on any other aspects of the plant's ecology.

Botanical nomenclature

Family/Genus/Species: Names currently recognised at the National Herbarium of New South Wales and mostly as used in *Flora of New South Wales*.

Common name: Names used in *Flora of New South Wales*.

Life history

Growth form: Brief description.

Source: *Flora of New South Wales*.

Vegetative spread: Indication of whether localised expansion or spread is possible from an individual by rhizome, stolon, rootsucker etc. Important in determining ability of species to colonise immediate local area. Does not include vegetative distance dispersal which is included under Establishment & Growth (diaspore).

Source: Flora descriptions, Herbarium specimens, field observations.

Longevity: Average potential life-span under natural conditions — range in years where possible, indefinite, where death is not a result of inherent growth e.g. continued rhizomatous growth. Longevity may be shorter in cultivation.

Source: Literature, authors' assessment from field observations.

Primary juvenile period: Time taken from germination to produce first fruits or spores (Gill 1975) uses the term for the period from germination to flowering but the period to fruit maturity is more significant ecologically). Secondary juvenile period is time taken for individual to recover to produce fruit after major damage e.g. from fire, but applicable only if species regularly resprouts.

Source: Literature, field observations.

Reproduction: for Angiosperms, Reproduction separated into:

Flowers: Flower colour, flowering period — range of months and, where possible, peak month based on frequency of herbarium collections. Pollination vectors.

Fruit: Fruit shape and size, particularly with respect to potential dispersal agents. Maturation period, seed size and number.

Source: Herbarium specimens, field observations, *Flora of New South Wales*, literature.

Establishment and growth: Diaspore type (including vegetative), dispersal agent. Germination requirements: seedbank presence, dormancy, growth rates, seasonality, deciduousness etc. [notes on propagation in cultivation may be given where these imply similar behaviour under natural field conditions e.g. insights into seed germination inhibition].

Source: Literature, field observations.

Fire response: General response of mature plant to fire, in particular whether it generally resprouts or is killed (see also Gill 1981, Gill & Bradstock 1992). Seedling recruitment associated with fire is included under establishment and growth.

Source: Field observations, literature.

Interaction with other organisms: Symbiosis, predators, diseases etc.

Source: Mainly literature.

Distribution

Status/origin: Native or naturalised, region of origin, source and date of introduction/naturalisation.

Source: *Flora of New South Wales*, literature.

Botanical subregions: Occurrence of species in botanical subdivisions of N.S.W., other states and countries.

Source: National Herbarium of New South Wales.

Distribution in Sydney region: Main geographic regions occupied by species.

Source: Herbarium specimen records.

Selected locations: Restricted to about 10 localities for each taxon reflecting natural geographical range of species in the Sydney area. Earliest collection dates are given for some species, particularly exotic species. Recent collection sites indicated where possible. Locality data must be interpreted carefully. The record may be based on an old specimen or observation record and the species may no longer be present at the site. However a knowledge of the original distribution may be important in showing up particular habitat requirements of the species.

Source: Herbarium specimen records.

Habitat

Specific data refers to Sydney area unless stated otherwise.

Habitat: Brief generalised description.

Source: Herbarium specimen records, field observations.

Altitude: Approximate altitudinal range (m +/-100 m) occupied by the species,

Source: Herbarium specimen records.

Annual rainfall: Approximate annual rainfall range (mm +/-100 mm) for sites occupied by the species.

Source: Bureau of Meteorology (1975).

Typical local abundance: Most frequent recordings (scale: dominant/frequent/occasional/rare).

Source: Herbarium specimen records.

Vegetation: Main structural type with typical associated species where available.

Source: Herbarium specimen records, field observations, literature.

Substrate: Geology, soil, moisture supply.

Soil nutrient rating scale: Very fertile (high nutrient) (e.g. basalt soils)/fertile (moderate nutrient)/infertile (low nutrient)/very infertile (very low nutrient) (e.g. sands)

Soil water-table scale: Permanently high/mostly high/mostly low/permanently low.

Soil salinity scale: Hypersaline/saline/brackish/fresh.

Source: Herbarium specimen records, field observations, literature.

Exposure:

Exposure scale: exposed/indifferent/sheltered.

Shading scale: deep shade/mid-shade/light shade/no shade.

Source: Herbarium specimen records, field observations, literature.

Conservation

Conservation: national significance listing, (Briggs & Leigh 1988, with current updating for Rare or Threatened Australian Plants (ROTAP) database maintained by NSW National Parks and Wildlife Service, regional significance and adequacy of conservation within Sydney area where available.

Source: Herbarium records, field observations, literature.

General comments on part 3

Part 3 covers 335 plant species, 246 native and 89 naturalised exotics. The occurrence of a number of species reported to occur in the CC and CT botanical subdivisions in Harden (1990–1993) could not be confirmed with herbarium records and they have not been included here (these are the native species *Crassula peduncularis* and exotic species *Arenaria serpyllifolia*, *Austrocyllindropuntia cylindrica*, *Cerastium balearicum*, *Euphorbia cyathophora*, *Euphorbia helioscopia*, *Ipomoea hederifolia*, *Opuntia elatior* and *Silene vulgaris* subsp. *maritima*). Also excluded from this work are a number of exotic species that do not appear to be naturalised, though there are records for them growing in cultivation in the area (*Cannabis sativa*, *Euphorbia depauperata* var. *pubescens*, *Momordica charantia* and *Phyllanthus tenellus*).

This part covers 30 plant families the largest being Epacridaceae (71 species), Euphorbiaceae (50 species), Chenopodiaceae (42 species) and Caryophyllaceae (35 species). The Epacridaceae are characteristic of the low nutrient sandy soils around Sydney and are an important component of the sclerophyllous heath/woodland vegetation, although they are rarely dominant species. Quite a number are endemic to the Sydney area, many of these having very restricted habitats, such as *Rupicola* on moist cliff lines, and restricted geographic ranges e.g. *Epacris hamiltonii* restricted to Blackheath. Several species, including *Leucopogon difformis* and *Sprengelia sprengelioides*, have become extinct in the Sydney area, while *Epacris sparsa*, was only rediscovered recently after its last confirmed recording in 1850. There has been little research on the biology of any of the species, for example on population or fire ecology; promotion of seed germination by smoke is being studied in Western Australia and may be relevant for Sydney species. Some species of *Styphelia* which have low population numbers could be disappearing unnoticed.

Euphorbiaceae (50 species), includes rainforest trees, shrubs of the sclerophyll woodlands and a number of widespread exotic weeds. Again little is known about the ecology of most species except the common weed species such as *Ricinus communis*, Castor Oil Plant. Two native species, *Bertya rosmarinifolia*, recorded from the Nepean/Grose junction in 1802, and *Amperea xiphoclada* var. *pedicillata*, recorded at Double Bay in 1888, are now locally extinct.

It is interesting that two taxa here noted as extinct in the Sydney area, *Leucopogon difformis* and *Amperea xiphoclada* var. *pedicillata* were recorded only in the eastern suburbs of Sydney, on dune sand, or swamps associated with the dunes. Another species, *Sprengelia sprengelioides* is also extinct in the Eastern Suburbs though there is a possible record from Salvation Creek in Ku-ring-gai Chase National Park. This vegetation, the Eastern Suburbs *Banksia* Scrub (Benson & Howell 1990), has now

almost completely gone and this draws attention to the loss of taxa that follow the almost complete destruction of a particular land system or vegetation complex.

Many Chenopodiaceae are salt-tolerant and restricted to saline soils of the coastlines and estuaries. Saltmarsh is frequently dominated by *Sarcocornia quinqueflora* and *Suaeda australis*, while coastal foreshores may have a number of *Atriplex* species, both native and exotic. A considerable amount of work has been done on the ecology of the common saltmarsh species e.g. *Sarcocornia quinqueflora*, though there is little known about the rare ones e.g. *Halosarcia pergranulata*.

Species of Chenopodiaceae are also characteristic of the clay soils of the dry western parts of the State and though some are naturally-occurring in the Sydney area, a considerable number have been introduced with stock into somewhat similar dry habitats in western Sydney e.g. *Einadia nutans* subsp. *linifolia*, *Maireana microphylla*, recorded from the Camden-Campbelltown area (native to NSW but exotic in CC). Many species have burrs and spines that assist dispersal by animals. Many species have been recorded only at the Flemington saleyards, and are probably extinct there now following its redevelopment e.g. *Atriplex eardleyae*, *Atriplex leptocarpa*, *Atriplex pseudocampanulata*, *Atriplex pumilio*, *Chenopodium cristatum*, *Scleroblitum atriplicinum*, *Scleroblitum bicornis* var. *horrida*, *Sclerolaena calcarata* (all native to other areas of NSW but exotic in CC) and the exotic species *Stellaria pallida*.

Caryophyllaceae (35 species) are generally herbaceous species that are found in disturbed sites and include many exotic species that are weeds of disturbed or cultivated areas.

A smaller family, Casuarinaceae (14 species), contains native species that may be locally predominant in heath and woodland vegetation. Some of the species are well known ecologically and there are more details and fewer gaps than for other families. Species of *Casuarina* tend to occur on higher nutrient soils than those of *Allocasuarina*, which are characteristic of scleromorphic vegetation. The ecology of the species is very variable. Some are fire-sensitive, e.g. *Casuarina cunninghamiana*, *Allocasuarina distyla*, while others resprout vigorously, e.g. *Allocasuarina nana*, or rootsucker, e.g. *Casuarina glauca*. Capsules and seed are retained on some species for more than 10 years, but shed annually by others. As a group the Casuarinaceae highlights the constraints of inferring similar ecological behaviour from related species, and the need for specific research on the particular species of interest.

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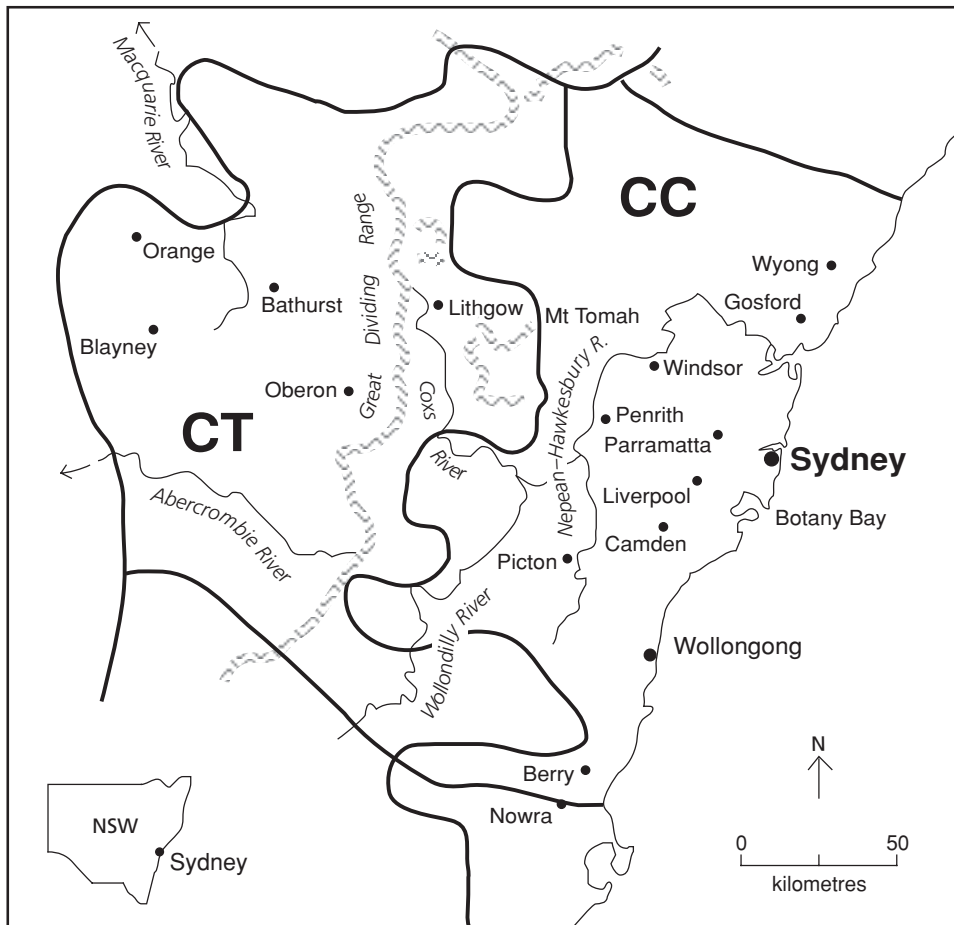
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The Sydney region

For this work the Sydney region is defined as the Central Coast and Central Tablelands botanical subdivisions.

Dicotyledon families Cabombaceae to Eupomatiaceae

Brasenia schreberi

CABOMBACEAE

Watershield

Life history

Growth form: Submerged aquatic herb rooted in mud, with floating, circular leaves covered with clear mucilage.

Vegetative spread: Stoloniferous, roots at nodes of stems.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Dull purple, November–January, emerging twice — first day for pollination, second day to release pollen (Aston 1977). Insect-pollinated, small *Diptera* (Osborne et al. 1991).

Fruit/seed: Indehiscent, beaked, 6–8 mm long, 1- or 2-seeded. Seed globular, 2.5–3 mm diam. Fruit still present in early June.

Dispersal, establishment & growth: Diaspore: ? fruit.

Fire response: Unlikely to be burnt.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SWP; Qld, Vic., Afr., Asia, Amer.

Distribution Sydney area: North-western Sydney

Select locations: Mangrove Creek, Gees Lagoon, Colo River, Cattai Creek, Thirlmere Lakes.

Habitat

Habitat: Freshwater lagoons or backwaters.

Altitude: 0–100 m **Annual rainfall:** more than 900 mm

Typical local abundance: Frequent.

Vegetation: Permanent, undisturbed fresh swamps.

Substrate: Alluvial mud, low nutrient, permanently inundated with clear water.

Exposure: Full sun.

Conservation

Conservation: Rare, coded 3V-t on national rare species list (ROTAP 1995).

Permanent fresh swamp habitat is vulnerable to disturbance.

Cabomba caroliniana *

CABOMBACEAE

Cabomba

Life history

Growth form: Submerged herb with stems to 2 m long, with floating and submerged leaves.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White or cream, floating, solitary, 10–20 mm diam., emerging twice — first day for pollination, second day to release pollen. Wind-pollinated (Osborn et al. 1991).

Fruit/seed: Indehiscent, mature in 2–4 weeks, seeds released by decomposition of the fruit wall, seeds 1.5–3 mm long (Ørgaard 1991).

Dispersal, establishment & growth: Diaspore: seed, probably bird-dispersed, adhering to feathers and mud, seeds sink into substratum protected from desiccation; difficult to germinate (Ørgaard 1991); spread by fragments (Swarbrick & Skarratt 1994).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to America.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coast.

Select locations: Dapto (1985), Centennial Park (1989).

<p>Habitat: Ponds and lakes. Altitude: 0–100 m Annual rainfall: above 1100 mm Typical local abundance: Frequent. Vegetation: Permanent fresh lakes. Substrate: Still or slow-flowing water to 3 m deep. Exposure:</p>	Habitat
<p>Conservation: An aquarium trade species and serious weed elsewhere in world (Harden 1990). Recently recorded naturalised and established at Dapto, persisting in spite of spraying and raking (Herbarium note 1985).</p>	Conservation

***Opuntia aurantiaca* ***

CACTACEAE

Tiger Pear

<p>Growth form: Succulent, low-growing shrub, with spines each having barbs, underground tubers and fibrous roots. Vegetative spread: No, but dispersed vegetatively. Longevity: Very long-lived (Parsons & Cuthbertson 1992). Primary juvenile period: Not applicable. Flowers: Yellow, 6 cm diam., with fleshy base. Fruit/seed: Pear-shaped, 2–3 cm long, red with purple mottling. Seed not viable, this species believed to be a sterile hybrid (Parsons & Cuthbertson 1992). Dispersal, establishment & growth: Diaspore: fruit segments / stem segments, spread by animals (barbs cling to skin, hides, wool etc.) and floodwater (Harden 1990). Most important dispersal is by humans as ornamental or hedge plant, or in dumping of garden refuse (Parsons & Cuthbertson 1992). Peak growing period October (Tanner 1989). Drought resistant (Parsons & Cuthbertson 1992). Fire response: Plant not easily burnt due to high moisture content; fire used as an effective control measure (in conjunction with removal of root system) (Parsons & Cuthbertson 1992). Interaction with other organisms: Host of fruit-fly and provide effective harbour for pest animals e.g. rabbits; fruit used for jam, flowers useful for honey, extracts used medicinally (Parsons & Cuthbertson 1992). Cochineal insect <i>Dactylopius austrinus</i> used as control measure in warmer areas (Tanner 1989), effective in Queensland but not consistent in NSW.</p>	Life history
<p>Status/origin: Naturalised exotic, native to Argentina and Uruguay, first noted in NSW 1883 (Parsons & Cuthbertson 1992). Introduced as garden plant (Tanner 1989). Botanical subregions: NC CC SC NT CT NWS CWS SWS NWP SWP; Qld, Vic. Distribution Sydney area: Western Sydney. Select locations: Windsor (1906), Camden Park (1980).</p>	Distribution
<p>Habitat: Infestations generally follow watercourses (Parsons & Cuthbertson 1992). Altitude: 0–300 m Annual rainfall: 600–800 mm Typical local abundance: Occasional. Vegetation: Woodland. Substrate: Clay soils on alluvium and shales, medium nutrients. Exposure: Full sun to light shade.</p>	Habitat
<p>Conservation: <i>O. aurantiaca</i> regarded as worst cactus plant in NSW, declared noxious weed in NSW, now has spread along many river systems, infecting 200,000 ha nationally (Tanner 1989). First recognised as a problem in NSW in 1911, remains a major pest in NSW including Hunter Valley, infestation in NSW increasing (Parsons & Cuthbertson 1992). Uncommon in Sydney area.</p>	Conservation

***Opuntia stricta* var. *stricta* ***

CACTACEAE

Common Prickly Pear

Life history

Growth form: Bushy, clumped, succulent shrub to 1.5 m high, without a distinct trunk, shallow fibrous root system.

Vegetative spread: No, but dispersed vegetatively.

Longevity: Long-lived (Parsons & Cuthbertson 1992).

Primary juvenile period: At least 3 years (Parsons & Cuthbertson 1992).

Flowers: Lemon yellow with greenish or pinkish markings, with fleshy base.

Late March–early May (Price).

Fruit/seed: Fleshy berry, 4–5 cm long, dark purple, edible if glochids removed.

Seed rounded, 5 mm diam., yellow or pale brown, numerous, embedded in pulp at centre of fruit (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: seed/vegetative. Stem segments dispersed by animals, flood waters, falling branches, and wind; seeds dispersed in faeces of birds, foxes etc. germinate at any time, bristled seedlings vulnerable in exposed situations, (Parsons & Cuthbertson 1992). Peak growing period October (Tanner 1989).

Fire response:

Interaction with other organisms: Successful control by insect *Cactoblastis cactorum*, released in 1926, also cochineal insect *Dactylopius opuntiae* (Tanner 1989). 90% destruction in Queensland by 1933 using insect *Cactoblastis cactorum*, but low temperatures in parts of NSW, and Victoria limit effectiveness of control (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to tropical and subtropical America.

Introduced in the early days of settlement, possibly as an ornamental, hedge plant, fodder crop or as food plant for cochineal insects (valuable source of cardamine dye), plants in cultivation at Parramatta in 1839 (Parsons & Cuthbertson 1992).

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area: Coast and western Sydney.

Select locations: Careel Bay, Cooks River (1912), Wallacia, Minnamurra.

Habitat

Habitat: Riverbanks.

Altitude: 0–100 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation:

Substrate: Sandy alluvial soils.

Exposure:

Conservation

Conservation: The species covered large areas in pest proportions, including areas SW of Sydney and the Hunter Valley, before being controlled by *Cactoblastis* insects.

Infestations still causing problems in Hunter Valley, Bylong and Hill End where low temperatures limit the effectiveness of *Cactoblastis* (Parsons & Cuthbertson 1992).

Occasional records for Sydney area. Declared noxious weed in NSW (Tanner 1989).

***Opuntia vulgaris* ***

CACTACEAE

Drooping Pear, Smooth Tree Pear

Life history

Growth form: Shrub with succulent, spiny stems, tree-like, with fibrous, shallow roots.

Vegetative spread: No but dispersed vegetatively.

Longevity:

Primary juvenile period:

Flowers: Yellow with red markings on back, fleshy base, 6 cm diam. (Parsons & Cuthbertson 1992).

Fruit/seed: Pear-shaped 4–7 cm long, flesh reddish and pulpy, with tufts of fine barbed bristles, seed yellow or pale brown, rounded, 3–4 mm diam. (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: seed/vegetative. Stem segments dispersed by animals, flood waters, falling branches, and wind; viable seeds dispersed in faeces of birds, foxes etc; germinate at any time, bristled seedlings vulnerable in exposed situations (Parsons & Cuthbertson 1992). Peak growing period October (Tanner 1989).

Fire response:

Interaction with other organisms: Biological control by insects *Cactoblastis cactorum*, *Dactylopius opuntiae* (Tanner 1989).

Distribution

Status/origin: Naturalised exotic, native to S America. Introduced as garden plant, possibly introduced by Governor Phillip as intended host for cochineal insect (Maiden 1912).

Botanical subregions: NC CC SC NWP; Qld, Vic., S.A.

Distribution Sydney area:

Select locations: Kogarah (1899), Woolloomooloo Bay (1903).

Habitat

Habitat:

Altitude: 0–50 m

Annual rainfall: above 1100 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Declared noxious weed in NSW (Tanner 1989), but not considered a major weed (Parsons & Cuthbertson 1992). Uncommon in Sydney area.

Callitriche muelleri

CALLITRICHACEAE

Life history

Growth form: Semi-aquatic glabrous herb.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period:

Flowers: Minute, usually paired, 1 of each sex, spring–summer (Harden 1992).

Fruit/seed: 1–2 mm long, breaking into 4, 1-seeded nutlets (mericarps).

Dispersal, establishment & growth: Diaspore: nutlet, winged, probably water-dispersed.

Fire response: Unlikely to be burnt.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC ?NT; Qld, Vic.

Distribution Sydney area: Coastal.

Select locations: Port Jackson (1899), Thirroul, Bulli, Albion Park.

Habitat

Habitat: Damp shady habitats.

Altitude: 0–50 m

Annual rainfall: above 1000 mm

Typical local abundance:

Vegetation:

Substrate: Creek bed, terrestrial on damp soil and in places subject to occasional inundation but sometimes aquatic in the shallows (Aston 1977).

Exposure:

Conservation

Conservation: Uncommon, probably inadequately conserved, few collections compared with *Callitriche stagnalis*.

Callitriche stagnalis* **CALLITRICHACEAE**

Common Starwort

Life history**Growth form:** Semi-aquatic glabrous herb.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Minute, usually paired, 1 of each sex, spring–summer (Harden 1992).**Fruit/seed:** 2 mm wide, breaking into 4, 1-seeded nutlets (mericarps).**Dispersal, establishment & growth:** Diaspore: nutlet, with a prominent wing. Animal, wind and possibly bird-dispersed (Carr et al. 1992), probably also water-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic.**Botanical subregions:** NC CC SC NT CT ST NWS SWS SWP FNWP; Qld, Vic., Tas., S.A., W.A., S Eur., Asia, N Amer.**Distribution Sydney area:** Widespread.**Select locations:** Wyong, Pennant Hills, Oxford Falls, Sydney (1881), Royal NP, Albion Park, Kanangra River, Mt Wilson (1898), Oberon, Wingecarribee Swamp.**Habitat****Habitat:** Damp swamp margins or open water channels.**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent–rare.**Vegetation:** With *Marsilea mutica*, *Cyperus eragrostis*, *Persicaria* spp.**Substrate:** An amphibious species growing up to 90 cm tall in water or creeping and mat-like on mud when stems intertwine the growth becomes quite dense (Aston 1977). Moist sand of creek beds, shallow muddy margins.**Exposure:****Conservation****Conservation:** Weed of wetland vegetation.***Wahlenbergia ceracea*****CAMPANULACEAE**

Waxy Bluebell

Life history**Growth form:** Erect, herb 10–115 cm high, with thickened taproot and spreading rhizomes, ending in single stems.**Vegetative spread:** Rhizomatous.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Blue, solitary, summer.**Fruit/seed:** Capsule 5–10 mm long, with numerous seeds 0.6 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).**Distribution****Status/origin:** Native.**Botanical subregions:** NT CT ST; Vic., Tas.**Distribution Sydney area:****Select locations:** Running Stream (N of Lithgow), Boyd Plateau, Wingecarribee Swamp.**Habitat****Habitat:** Bogs and swamps at high altitudes.**Altitude:** 650–1400 m **Annual rainfall:** above 1000 mm**Typical local abundance:** Occasional–frequent.**Vegetation:** Swamp vegetation e.g. with *Empodisma minus*, *Restio australis* and dense, moist grassland on swamp margins e.g. with *Leptospermum obovatum*, and forest e.g. with *Eucalyptus dalrympleana*, *E. viminalis*, *E. pauciflora*, *E. stellulata*.**Substrate:** Peaty to sandy soil, permanently wet, low-moderate nutrients.**Exposure:****Conservation****Conservation:** Not considered at risk (Smith 1992).

Wahlenbergia communis**CAMPANULACEAE**

Tufted Bluebell

Life history**Growth form:** Tufted herb 5–75 cm high, with thickened taproot.**Vegetative spread:** No.**Longevity:** Perennial.**Primary juvenile period:** 3–6 months.**Flowers:** Blue, at any time of year.**Fruit/seed:** Capsule, 4–9 mm long with numerous seeds 0.5 mm long.**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed, no particular dispersal morphology (McIntyre et al. 1995). Soil-stored seedbank (Fox 1988). Coloniser.**Fire response:** Killed by fire (Fox 1988). Flowering within 16 weeks at Albion Park Rail (M. Robinson pers. comm.), flowering and fruit forming within 10 months of high intensity fire (1/94 at Narrabeen Lake, Lane cove, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A., N.G.**Distribution Sydney area:** Widespread.**Select locations:** Government House (1915), Richmond, Glenbrook, Mt Annan, Yallah, Albion Park Rail, Jenolan SF, Bathurst, Hilltop, Mittagong.**Habitat****Habitat:** Disturbed sites and is especially common along roadsides (Smith 1992).**Altitude:** 0–1200 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** In a variety of vegetation types, typically in the open e.g. woodland with *Eucalyptus ovata*, *E. radiata*, or with *Eucalyptus longifolia*, *E. tereticornis*, *E. eugenioides* (M. Robinson pers. comm.), grassland understorey and open grassland e.g. with *Themeda australis*.**Substrate:** Clayey soils from shale, siltstone, occasionally basalt, medium nutrients.**Exposure:****Conservation****Conservation:** Not considered at risk (Smith 1992). Conserved in Western Sydney (Benson & McDougall 1991).***Wahlenbergia gracilis*****CAMPANULACEAE**

Sprawling Bluebell, Australian Bluebell

Life history**Growth form:** Tufted herb, 5–80 cm high, with thickened taproot.**Vegetative spread:** No.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Blue, sometimes pink or white, at any time of year, except June, peak October, April.**Fruit/seed:** Capsule, 2.5–7 mm long, with numerous seeds 0.3 mm long.**Dispersal, establishment & growth:** Diaspore: seed, mobile (McIntyre et al. 1995). Coloniser.**Fire response:** Probably killed by high intensity fire (at Lane Cove River 1/94), flowering within 4 months and fruiting within 6 months (P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP; LHL, Qld, Vic., Tas., N.T., S.A., N.G., N. Cal., N.Z.**Distribution Sydney area:** Widespread.**Select locations:** Wyong, Mogo Creek, Narrabeen, Willoughby, Centennial Park, Port Hacking, Mt Coolangatta, Doonside, Yerranderie, Jenolan Caves, Mt Armour, Mittagong.

Habitat

Habitat: Hillsides, riverbanks.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: In many vegetation types e.g. moist forest with *Eucalyptus deanei*, *Syncarpia glomulifera*, *Eucalyptus saligna*, *Angophora floribunda*, often in disturbed sites.

Substrate: Clay soils from shale, volcanics, alluvium.

Exposure: Light to mid-shade.

Conservation

Conservation: Not considered at risk (Smith 1992). Conserved in Western Sydney (Benson & McDougall 1991).

Wahlenbergia graniticola**CAMPANULACEAE**

Granite Bluebell

Life history

Growth form: Tufted herb 7–95 cm high, with thickened taproot.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Blue, November–January.

Fruit/seed: Capsule, 3–10 mm long with numerous seeds 0.5 mm long.

Dispersal, establishment & growth: Diaspore: seed, probably wind-dispersed.

Fire response: Reported as vigorous in area regularly burned-off (Herbarium note).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NT CT ST NWS CWS SWS NWP SWP NFWP; Qld, Vic.

Distribution Sydney area: Lithgow, Mittagong.

Select locations: Mt Victoria–Lithgow, Lidsdale, Mt Gibraltar.

Habitat

Habitat:

Altitude: 400–1000 m **Annual rainfall:** 800–1000 mm

Typical local abundance: Frequent.

Vegetation: Grassy areas in eucalypt forest.

Substrate: Clay soils from shale, granite, low nutrient.

Exposure: Full sun to light shade.

Conservation

Conservation: Not considered at risk (Smith 1992).

Wahlenbergia littorcola**CAMPANULACEAE****Life history**

Growth form: Tufted herb, 10–80 cm high, with thickened taproot.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Blue, August–December, March–May.

Fruit/seed: Capsule, 3–8 mm long, with numerous seeds, 0.5 mm long.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC SC NT CT ST SFWP; Vic., Tas., S.A., W.A., N.Z.

Distribution Sydney area: Coast and Southern Highlands.

Select locations: Hornsby, St Marys, Yerranderie, Thirlmere Lakes, Mt Gibraltar, Bowral.

	Habitat
<hr/>	
Habitat:	
Altitude: 0–700 m	Annual rainfall: above 700 mm
Typical local abundance: Occasional.	
Vegetation:	
Substrate: Sandy–clay soils from Hawkesbury Sandstone, Wianamatta Shale, well-drained, low to medium nutrients.	
Exposure:	
	Conservation
Conservation: Conservation status unknown.	

Wahlenbergia luteola**CAMPANULACEAE**

	Life history
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Growth form: Tufted herb 5–80 cm high, with thickened taproot.	
Vegetative spread: No.	
Longevity: Perennial.	
Primary juvenile period:	
Flowers: Blue, at any time of year.	
Fruit/seed: Capsule, 5–12 mm long, with numerous seeds 0.6 mm long.	
Dispersal, establishment & growth: Diaspore: seed, mobile (McIntyre et al. 1995).	
Fire response:	
Interaction with other organisms:	
	Distribution
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Status/origin: Native.	
Botanical subregions: CC NT CT ST NWS CWS SWS NWP SWP SFWP; Vic., S.A.	
Distribution Sydney area: Lithgow area.	
Select locations: Cow Pastures (1803), Little Hartley, Hartley, Tarana.	
	Habitat
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Habitat: Often in disturbed sites such as roadsides (Smith 1992).	
Altitude: 0–1000 m	Annual rainfall: 700–1000 mm
Typical local abundance: Frequent.	
Vegetation: Woodland and grassland and, typically in the open.	
Substrate: Shale soils, moderate nutrients.	
Exposure:	
	Conservation
Conservation: Probably extinct in coastal districts though not considered at risk (Smith 1992) elsewhere.	

Wahlenbergia multicaulis**CAMPANULACEAE**

Tadgell's Bluebell	
	Life history
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Growth form: Tufted herb 10–75 cm high, with thickened taproot.	
Vegetative spread: No.	
Longevity: Perennial.	
Primary juvenile period:	
Flowers: Blue, at any time of year.	
Fruit/seed: Capsule, 4–12 mm long, with numerous seeds, 0.4 mm long.	
Dispersal, establishment & growth: Diaspore: seed.	
Fire response:	
Interaction with other organisms:	
	Distribution
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Status/origin: Native.	
Botanical subregions: NC SC NT CT ST SWS SWP; Vic., Tas., S.A., W.A.	
Distribution Sydney area: Hornsby–Punchbowl, western Blue Mountains.	
Select locations: Hornsby (1915), Ashfield (1917), Punchbowl (1953), Ilford, Abercrombie Caves.	

Habitat

Habitat: Forest, woodland, grassland.

Altitude: 0–800 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt open-forest e.g. with *Eucalyptus bridgesiana*, *E. viminalis*, *E. macrorhyncha*.

Substrate: Shaley soils, low nutrient.

Exposure:

Conservation

Conservation: Generally not considered at risk (Smith 1992), though rare in Sydney region, most records old and species possibly extinct there.

Wahlenbergia planiflora* subsp. *planiflora**CAMPANULACEAE****Life history**

Growth form: Glabrous, tufted herb, 10–70 cm high, with thickened taproot.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Blue, at any time of year.

Fruit/seed: Capsule, 2–8 mm long, with numerous seeds 0.5 mm long.

Dispersal, establishment & growth: Diaspore: seed, mobile (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST; Vic.

Distribution Sydney area: Coast and Southern Highlands.

Select locations: Lake Macquarie–Myuna Bay, Albion Park, Lowther, Mittagong.

Habitat

Habitat: Forest, woodland, grassland (Harden 1992).

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Forest woodland and grassland, typically among other herbs rather than in the open.

Substrate:

Exposure:

Conservation

Conservation: Not considered at risk (Smith 1992).

Wahlenbergia stricta* subsp. *stricta**CAMPANULACEAE**

Tall Bluebell

Life history

Growth form: Tufted herb 10–90 cm high, with thickened taproot.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Blue, at any time of year.

Fruit/seed: Capsule, 3–10 mm long, with numerous seeds, 0.5 mm long.

Dispersal, establishment & growth: Diaspore: seed, no particular dispersal morphology (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP; Qld, Vic., Tas., S.A., W.A., N.Z.

Distribution Sydney area: Widespread.

Select locations: Mt Kindarun, Mogo Creek, Mooney Mooney, Denistone, Douglas Park, Wollongong, Albion Park, Glenbrook, Katoomba, Lithgow, Oberon, Berrima.

<p>Habitat: Open grassy areas. Altitude: 0–1400 m Annual rainfall: above 800 mm Typical local abundance: Vegetation: Forest e.g. with <i>Eucalyptus viminalis</i>, <i>E. radiata</i>, woodland e.g. <i>Eucalyptus crebra</i>, <i>E. moluccana</i>, <i>E. eximia</i>, <i>Eucalyptus tereticornis</i>, <i>E. eugenioides</i>, <i>E. longifolia</i> (M. Robinson p. c.); scrub e.g. with <i>Banksia integrifolia</i> and grassland, among other herbs rather than in the open. Substrate: Sandy to sandy loam soils from sandstone, shale, slates, siltstones, sand dunes, also basalt, well-drained, low to high nutrients. On Berry Siltstone and latite in Illawarra (M. Robinson pers. comm.). Exposure: Light shade.</p>	Habitat
<p>Conservation: Generally not considered at risk (Smith 1992), but vulnerable in Western Sydney (Benson & McDougall 1991), and inadequately conserved in Illawarra (M. Robinson pers. comm.).</p>	Conservation

Wahlenbergia victoriensis**CAMPANULACEAE**

<p>Growth form: Herb 10–40 cm high, with slender taproot. Vegetative spread: No. Longevity: 1 year. Primary juvenile period: Less than 1 year. Flowers: Blue, winter–summer. Fruit/seed: Capsule, 3–6 mm long, with numerous seeds, 0.5 mm long. Dispersal, establishment & growth: Diaspore: seed. Fire response: Interaction with other organisms:</p>	Life history
<p>Status/origin: Native. Botanical subregions: CT CWS SWP; Vic. Distribution Sydney area: Orange. Select locations: Four Mile Creek via Orange (1961) (only record).</p>	Distribution
<p>Habitat: Open sites, floodplains to dry, stony ridges. Altitude: 800 m Annual rainfall: 1000 mm Typical local abundance: Vegetation: Eucalypt woodland, grassland and saltbush plains. Substrate: Exposure:</p>	Habitat
<p>Conservation: Distributed from Orange in the north-east to Hawkesdale in the south-west. Reasonably widespread and occurring in a variety of habitats, but an uncommon species within its range and often not collected (Smith 1992).</p>	Conservation

Cleome hassleriana* **CAPPARACEAE**

Giant Spider-flower

<p>Growth form: Herb to 1.5 m high, leaves 5–7-foliolate. Vegetative spread: No. Longevity: 1 year. Primary juvenile period: Less than 1 year. Flowers: Purple or white. Fruit/seed: Capsule, 3–10 cm long. Dispersal, establishment & growth: Fire response: Interaction with other organisms:</p>	Life history
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Distribution

Status/origin: Naturalised exotic, native to tropical America, introduced as ornamental.

Botanical subregions: NC CC SWS; Qld.

Distribution Sydney area:

Select locations: Arcadia (1952).

Habitat

Habitat: Church grounds.

Altitude: 0–200 m

Annual rainfall: 1000 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Widely cultivated, occasionally naturalised.

Leycesteria formosa* **CAPRIFOLIACEAE**

Himalayan Honeysuckle

Life history

Growth form: Deciduous shrub, to 2 m high, with opposite leaves.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Purplish, summer.

Fruit/seed: Dark red berry, 10 mm long, with many seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Himalayas, W China, introduced as ornamental.

Botanical subregions: CT; Vic., Tas.

Distribution Sydney area: Upper Blue Mountains.

Select locations: Leura (1985), Mt Wilson (1965).

Habitat

Habitat: Moist hillsides.

Altitude: 900–1000 m

Annual rainfall: above 1200 mm

Typical local abundance: Occasional.

Vegetation: Tall eucalypt open-forest and *Callicoma* scrub.

Substrate: On basalt and sandstone, wet places.

Exposure: Sheltered.

Conservation

Conservation: Cultivated, occasionally naturalised in the Blue Mountains.

Lonicera japonica* **CAPRIFOLIACEAE**

Japanese Honeysuckle

Life history

Growth form: Climber or scrambling shrub 7–10 m high, with opposite leaves and pubescent young stems, semi-deciduous.

Vegetative spread: Roots strongly from nodes on stems.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Fragrant, white, often purplish outside, turning yellowish, November.

Fruit/seed: Shiny, black berry, 6–10 mm long, January.

Dispersal, establishment & growth: Diaspore: fruit, dispersed by gravity or water (Anon 1991). Bird-dispersed e.g. Pied Currawongs, Silvereyes (M. Clarke pers. comm.). Dispersed by stem fragments, by water, and in garden waste. Prolific seeder but rarely germinates (R. Buchanan pers. comm.).

Fire response: Stems killed, resprouts after high-intensity fire (at Narrabeen 1994), from buried nodes (R. Buchanan pers. comm.). Resprouted from base after high intensity fire at Narrabeen Lake and Lane Cove River (P. Kubiak pers. comm.).

Interaction with other organisms: Major bushland weed, controlled by application of glyphosate to scraped stems.

Distribution

Status/origin: Naturalised exotic, native to E Asia.

Botanical subregions: NC CC SC CT ST NWS; Qld, S.A.

Distribution Sydney area: Widespread.

Select locations: Galston (1920), Hornsby, Eastwood, Middle Harbour Creek, Woolooware Bay, Georges River, Macquarie Fields, Campbelltown, Wollongong, Minnamurra, Nowra, Glenbrook, Picton, Mittagong, Long Swamp (Kodola et al. 1992).

Habitat

Habitat: Moist, sheltered areas near creeks and drains, sheltered slopes.

Altitude: 0–620 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–dominant.

Vegetation: Tall open-forest, open-forest, and woodland. Upland mire (Kodola et al. 1992), also in dry rainforest, sub-tropical rainforest, and littoral rainforest in Illawarra (A. Bofeldt pers. comm.).

Substrate: Sandy loams from alluvium, shale, sandstone and volcanic necks.

Exposure: Mid-shade to full sun.

Conservation

Conservation: Noted ‘spreading in bush’ at Galston (1920), and as ‘a curse’ in 1960 at St Ives. Now major weed of urban bushland areas (McLoughlin & Rawling 1990). Becoming a serious weed in urban bushland of Wollongong area (Illawarra), invading bushland near old dwellings in rural areas, also in more remote areas (M. Robinson, A. Bofeldt p. c.).

Cerastium fontanum* subsp. *vulgare* **CARYOPHYLLACEAE**

Lesser Mouse-ear Chickweed

Life history

Growth form: Herb with decumbent non-flowering shoots and ascending flowering shoots.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: Perennial.

Primary juvenile period:

Flowers: White, spring–summer.

Fruit/seed: Capsule, with numerous, brown seeds.

Dispersal, establishment & growth: Mechanism for dispersal undefined (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, reported by Robert Brown to be introduced to Sydney by 1804 (Maiden 1909), native to Europe, almost cosmopolitan.

Botanical subregions: CC; LHI.

Distribution Sydney area: Yarralong.

Select locations: Yarralong (1974).

Habitat

Habitat:

Altitude: 0–100 m **Annual rainfall:** above 1200 mm

Typical local abundance: Common.

Vegetation: With other roadside weeds.

Substrate:

Exposure:

Conservation

Conservation: Minor weed.

Cerastium glomeratum* **CARYOPHYLLACEAE**

Mouse-ear Chickweed

Life history**Growth form:** Herb with erect or ascending flowering shoots.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, July–November.**Fruit/seed:** Capsule 5–8 mm long, with numerous, brown seeds.**Dispersal, establishment & growth:** Diaspore seed, mobile (McIntyre et al. 1995), possibly animal, water and wind-dispersed (Carr et al. 1992). More common in years of good winter and spring rainfall, plants dry off quickly in dry conditions (Cunningham et al. 1981).**Fire response:** Probably killed, seedlings observed; fruited and shed seeds (with some still flowering) within 6 months of high intensity fire (P. Kubiak pers. comm.).**Interaction with other organisms:** Flowers, leaves, and seed eaten by Galah *Cacatua roseicapilla*, flowers eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993). Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Naturalised exotic, native to Europe, almost cosmopolitan weed.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP; LHI, Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Yarramalong, Pennant Hills, Royal Botanic Gardens (1902), Penshurst, Richmond, Menangle Park, Mt Tomah, Little Hartley, Jenolan Caves (1899).**Habitat****Habitat:** Disturbed sites.**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** With other disturbance weeds e.g. *Euphorbia peplus*, *Stellaria media*, *Romulea rosea*.**Substrate:** Sandy clay soil from alluvium, shale, low–medium nutrient. Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Mid-shade.**Conservation****Conservation:** Minor weed of disturbed sites.***Dianthus armeria* *****CARYOPHYLLACEAE**

Deptford Pink

Life history**Growth form:** Erect herb, with grass-like leaves.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pink, October–January.**Fruit/seed:** Capsule 6–12 mm long, with reddish-brown seeds.**Dispersal, establishment & growth:** Diaspore: seed, not adapted for dispersal (McIntyre et al. 1995).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe and Asia.**Botanical subregions:** CC NT CT ST; Vic.**Distribution Sydney area:** Tablelands.**Select locations:** Mittagong (1975), Moss Vale, Sunny Corner (1982).**Habitat****Habitat:** Woodland, pasture, disturbed sites.**Altitude:** 600–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Rare–occasional.**Vegetation:** Woodland e.g. with *Eucalyptus tereticornis* and grassland e.g. with *Themeda australis*.**Substrate:** Clay soils from shaley alluvium.**Exposure:****Conservation****Conservation:** Weed of disturbed ground, only recently reported as naturalised in Sydney region.

Dianthus barbatus* **CARYOPHYLLACEAE**

Sweet William

Life history**Growth form:** Erect, glabrous herb.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Purple.**Fruit/seed:** Capsule 11 mm long, with reddish-brown seeds.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe and Asia. Cultivated as ornamental.**Botanical subregions:** CT.**Distribution Sydney area:** Orange.**Select locations:** Orange.**Habitat****Habitat:****Altitude:** 900–1000 m**Annual rainfall:** 1000 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Naturalised in Orange district (Harden 1990).***Gypsophila tubulosa*****CARYOPHYLLACEAE**

Annual Chalkwort

Life history**Growth form:** Erect herb 5–20 cm high, with sticky, glandular hairs and opposite leaves.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pink, spring.**Fruit/seed:** Capsule, 4–5 mm long, with numerous, minute seeds, mature January.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Probably killed.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC NT ST NWS CWS NWP SWP NFWP; Qld, Vic., Tas., S.A., W.A., N.Z.**Distribution Sydney area:** Menangle Park, only record.**Select locations:** Menangle Park (1970).**Habitat****Habitat:****Altitude:** 0–200 m**Annual rainfall:** 700 mm**Typical local abundance:** Rare.**Vegetation:** Grassland, woodland.**Substrate:** Deep sandy soil, probably alluvium, medium nutrient.**Exposure:****Conservation****Conservation:** Only record for Sydney region, conservation status unknown.

Lychnis chalconica* **CARYOPHYLLACEAE****Life history****Growth form:** Herb with sessile leaves.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Scarlet, summer (December).**Fruit/seed:** Capsule, 14 mm long, with numerous kidney-shaped, reddish-brown seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Rarely naturalised exotic, native to Europe. Introduced as ornamental.**Botanical subregions:** CT.**Distribution Sydney area:** Bowral, only record.**Select locations:** Bowral (1963).**Habitat****Habitat:****Altitude:** 600–700 m**Annual rainfall:** 1000 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Cultivated as an ornamental, rarely naturalised, only one record.***Lychnis coronaria* *****CARYOPHYLLACEAE**

Rose Champion

Life history**Growth form:** Herb to 1 m high, with sessile leaves.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Red–purple, summer (February).**Fruit/seed:** Capsule, 15 mm long, with numerous kidney-shaped, reddish-brown seeds, mature February.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to temperate Eurasia. Introduced as ornamental.**Botanical subregions:** NT CT ST.**Distribution Sydney area:** Tablelands.**Select locations:** Hampton (1982), Orange (1972).**Habitat****Habitat:** Disturbed areas, roadsides.**Altitude:** 900–1200 m**Annual rainfall:** more than 800 mm**Typical local abundance:** Occasional.**Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Cultivated as an ornamental and locally naturalised on disturbed ground (Harden 1990).

Moenchia erecta* **CARYOPHYLLACEAE**

Erect Chickweed

Life history**Growth form:** Erect, glabrous herb with slender stems.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, spring (September).**Fruit/seed:** Capsule, 5–7 mm long, with numerous, minute seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NT CT ST NWS SWS; Vic., Tas., S.A.**Distribution Sydney area:** Orange, only record.**Select locations:** Orange (1949).**Habitat****Habitat:** Garden, pastures and woodlands.**Altitude:** 800 m**Annual rainfall:** 1000 mm**Typical local abundance:****Vegetation:****Substrate:** Moist sites.**Exposure:****Conservation****Conservation:** Uncommon weed of moist sites.***Paronychia brasiliana* *****CARYOPHYLLACEAE**

Chilean Whitlow Wort, Brazilian Whitlow

Life history**Growth form:** Prostrate herb, with stem often knotted and woody.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Small, without petals, almost concealed by bracts.**Fruit/seed:** Capsule 1 mm long, with bristle, 1-seeded, indehiscent.**Dispersal, establishment & growth:** Diaspore: probably fruit, possibly dispersed by people and in mud or on cars (Wace 1977). No particular dispersal morphology (McIntyre et al. 1995).**Fire response:****Interaction with other organisms:** Seed eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993). Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Naturalised exotic, native to S America.**Botanical subregions:** NC CC SC NT CT ST NWS CWS NWP SWP; Qld, Vic., S.A.**Distribution Sydney area:** Widespread.**Select locations:** Howes Valley, Pennant Hills, Rose Bay (1929), Centennial Park, Leumeah, Sutherland, Albion Park, Capertee Valley, Bullio.**Habitat****Habitat:** Grass flats, roadsides and pastures, lawns.**Altitude:** 0–700 m**Annual rainfall:** above 600 mm**Typical local abundance:** Frequent.**Vegetation:** Grassland, mowed or grazed, common on grazed hillsides (Capertee Valley).**Substrate:** Sandy or clayey soils from coastal sands, shales, conglomerates, basalt, low to high nutrient, well-drained.**Exposure:** Full sun.**Conservation****Conservation:** A troublesome weed in lawns and pastures (Harden 1990).

***Petrorhagia nanteuilii* ***

CARYOPHYLLACEAE

Life history

Growth form: Herb to 60 cm high. An allotetraploid possibly having *P. velutina* and *P. prolifera* as its diploid parents (Harden 1990).

Vegetative spread: Some rooting at nodes but spread generally limited.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Pink, September–December, self-compatible, autogamous.

Fruit/seed: Capsule, 6 mm long, seeds 1.3–1.6 mm long.

Dispersal, establishment & growth: Diaspore: seed, no particular dispersal morphology (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977).

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: CC SC NT CT ST NWS CWS SWS NWP SWP SFWP; Qld, Vic., Tas., S.A., W.A.

Distribution Sydney area: Mainly coastal.

Select locations: The Spit, The Domain (1903), Kurnell, Mt Annan, Lake Illawarra, Fitzroy Falls, Wingello (1900).

Habitat

Habitat: Disturbed ground.

Altitude: 0–700 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Grassland and pasture e.g. with *Cynodon dactylon*, *Paspalum dilatatum*, *Hypochaeris radicata*, *Plantago lanceolata*.

Substrate: Sand, clay soils from shales, basalt, fill material.

Exposure: Full sun.

Conservation

Conservation: Weed of pastures and disturbed ground.

***Petrorhagia velutina* ***

CARYOPHYLLACEAE

Life history

Growth form: Erect herb to 60 cm high.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Pink, September–December.

Fruit/seed: Capsule, 5 mm long, seeds usually less than 1.3 mm long, glandular papillate.

Dispersal, establishment & growth: Diaspore: seed, no particular dispersal morphology (McIntyre et al. 1995).

Fire response: Probably killed, flowering and fruiting within 10 months of high intensity fire (1/94 at Lane Cove River and Narrabeen Lake, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: NC CC SC ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., S.A., W.A.

Distribution Sydney area: Coast.

Select locations: Woy Woy, Pennant Hills, Clyde, Centennial Park (1909), Richmond, St Marys, Bents Basin, Bomaderry.

Habitat

Habitat: Pastures and disturbed areas, roadsides. Sand spit at Minnamurra (M. Robinson p. c.).

Altitude: 0–200 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional–frequent.

Vegetation: Grassland.

Substrate: Sandy alluvial soils, disturbed soil, low–medium nutrient. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Weed of pastures and disturbed ground.

Polycarpaea corymbosa* var. *minor**CARYOPHYLLACEAE****Life history****Growth form:** Erect herb, usually pubescent.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Small, with conspicuous white, pink or purple bracts 2–4 mm long.**Fruit/seed:** Capsule, 1.1–1.6 mm long.**Dispersal, establishment & growth:****Fire response:** Resprouts from base.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT ST NWS NWP SWP NFWP SFWP; Qld, N.T.**Distribution Sydney area:** Menangle Park.**Select locations:** Menangle Park (1972) only record.**Habitat****Habitat:** Disturbed site beside railway.**Altitude:** 0–200 m **Annual rainfall:** 700 mm**Typical local abundance:** Rare–frequent.**Vegetation:** Grassland with *Cynodon dactylon*, *Themeda australis*, *Imperata cylindrica*.**Substrate:** Deep sandy soil.**Exposure:** ? Full sun.**Conservation****Conservation:** Rare — only one record for Sydney district.***Polycarpon tetraphyllum* *****CARYOPHYLLACEAE**

Four-leaved Allseed

Life history**Growth form:** Herb, with opposite leaves.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, small, September–November.**Fruit/seed:** Capsule, less than 3 mm long, with c. 15 seeds, September–December.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed; mobile (McIntyre et al. 1995).**Fire response:** Probably killed, fruiting within 11 months of high intensity fire (1/94 at Lane Cove River, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NC CC SC CT ST NWS CWS NWP SWP NFWP SFWP; LHI, Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Wollombi, Narrabeen, Pennant Hills, Centennial Park, Oatley (1887), Richmond, Linden, Kiama (1888), Jenolan Caves (1899), Abercrombie Caves.**Habitat****Habitat:** Gardens, pastures.**Altitude:** 0–900 m **Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** Gardens, pastures.**Substrate:** Sandy soils from alluvium, and on shales, limestone, sandstone, garden soils, full sun. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Common weed of gardens and pastures.

***Sagina apetala* ***

CARYOPHYLLACEAE

Annual Pearlwort

Life history**Growth form:** Erect, glabrous herb.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Spring–summer.**Fruit/seed:** Capsule, with numerous reddish-brown seeds.**Dispersal, establishment & growth:** Diaspore: seed, mobile (McIntyre et al. 1995).**Fire response:** Probably killed.**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S Europe and W Asia.**Botanical subregions:** CC SC ST NWS CWS SWS SWP; Qld, Vic., Tas., W.A.**Distribution Sydney area:** Coast and western Sydney suburbs.**Select locations:** Balgowlah, Cheltenham, Royal Botanic Gardens (1900), Coogee, Casula, Wilberforce, Albion Park.**Habitat****Habitat:** Gardens.**Altitude:** 0–200 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:** Gardens.**Substrate:** Moist sandy soils, gardens, sandstone rock platforms.**Exposure:** Mid-shade.**Conservation****Conservation:** Weed of moist areas.***Sagina procumbens* ***

CARYOPHYLLACEAE

Procumbent Pearlwort, Spreading Pearlwort

Life history**Growth form:** Procumbent, glabrous herb, with vegetative stems present at flowering.**Vegetative spread:** Often rooting from lower nodes of stem, forming dense mats in gardens and lawns.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Terminal, solitary, October–December.**Fruit/seed:** Capsule 2–4 mm long, with numerous reddish-brown seeds.**Dispersal, establishment & growth:** Diaspore: seeds.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to N temperate regions.**Botanical subregions:** CC NT CT ST NWS; Qld, Vic, Tas, SA.**Distribution Sydney area:** Coast and upper Blue Mountains.**Select locations:** Pymble, Royal Botanic Gardens (1939), La Perouse, Stanwell Park, Albion Park, Katoomba, Mt Tomah.**Habitat****Habitat:** Gardens.**Altitude:** 0–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Uncultivated garden areas.**Substrate:** Sandy soils, also on basalt.**Exposure:** Semi-shade to full sun.**Conservation****Conservation:** Garden weed of moist areas.

Saponaria calabrica* **CARYOPHYLLACEAE****Life history**

Growth form: Herb.
Vegetative spread: No.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers:
Fruit/seed: Capsule, with black kidney-shaped seeds.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Mediterranean.
Botanical subregions: CT.
Distribution Sydney area: Jenolan Caves (only record).
Select locations: Jenolan Caves 1899.

Habitat

Habitat:
Altitude: 800 m **Annual rainfall:** 1000 mm
Typical local abundance:
Vegetation:
Substrate:
Exposure:

Conservation

Conservation: Only one old record for NSW, now possibly extinct.

Saponaria officinalis* **CARYOPHYLLACEAE**

Soapwort

Life history

Growth form: Robust, stoloniferous herb with stout rhizomes, mat-forming over areas up to 10 m across.
Vegetative spread: Stolons and rhizomes.
Longevity:
Primary juvenile period:
Flowers: White or pink, winter or spring.
Fruit/seed: Capsule, with black, kidney-shaped seeds, December–January.
Dispersal, establishment & growth: Possibly mainly restricted to local vegetative spread by rhizome and stolons, possibly widespread by humans.
Fire response:
Interaction with other organisms: Reported to contain a saponin which is potentially poisonous to stock (Hurst 1942).

Distribution

Status/origin: Naturalised exotic, native to Europe. Reported as naturalised by 1939 (Hurst 1942).
Botanical subregions: NC CC SC NT CT ST CWS; Vic., Tas.
Distribution Sydney area: Widespread.
Select locations: Meadowbank, Richmond (1910), Hartley, Bathurst, Orange, Mittagong, Kangaroo Valley.

Habitat

Habitat: Roadsides, wasteland.
Altitude: 0-1200 m **Annual rainfall:** above 700 mm
Typical local abundance: Frequent.
Vegetation:
Substrate: Roadside embankments, alluvial flats, granite soils.
Exposure: Full sun.

Conservation

Conservation: Occasional weed of waste ground.

Scleranthus biflorus**CARYOPHYLLACEAE****Life history**

Growth form: Small, much-branched herb, either lax and spreading with ascending tips or forming a dense, compact mat.

Vegetative spread: Yes (McIntyre et al. 1995).

Longevity: Perennial.

Primary juvenile period:

Flowers: No petals, spring.

Fruit/seed: 1-seeded, indehiscent nutlet.

Dispersal, establishment & growth: No particular dispersal morphology (McIntyre et al. 1995).

Fire response:

Interaction with other organisms: Weed growth at base of plants in cultivation can cause sweating resulting in death of plant (Jones & Elliot 1986).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS; Vic., Tas.

Distribution Sydney area: Sydney, Blue Mountains, Southern Highlands.

Select locations: Gladesville (1904), Springwood (1889), Long Swamp (Kodela et al.1992).

Habitat

Habitat: More frequent at higher altitudes (Harden 1990).

Altitude: 0–600 m

Annual rainfall:

Typical local abundance:

Vegetation: Margin of upland mire (Kodela et al. 1992), grassland (Harden 1990).

Substrate: Peaty sand, low nutrients.

Exposure:

Conservation

Conservation: Rare in Sydney region. The species is currently under revision and it appears certain that it will be divided into a number of taxa (Harden 1990).

Silene dioica* **CARYOPHYLLACEAE****Life history**

Growth form: Erect herb to 80 cm high, hybridizes readily with *S. pratensis* (Harden 1990).

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Red or pink, unisexual, summer.

Fruit/seed: Capsule, 2 cm long, numerous kidney-shaped seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to North and Central Europe.

Botanical subregions: CT .

Distribution Sydney area: Mt Tomah.

Select locations: Mt Tomah (1982) only record.

Habitat

Habitat: Garden.

Altitude: 1000 m

Annual rainfall: 1200 mm

Typical local abundance:

Vegetation:

Substrate: Probably basaltic soil.

Exposure:

Conservation

Conservation: Garden weed, rare (Harden 1990), only recently recorded.

***Silene gallica* var. *gallica* ***

CARYOPHYLLACEAE

French Catchfly

Life history**Growth form:** Erect herb.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White or pink, August–November, peak October.**Fruit/seed:** Capsule 6–9 mm long, seeds numerous, kidney-shaped, September–December.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Probably killed, flowering within 9 months and fruiting within 10 months of high intensity fire (1/94 at Lane Cove River, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NC CC SC NT CT ST CWS SWP NFWP; L.H.I., W.A.**Distribution Sydney area:** Coast, western Sydney, Bathurst area, Southern Highlands.**Select locations:** Cheltenham, Port Jackson (1881), Centennial Park, Homebush, Richmond, Mt Annan, Mt Tomah, Bathurst (1892), Robertson.**Habitat****Habitat:** Disturbed areas, roadsides, grassland.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:** Grassland e.g. with *Themeda australis*, riverbanks e.g. with *Casuarina cunninghamiana*, footpaths e.g. with *Plantago lanceolata*, edge of saltmarsh.**Substrate:** Sandy soil and sandstone boulders, clay soil from Wianamatta Shale, low to medium nutrient. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Weed of disturbed sites.***Silene gallica* var. *quinquevulnera* ***

CARYOPHYLLACEAE

Five-wounded Catchfly

Life history**Growth form:** Erect, hairy herb, to 40 cm high, often sticky (Cunningham et al. 1981).**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pink or white, with a dark crimson blotch at base, October–December, peak November.**Fruit/seed:** Capsule, 6–9 mm long, enclosed in the calyx, numerous blackish seeds, kidney-shaped, October–November.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe. Reported by Robert Brown as introduced to Sydney by 1804 (Maiden 1909).**Botanical subregions:** CC SC NT ST SWS SWP; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Coastal.**Select locations:** Wondabyne, Mosman, Little Bay, Kurnell, Otford, Thirroul (1917), Mt Keira.**Habitat****Habitat:** Waste ground.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Frequent.**Vegetation:** Grassland.**Substrate:** Mainly coastal sand, low nutrient.**Exposure:****Conservation****Conservation:** Weed of waste areas.

***Silene nocturna* ***

CARYOPHYLLACEAE

Life history

Growth form: Erect herb with hairy stems.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pink, June–October.**Fruit/seed:** Capsule 5–9 mm long, seeds numerous, kidney-shaped.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to S Europe.**Botanical subregions:** CC SC CWS SWS NWP SWP; Vic., S.A.**Distribution Sydney area:** Widespread.**Select locations:** Cowan, Dundas (1923), Richmond (1923), Fairfield, Douglas Park, Austinmer.

Habitat

Habitat: Waste areas.**Altitude:** 0–200 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Grassland.**Substrate:** Clay soils from shale, medium nutrient.**Exposure:** Mid-shade.

Conservation

Conservation: Weed of waste areas.***Silene pratensis* ***

CARYOPHYLLACEAE

White Champion

Life history

Growth form: Erect herb to 1 m high.**Vegetative spread:****Longevity:** Biennial or perennial.**Primary juvenile period:****Flowers:** White, mainly summer.**Fruit/seed:** Capsule 2 cm long, with numerous, kidney-shaped seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to Europe.**Botanical subregions:** NC CC SC NT CT ST; Vic.**Distribution Sydney area:** Higher areas.**Select locations:** Mt Tomah (1973), Bowral (1971).

Habitat

Habitat: Disturbed areas, pasture.**Altitude:** 700–1000 m**Annual rainfall:** 1100 mm**Typical local abundance:****Vegetation:** Grassland.**Substrate:** Clay soil from basalt, high nutrient.**Exposure:**

Conservation

Conservation: Weed of pasture and waste ground.

Silene vulgaris* subsp. *vulgaris* **CARYOPHYLLACEAE**

Bladder Campion

Life history**Growth form:** Erect herb to 1 m high, with short, thick rootstock, branching, rope-like roots to 1.5 m deep (Parsons & Cuthbertson 1992).**Vegetative spread:** Creeping lateral roots, also root fragments (Parsons & Cuthbertson 1992).**Longevity:** Perennial.**Primary juvenile period:** 1 year.**Flowers:** White, bisexual or unisexual, October–January (Parsons & Cuthbertson 1992).**Fruit/seed:** Brownish capsule 5–10 mm long, enclosed by calyx, with numerous kidney-shaped seeds, 1.5–2 mm long.**Dispersal, establishment & growth:** Diaspore: seed, no special dispersal morphology, dispersed short distance by wind/gravity, in mud, water flow, and in pasture seed (Parsons & Cuthbertson 1992). Pioneer species, peak germination in spring and autumn, overwintering rosettes produce flowering stems in spring (Parsons & Cuthbertson 1992).**Fire response:****Interaction with other organisms:** Very competitive in pastures and interferes with cultivation, deep root system so not easily controlled (Parsons & Cuthbertson 1992).**Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** CC CT ST NWS CWS SWS NFWP SFWP; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Chatswood (1935), Mt Kembla, Wattle Flat, Carcoar.**Habitat****Habitat:** Disturbed areas.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:****Substrate:** Light-textured, free-draining, gravelly soils (Parsons & Cuthbertson 1992).**Exposure:** Obligate long-day plant, needs continuous light — short days (e.g. only 8 hrs light) delay flowering up to 4 years (Parsons & Cuthbertson 1992).**Conservation****Conservation:** Weed of pastures and crops.***Spergula arvensis* *****CARYOPHYLLACEAE**

Corn Spurry

Life history**Growth form:** Herb, branching near base, erect or ascending.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** September–January.**Fruit/seed:** Capsule, with numerous, black, wrinkled seeds 1 mm diam., fruiting July–December.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Probably killed.**Interaction with other organisms:** Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Naturalised exotic, native to N Asia, Africa.**Botanical subregions:** NC CC SC NT CT ST CWS SWP; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Cheltenham, Manly (1889), Centennial Park, Ryde (1887), Richmond, Bilpin, Wallacia, Picton, Thirlmere, Kiama, Wingecarribee, Blackheath, Hill End.

Habitat

Habitat: Roadsides, riverbanks, cultivated areas.
Altitude: 0–1000 m **Annual rainfall:** above 700 mm
Typical local abundance: Occasional.
Vegetation: Pasture grasses and roadside weeds.
Substrate: Sandy soils, alluvial soil, medium nutrients.
Exposure: Full sun.

Conservation

Conservation: Weed of cultivated land.

Spergularia levis* **CARYOPHYLLACEAE****Life history**

Growth form: Stout, glabrous herb, with opposite leaves and basal leaves.
Vegetative spread:
Longevity: Perennial.
Primary juvenile period:
Flowers: White, spring.
Fruit/seed: Capsule 4–8 mm long, with numerous, small winged seeds, mature October–March.
Dispersal, establishment & growth: Diaspore: seed, probably wind-dispersed short distance.
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S America.
Botanical subregions: CC.
Distribution Sydney area: Ingleburn–Minto.
Select locations: Ingleburn (1964), Minto (1968).

Habitat

Habitat: Stockyards, railway land.
Altitude: 0–200 m **Annual rainfall:** above 700 mm
Typical local abundance: Frequent.
Vegetation: Grassy paddocks.
Substrate: Clay soil from Wianamatta Shale.
Exposure: Probably full sun.

Conservation

Conservation: Recently established weed, possibly in early stages of spread.

Spergularia marina* **CARYOPHYLLACEAE****Life history**

Growth form: Herb, with opposite leaves and a slender taproot. Different from *S. marina* in northern Europe and possibly includes several unrecognised taxa (P. Adam pers. comm.).
Vegetative spread: No.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Pink, spring.
Fruit/seed: Capsule, with numerous brown–black seeds, mature at any time.
Dispersal, establishment & growth: Diaspore: seed.
Fire response: Killed.
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.
Botanical subregions: NC CC SC ST NWS CWS SWS NWP SWP NFWP SFWP; Vic., S.A., W.A.
Distribution Sydney area: Mainly estuarine and coastal.
Select locations: Parramatta (1881), Homebush Bay, Elizabeth Bay (1888), Bronte, Cooks River, Kurnell, Leppington, Five Islands, Albion Park, Mittagong.

Habitat

Habitat: Edges of saltmarshes, wetland.

Altitude: 0–700 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Saltmarsh, pasture, heath on headlands and rarely woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*.

Substrate: Sandy to clay soils mainly from alluvium but also on Wianamatta Shale and Hawkesbury Sandstone on headlands, medium nutrient, poorly-drained, saline. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Open sites exposed to salt spray.

Conservation

Conservation: Weed of estuarine habitats and occasionally of cultivation.

Spergularia rubra* **CARYOPHYLLACEAE**

Sandspurry

Life history

Growth form: Herb with opposite leaves.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Pink, spring.

Fruit/seed: Capsule, with numerous brown–black seeds, not winged.

Dispersal, establishment & growth: Diaspore: seed, mobile (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977).

Fire response:

Interaction with other organisms: Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Vic., Tas., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: Pennant Hills, Gladesville, Flemington, St Marys (1886), Glenfield, Camden, Bomaderry, Mt Victoria (1889), Katoomba, Hilltop, Burrawang.

Habitat

Habitat: Waste and disturbed ground.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Grassland.

Substrate: Clay soils from shale, alluvium, medium nutrient. Recorded on saline sites in western NSW (Semple 1993) and Lower Boro on the Southern Tablelands (Kodala & Foster 1990).

Exposure:

Conservation

Conservation: Common weed of waste and disturbed ground.

Spergularia* species *B**CARYOPHYLLACEAE****Life history**

Growth form: Herb with opposite leaves.

Vegetative spread:

Longevity: Annual–perennial.

Primary juvenile period:

Flowers: Pink, spring–summer.

Fruit/seed: Capsule 5–10 mm long, with numerous black, winged seeds.

Dispersal, establishment & growth: Diaspore: seed, probably wind-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC CWS SWS; Vic., Tas., S.A., W.A.

Distribution Sydney area: Coast south from Sydney Harbour.

Select locations: Royal Botanic Gardens (1900), Lake Illawarra, Minnamurra River (1905, 1970), Bass Point (M. Robinson pers. comm.).

Habitat

Habitat: Coastline and estuaries.

Altitude: 0–100 m **Annual rainfall:** above 1000 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Damp, alluvial soil, often brackish, also in vicinity of salt spray (Harden 1990).

Exposure:

Conservation

Conservation: Rare, conservation status unknown.

Stellaria angustifolia**CARYOPHYLLACEAE**

Swamp Starwort

Life history

Growth form: Weak, trailing, glabrous herb, often supported by other plants.

Vegetative spread: Yes (McIntyre et al. 1995).

Longevity: Perennial, medium?.

Primary juvenile period:

Flowers: White, September–December.

Fruit/seed: Capsule, with numerous seeds.

Dispersal, establishment & growth: Diaspore: seed, no particular dispersal morphology (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP; Qld, Vic., Tas., S.A.

Distribution Sydney area: Boyd Plateau, Southern Highlands.

Select locations: Boyd Plateau, Wingecarribee Swamp, Long Swamp (Kodela et al. 1992), Wildes Meadow (P. Kodela pers. comm.).

Habitat

Habitat: Widespread, swamps or wet places; upland mire (Kodela et al. 1992).

Altitude: 700–1200 m **Annual rainfall:** above 1000 mm

Typical local abundance: Rare–frequent (P. Kodela pers. comm.).

Vegetation: Sedgeland, restioid heaths, wet meadow, upland mires (P. Kodela p. c.).

Substrate: Peat.

Exposure: Semi-shade to full sun.

Conservation

Conservation: Conservation status unknown

Stellaria flaccida**CARYOPHYLLACEAE****Life history**

Growth form: Procumbent or ascending herb with trailing stems up to 1 m long, carpeting ground, scrambling over vegetation and up tree trunks to 1.2 m.

Vegetative spread: Adventitious roots from stems, may form dense mats.

Longevity: Indefinite.

Primary juvenile period:

Flowers: White, September–March.

Fruit/seed: Capsule with few reddish-brown seeds.

Dispersal, establishment & growth: Diaspore: seed / stem fragments that take root. Coloniser. May grow vigorously with spring to autumn rains to form dense mats. Shallow roots susceptible to trampling. Dies back in drier periods.

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST; Qld, Vic., Tas., S.A.

Distribution Sydney area: Hawkesbury–Nepean River, Illawarra coast and Southern Highlands.

Select locations: Putty, Kurrajong Heights, Nepean Gorge, Wallacia, Razorback, Waterfall, Jamberoo, Berry, Belmore Falls, Mt Wilson.

Habitat

Habitat: Sheltered sites, creekbanks.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Margins of, or light gaps within moist rainforest (P. Kodela p. c.) e.g. with *Doryphora sassafras*, *Ceratopetalum apetalum*, and dry rainforest, moist eucalypt forest along creeks.

Substrate: High nutrient soils on alluvium, basalt, volcanic necks, shale, occasionally sandstone boulders.

Exposure: Deep shade to mid-shade.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.

Stellaria media *

CARYOPHYLLACEAE

Common Chickweed

Life history

Growth form: Prostrate herb, with a slender taproot, spreading about 30 cm.

Vegetative spread: No.

Longevity: Short-lived, about 6 months.

Primary juvenile period: 2–3 months.

Flowers: White, self-pollinated, June–November, peak August.

Fruit/seed: Capsule 5–7 mm long, with 2–17 (mean 8.4) seeds, mature June–November. Seeds 0.8–1.3 mm diam., reddish brown, air dry weight 0.67±0.04 mg (Sobey 1981). Seeds released very quickly and plants die.

Dispersal, establishment & growth: Diaspore: seed, gravity-dispersed, animal-dispersed over longer distances in faeces of horses, cattle, sparrows (Sobey 1981). Soil-stored seedbank, 6–22% viability after 10 years burial; germination properties highly variable and seeds possess three forms of dormancy, innate: some seeds have after-ripening requirement, enforced: buried seeds remain dormant until conditions change, induced: seeds initially not possessing light requirement develop one during burial (Sobey 1981). Seedlings establish and grow vigorously in late winter to early spring, especially where moist.

Fire response: Plant killed, recruitment from seed and fruiting within 4 months of high intensity fire (at Lane Cove River 1/94, P. Kubiak pers. comm.).

Interaction with other organisms: Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).

Distribution

Status/origin: Naturalised exotic, native to N Hemisphere.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP SFWP; LHI, Qld, Vic., Tas., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: Wollombi Brook, Cheltenham, Centennial Park, Richmond (1903), Menangle Park, Jenolan Caves (1899), Cocks River.

Habitat

Habitat: Gardens, riverbanks.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: With short-lived weeds e.g. *Euphorbia peplus*, *Cerastium glomeratum*, *Romulea rosea*.

Substrate: Well-aerated, moist, but never water-logged, weakly acidic to alkaline, nitrogen-rich soils (Sobey 1981).

Exposure: Full sun.

Conservation

Conservation: Weed of cultivation and gardens, confined essentially to cultivated soils.

Stellaria pallida* **CARYOPHYLLACEAE**

Common Chickweed

Life history

Growth form: Prostrate herb, petals absent.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: White, spring.

Fruit/seed: Capsule with numerous seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: CC ST NWS; Vic., Tas., S.A.

Distribution Sydney area: Flemington.

Select locations: Flemington Saleyards (only record).

Habitat

Habitat: Saleyards.

Altitude: 0–100 m **Annual rainfall:** 1000 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Weed of cultivation, rarely recorded.

Stellaria pungens**CARYOPHYLLACEAE**

Prickly Starwort

Life history

Growth form: Prostrate or ascending herb.

Vegetative spread: Often mat-forming.

Longevity: ? medium

Primary juvenile period:

Flowers: White, August–December, peak November.

Fruit/seed: Capsule, with numerous seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: SC NT CT ST NWS CWS SWS; Vic., Tas., S.A.

Distribution Sydney area: Tablelands.

Select locations: Mt Toinhiny, Mt Cameron, Junction Reefs, Rydal, Jenolan Caves, Oberon, Kowmung River, The Peaks, Cordeaux Creek, Burrawang, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Shady places, steep slopes.

Altitude: 200–1200 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Moist tall open-forest e.g. with *Eucalyptus viminalis*, *E. radiata*, riverbank forest e.g. with *Casuarina cunninghamiana*.

Substrate: Clay loam on sandstone, slates, quartzite, conglomerates, often in rocky sites, high to low nutrient soils.

Exposure: Mid-shade, sheltered sites.

Conservation

Conservation: Conservation status unknown.

Vaccaria hispanica* **CARYOPHYLLACEAE**

Bladder Soapwort, Cow Soapwort

Life history

Growth form: Erect, glaucous herb, to 1 m high.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Pink, spring.

Fruit/seed: Capsule 7–10 mm long, with black seeds 2 mm diam. Old fruit persistent on stems.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: CC NT NWS CWS NWP SWP NFWP SFWP; Qld, Vic., S.A., W.A.

Distribution Sydney area: Casula.

Select locations: Casula (only record).

Habitat

Habitat: Railway line.

Altitude: 0–100 m **Annual rainfall:** 800–900 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Uncommon weed of wasteland and cultivated areas.

Allocasuarina diminuta* subsp. *diminuta**CASUARINACEAE****Life history**

Growth form: Dioecious or monoecious shrub or small tree 1–5 m high with branchlets to 23 cm long, with tooth-leaves 6–8.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Male and female flowers on same or different plants. Wind-pollinated (Turnbull & Martensz 1983).

Fruit/seed: Woody cone, 5–20 mm long, retained on plant. Seed (samara) winged.

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed short distance.

Fire response: May be some basal resprouting (L. Johnson pers. comm.).

Interaction with other organisms: Symbiotic relationship with actinomycete *Frankia* (L. Johnson pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: CT CC NWS CWS SWS NWP.

Distribution Sydney area: Capertee–Bathurst.

Select locations: Putty, Capertee, Winburndale, Yetholme, Perthville, Wambool, Berrima.

Habitat

Habitat: Eucalypt woodland.

Altitude: 800–1000 m

Annual rainfall: 600–800 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt woodland e.g. with *Eucalyptus rossii*, *E. goniocalyx*, and shrubs e.g. *Brachyloma daphnoides*, *Hakea sericea*, *Daviesia virgata*, *Acacia buxifolia*, *Acacia gunnii*.

Substrate: Soils from granite, shale, sandstone, infertile. Well-drained (L. Johnson p. c.).

Exposure: Light shade or full sun (L. Johnson pers. comm.).

Conservation

Conservation: Conservation status unknown.

Allocasuarina diminuta* subsp. *mimica**CASUARINACEAE****Life history**

Growth form: Shrub or small tree 1–2.5 m high with branchlets to 23 cm long, tooth-leaves 6–10.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Male and female flowers on the same plant or separate plants, female flowers throughout most of the year, male flowers March–August, wind-pollinated (Turnbull & Martensz 1983)

Fruit/seed: Cone, 5–20 mm long, with winged seeds 3–5 mm long, retained on plant for some time before being shed.

Dispersal, establishment & growth: Diaspore: winged seed, probably wind-dispersed locally, temporary seedstore on plant, probably no dormancy.

Fire response: Probably killed, regenerating from seed. 90% seed released within 1 week of fire (M. Dunlop pers. comm.).

Interaction with other organisms: Symbiotic relationship with actinomycete *Frankia* (L. Johnson pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area:

Select locations: Kingsford, Little Bay, Menai, Leura, Berrima, Bundanoon, Tallong.

Habitat

Habitat: Ridgetops, rises.

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–dominant.

Vegetation: Dry heath, and scrub e.g. with *Angophora hispida*, *Brachyloma daphnoides*, *Hakea sericea*, *Petrophile sessilis*, and woodland e.g. *Eucalyptus sclerophylla*, *E. radiata*, *E. mannifera*.

Substrate: Sand to sandy loam from sandstone, low-nutrient, well-drained soils.

Exposure: Full sun.

Conservation

Conservation: Rare and localised disjunct populations. Populations at Kingsford and Menai are vulnerable; likely to be adequately conserved in Blue Mountains. Conservation status for other populations unknown.

Allocasuarina distyla**CASUARINACEAE**

Scrub She-oak

Life history

Growth form: Single-stemmed shrub 1–3 m high, with 6–8 tooth-leaves, dioecious, sometimes hybridizes with *A. littoralis*.

Vegetative spread: No.

Longevity: 25–40 years.

Primary juvenile period: 7–9 years (Parnell & Myerscough 1993).

Flowers: Male and female flowers on different plants, wind-pollinated, male flowers April–October, female flowers July–December.

Fruit/seed: Woody cone 13–35 mm long, retained on plant for its lifetime, though seed viability is lost after 13 years; youngest seed is near stem apex, older seed is progressively down stem (Parnell & Myerscough 1993). Winged seeds 4–8 mm long, dark brown to black, released when stem dies generally after fire. In long-unburnt stands there is a light seed rain from the canopy (about 1 viable seed/m²/week) but no successful seedling recruitment from these (Parnell 1995).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed locally (Westoby et al. 1990). Germinates without treatment. Seed viability declines from 60% to less than 10% within about 12 years after seed set due to insect and fungal attacks and senescence (Parnell & Myerscough 1993). Some seed, still viable, dispersed from older cones on live branches but recruitment fails in absence of fire, limited by poor light, competition for resources and ant predation of seed; litter may enhance recruitment of seedlings by conserving soil moisture; most successful recruitment after late summer fires (Pannell 1995).

Fire response: Killed by fire (Parnell & Myerscough 1993) in the Sydney area, but basal sprouts evident 3–4 years after fire at Myall Lakes (Fox pers. comm.). Generally vigorous seedling establishment from seed store in cones on plants released after fire.

Interaction with other organisms: Root nodules of type produced by actinomycete *Frankia* reported (Torrey 1983). Seedlings apparently eaten by rabbits (at Lane Cove, P. Kubiak p. c.). Seed harvesting by ants is seasonally related, inactive during wet/cold weather (Pannell 1995). Jewel Beetle *Paracephala cyaneipennis* recorded breeding in galls on brachches (Hawkeswood 1982).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST; Vic.

Distribution Sydney area: Mainly coast and Blue Mountains.

Select locations: Killcare, West Head, Berowra, Middlecove, North Head, La Perouse, Helensburgh, Coalcliff, Woodford, Katoomba, Newnes Plateau, Bonnum Pic, Carrington Falls, Bundanoon.

Habitat

Habitat: Plateaus and exposed hillsides.

Altitude: 0–1200 m

Annual rainfall: 700–1400 mm

Typical local abundance: Frequent–dominant.

Vegetation: Sea cliff scrub e.g. with *Acacia sophorae*, *Banksia aemula*; heath e.g. with *Banksia ericifolia*, *Hakea dactyloides*, *Calytrix tetragona*; woodland e.g. with *Eucalyptus gummiifera*, *E. sieberi*, *E. piperita*, *E. haemastoma*, *E. sclerophylla*.

Substrate: Sandy soil over sandstone, occasionally gravelly clay, well-drained, low-nutrient soils.

Exposure: Full sun, exposed to wind. Seedling recruitment limited by low light (Parnell 1995).

Conservation

Conservation: Probably adequate.

Allocasuarina glareicola**CASUARINACEAE****Life history**

Growth form: Erect to decumbent dioecious or monoecious shrub to 1–2 m high with 5–7 tooth-leaves, forming small thickets.

Vegetative spread: Plants have ability to root-sucker up to 3 m from parent but these do not appear to be supported by feeder root systems so that spread is still confined by the central plant's feeding system (K. Wilson pers. comm.).

Longevity: Indefinite.

Primary juvenile period:

Flowers: October. Male flowers may appear several seasons before female flowers (K. Wilson pers. comm.).

Fruit/seed: Woody cones 10–13 mm long releasing seed when stem dies e.g. after breakage, fire. Winged seed (samara) 3–3.5 mm long.

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed locally. Probably no dormancy. Short term seed store in canopy.

Fire response: Resprouts from base and root-suckers.

Interaction with other organisms: Symbiotic relationship with actinomycete *Frankia* (L. Johnson pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: CC.

Distribution Sydney area: Very localised populations between Penrith and Windsor.

Select locations: Castlereagh SF, Spence Rd (Berkshire Park), Agnes Banks.

Habitat

Habitat: Flat to gently sloping land with eucalypt woodland.

Altitude: 50 m

Annual rainfall: 800 mm

Typical local abundance: Rare.

Vegetation: Woodland of *Angophora bakeri* and *Eucalyptus sclerophylla* with heathy understorey.

Substrate: Yellow clay soils on Tertiary alluvial deposits. Sandy topsoil. Low-nutrient soil. Watertable mostly low, moisture supply intermittent, fresh.

Exposure:

Conservation

Conservation: Local endemic species coded 2E on national rare species list (ROTAP 1995), only three pops are known with a total of approximately 50 plants. One is in Castlereagh State Forest, the others may be built on ultimately. Long term conservation is not guaranteed. Vulnerable in Western Sydney (Benson & McDougall 1991).

Allocasuarina gymnanthera**CASUARINACEAE****Life history**

Growth form: Shrub or small tree 2–5 m high, with 6–9 tooth-leaves, dioecious.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Male and female flowers on different plants, wind-pollinated (Turnbull & Marntenz 1983).

Fruit/seed: Cone 14–40 mm long with winged seeds 4.5–7.0 mm long, dark brown to black.

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed locally.

Fire response:

Interaction with other organisms: Symbiotic relationship with actinomycete *Frankia* (L. Johnson pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: NC CT NWS CWS.

Distribution Sydney area: Glen Davis.

Select locations: Glen Davis.

Habitat

Habitat: Talus slopes below sandstone cliffs.

Altitude: 300 m

Annual rainfall: 600 mm

Typical local abundance: Rare.

Vegetation: Open-forest with *Eucalyptus punctata*, *E. fibrosa*, *Callitris endlicheri*.

Substrate: Skeletal soils on sandstone, low nutrients.

Exposure:

Conservation

Conservation: Rare, local disjunct population.

Allocasuarina littoralis**CASUARINACEAE**

Black Sheoak

Life history

Growth form: Small tree 6–15 m high, with rough bark, branchlets mostly erect, with 5–9 tooth-leaves. Root nodulation variable, influenced by environmental factors (Anon 1984).

Vegetative spread: No.

Longevity: 25–50 years.

Primary juvenile period: 3–5 years.

Flowers: Male and reddish female flowers usually on different plants. Female flowers April–October, male flowers April–August. Wind-pollinated.

Fruit/seed: Woody cone 10–30 mm long with winged seeds 4–10 mm long, retained on plant for some time before being shed. Mean seed weight 2.1 mg, mean number of seeds per kg 480,000 (Turnbull & Martensz 1983). Seeds exude copious mucilage when wet (M. Dunlop pers. comm.).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed (Westoby et al. 1990). Germinates without treatment, temporary seedbank on plant but no soil-stored seedbank. Germination more than 50% in 10 days with or without light at 15–39°C, 68% 12-hours light, 9% no light, at 7°C (after 51 days) (Turnbull & Martensz 1983). Can establish from seed in absence of disturbance possibly due to tolerance of shade and drought (Ladd 1988). Seedlings moderately resistant to salinity (Clemens et al. 1983). Common coloniser of disturbed soil. Seedlings found regenerating under adult plants in bush unburnt for 23 years at Elouera and young plants 30 cm high recorded in bush unburnt for 13 years at Field of Mars (D.H.B.). Appears to attain dominance in areas unburnt for long periods.

Fire response: Generally killed and re-established from seed released from cones; 90% seed released within 1 week of fire (M. Dunlop pers. comm.). Some resprouting after high-intensity fire 1/1994 — slowly from base at 4 months post-fire at Narrabeen, from young plant with 1 season's cones at Mona Vale (L.McD.). Larger plants mostly killed by high intensity fire (1/94 at Lane Cover River), smaller plants tend to resprout, mostly from base, but some from stem; one resprouting plant with flowers 2 yrs 8 mths after moderate intensity September fire (P. Kubiak pers. comm.).

Interaction with other organisms: Root nodules of type produced by actinomycete *Frankia* (Torrey 1983). Fungus *Phytophthora cinnamomi* reported causing root rot and dieback (Titze & Pennen 1983). Seedlings fed upon by rabbits; a medium-sized plant possibly killed by rabbits feeding on resprouting shoots (indirect observation, P. Kubiak pers. comm.). First-class fuel, widely used in the past for shingles, handles, rough furniture and farm buildings (Doran & Hall 1983). Medium importance as source of pollen for honey bees (Clemenson 1985). Host plant of Cerambycid beetles *Coptopterus decoratus*, *Phacodes personatus* (Hawkeswood 1993).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS NWP; Qld, Vic., Tas.

Distribution Sydney area: Widespread.

Select locations: Howes Valley, Kincumber, Hornsby, Heathcote, Holsworthy, Bomaderry, Bilpin, Castlereagh, Bargo, Yerranderie, Wentworth Falls, Capertee, Wombeyan Caves.

Habitat

Habitat: On hillsides, dry ridges and rocky sites. Also hind-dunes (L. Johnson pers. comm.).

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt forest, woodland and scrub e.g. with *Eucalyptus gummifera*, *E. punctata*, *Angophora costata*, *Eucalyptus piperita*, *E. maculata*, *E. tereticornis*.

Substrate: Sandy soil on sandstone, sometimes with shale influence, also in quartzite, shale, low-nutrient soils, well-drained. Not on limestone or basalt (L. Johnson pers. comm.).

Exposure: Full sun to mid shade. Tolerates 70 frosts per year (Anon 1984).

Conservation

Conservation: Generally well conserved in the Sydney area. Conserved in Western Sydney (Benson & McDougall 1991). One of the most plentiful *Casuarina* species in Australia, in the widest range of latitudes, and in widely varying climates, mainly within 100 km of the sea from northern tip of Queensland to Tasmania (L. Johnson pers. comm.).

Allocasuarina luehmannii**CASUARINACEAE**

Bullock

Life history**Growth form:** Tree 5–15 m high, with 10–14 tooth-leaves.**Vegetative spread:** Produces suckers from shallow, thickened lateral roots (Torrey 1983).**Longevity:****Primary juvenile period:****Flowers:** Male and female flowers on different plants. Wind-pollinated (Turnbull & Martensz 1988).**Fruit/seed:** Cone 5–12 mm long, with winged seed (samara) red-brown 4.5–5.0 mm long.**Dispersal, establishment & growth:** Diaspore: winged seed, wind-dispersed locally.

Temporary seedstore on plant. Can establish from seed in absence of disturbance possibly due to tolerance of shade and drought (Ladd 1988).

Fire response:**Interaction with other organisms:** Symbiotic relationship with actinomycete*Frankia* (L. Johnson pers. comm.).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., S.A.**Distribution Sydney area:** Glen Davis.**Select locations:** Glen Davis.**Habitat****Habitat:** Talus slopes below sandstone cliffs.**Altitude:** 300 m **Annual rainfall:** 600 mm**Typical local abundance:** Rare.**Vegetation:** Open-forest with *Eucalyptus punctata*, *E. fibrosa*, *E. sideroxylon*, *E. microcarpa*, *Callitris endlicheri*.**Substrate:** Sandy clay soils, non-calcareous, well-drained, low nutrients. Reported to withstand some seasonal inundation (Doran & Hall 1983), but this would be most unusual and is certainly not characteristic in the area covered here (L. Johnson pers. comm.).**Exposure:** Full sun.**Conservation****Conservation:** Rare, local disjunct population. Conservation status unknown.***Allocasuarina nana*****CASUARINACEAE**

Forest Oak

Life history**Growth form:** Low spreading shrub 1–2 m high, with 4–6 tooth-leaves.**Vegetative spread:** No.**Longevity:** ? 50–100 years.**Primary juvenile period:** Usually more than 7–9 years (Parnell & Myerscough 1993).**Flowers:** Male and female flowers usually on different plants. Female flowers July–March, peak October, male flowers July–October, peak August–September. Wind-pollinated.**Fruit/seed:** Woody cone, 14–24 mm long, retained on plant for its lifetime, winged seed (samara) released; when stem dies. Younger cones are formed closer to stem apices than older ones (Parnell & Myerscough 1993). Canopy-stored seedbank, no soil-stored seedbank.**Dispersal, establishment & growth:** Diaspore: winged seed, wind-dispersed locally, germinates without special treatment. Initial seed viability of 40%, declines to less than 10% within 12 years after seed set due to insect and fungal attacks and senescence (Parnell & Myerscough 1993). Some seed, still viable, dispersed from older cones on live branches but recruitment fails in absence of fire, limited by poor light, competition for resources and ant predation of seeds; litter may reduce recruitment, seedlings dying before radicles reach the soil, the small seeds lacking reserves for initial growth (Pannell 1995). Sticky mass released on germination of seed, possibly evolutionary adaptation to dry conditions (Torrey 1983).**Fire response:** Stems killed, resprouts with multiple stems from lignotuber (Parnell & Myerscough 1993). Seeds shed from burnt cones after fire.**Interaction with other organisms:** Root nodules of type produced by actinomycete *Frankia* (Torrey 1983). Seed harvesting by ants is seasonally related, inactive during wet / cold weather (Parnell 1995).

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT ST; Vic.

Distribution Sydney area: Mainly higher parts of Blue Mountains, sporadic localised populations on coast.

Select locations: Cowan, Terrey Hills, Long Bay, Bundeena, Coalcliff, Macquarie Pass, Coricudgy, Newnes Junction, Mt Wilson, Mt Victoria, Kanangra Tops, Berrima, Penrose, Barren Grounds.

Habitat

Habitat: Exposed situations such as ridges, cliff faces.

Altitude: 0–1200 m **Annual rainfall:** above 1200 mm

Typical local abundance: Frequent–dominant.

Vegetation: Common species in montane heath, often with *Eucalyptus stricta*, *E. sieberi*, *Leptospermum trinervium*, *Banksia ericifolia*.

Substrate: Sandy skeletal soils from sandstone, infertile, well-drained.

Exposure: Full sun, often windswept sites. Seedling recruitment limited by low light (Parnell 1995).

Conservation

Conservation: Probably well conserved generally, though isolated coastal populations may need protection. Small populations on coast (e.g. Terrey Hills) may be indicative of wider past occurrence.

Allocasuarina paludosa**CASUARINACEAE****Life history**

Growth form: Spreading shrub 0.3–3 m high, with tooth-leaves erect, spreading, often withering.

Vegetative spread: No.

Longevity: More than 60 years (D. Keith pers. comm.).

Primary juvenile period:

Flowers: Male and female flowers on same or different plants, July–December.

Fruit/seed: Cone 10–18 mm long, with winged seed 3.5–5.0 mm long, dark brown–black.

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed locally. Temporary seedstore on plant. Seeds germinate without treatment. Can establish from seed in absence of disturbance possibly due to tolerance of shade and drought (Ladd 1988).

Fire response: Resprouts (D. Keith pers. comm.).

Interaction with other organisms: Symbiotic relationship with actinomycete *Frankia* (L. Johnson pers. comm.). Fungus *Phytophthora cinnamomi* reported causing root rot and dieback (Titze & Pennen 1983).

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT ST; Vic., Tas., S.A.

Distribution Sydney area: Coast and Southern Highlands.

Select locations: Bilgola, Narrabeen Head, Kurnell, Maddens Plains, Berrima, Medway, Butlers Swamp, Carrington Falls, Budderoo Track, Hanging Rock Swamp, Bundanoon, Penrose.

Habitat

Habitat: Poorly-drained heath, woodland.

Altitude: 0–800 m **Annual rainfall:** above 900 mm

Typical local abundance: Occasional.

Vegetation: Heath above swamps e.g. with *Hakea teretifolia*, *Banksia oblongifolia*, *Aotus ericoides*, restioid heath (Keith 1994), headland, and grassland/heath e.g. with *Themeda australis*, edge of woodland e.g. with *Eucalyptus radiata*, *E. mannifera*, *E. sieberi*, *E. macarthurii*.

Substrate: Sandy soil on sandstone, Narrabeen Shales, poorly-drained, low-nutrient soils.

Exposure:

Conservation

Conservation: Uncommon in Sydney region (Keith 1994). Broken Bay is northern geographical limit. Populations at Pittwater and Penrose need protection.

Allocasuarina portuensis**CASUARINACEAE****Life history**

Growth form: Slender, dioecious shrub 3-5 m high, with 7-8 spreading tooth-leaves, often withering.

Vegetative spread: No.

Longevity: ? 25 years.

Primary juvenile period: 4 years (M. Matthes pers. comm.).

Flowers: Separate male and female plants, male plants flower June/July, female plants flower July/August. Some cultivated plants show both male and female characteristics, with one sex predominating around the 2nd year of flowering (Matthes & Nash 1994).

Female flowers within 18 months of germination (in cultivation A. Lewis pers. comm.).

Fruit/seed: Cone with winged seed 4-5 mm long.

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed locally. Seed germinates without treatment. No seedlings observed on site possibly due to lack of suitable conditions such as fire, light and space of seedling establishment (Matthes & Nash 1994).

Fire response: Single-stemmed plants probably killed by fire, last fire probably 1965-70, and this may be the reason for lack of recruitment (Matthes & Nash 1994).

Interaction with other organisms: Symbiotic relationship with actinomycete *Frankia* (L. Johnson pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: CC.

Distribution Sydney area: Nielsen Park.

Select locations: Nielsen Park.

Habitat

Habitat: Sheltered slope of harbourside headland.

Altitude: 0-50 m **Annual rainfall:** 1200 mm

Typical local abundance: Rare.

Vegetation: Tall closed shrubland with *Glochidion ferdinandi* and *Pittosporum undulatum* with exotic weeds.

Substrate: Low-nutrient, shallow, sandy soil on Hawkesbury Sandstone.

Exposure:

Conservation

Conservation: Local endemic species known only from one location within Sydney Harbour NP. Vulnerable because population is small, only 2 female plants in 1994 (Matthes & Nash 1994). Coded 2ECit on national rare species list (ROTAP 1995). Since 1986 additional plantings have been made nearby with 59 surviving in 1994 (Matthes & Nash 1994).

Allocasuarina torulosa**CASUARINACEAE**

Forest Oak

Life history

Growth form: Slender tree to 25 m high with corky, rough bark and slender drooping angular branchlets, tooth-leaves 4 or 5.

Vegetative spread: No.

Longevity: Long, ? 50-100 years.

Primary juvenile period:

Flowers: Male and female flowers usually on separate plants. March-September, peak April. Wind-pollinated.

Fruit/seed: Woody cone, 15-33 mm long, retained on plant for some time, (recorded December, March-January) then dropped, winged seeds 6 mm long. Mean seed weight 5.04 mg seeds, mean number of seeds per kg 200,000; seed viability 45% pre storage, 39% viability after 18 years storage (Turnbull & Martensz 1983).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed (Westoby et al. 1990), probably no dormancy, temporary seed-store on plant. Germination more than 50% in 7 days with or without light at 17-38°C, no germination at 7°C (after 51 days) (Turnbull & Martensz 1983). Can establish from seed in absence of disturbance possibly due to tolerance of shade and drought (Ladd 1988).

Fire response: Slow to resprout from base, trunk and limbs — 3 months after high intensity fire 1/1994 Illawong Bay and Katandra (L.McD.) and after high-intensity fire at Narrabeen 1994. Resprouted from base, St Albans 1994 (E. Ashby pers. comm.). Resprouted from trunk and branches after high intensity fire (1/94 at Lane Cove River and Narrabeen Lake), seeds released from cones on tree after fire (P. Kubiak pers. comm.). Re-establishes from seed released from cones after fire.

Interaction with other organisms: Fungi reported on plant, *Fomes robustus* (as white pocket rot), *Phellinus noxius* (as brown rot of stems and trunks) (Titze & Pennen 1983). Root nodules of type produced by actinomycete *Frankia* reported (Torrey 1983). Host plant of Cerambycid beetle *Coptopterus cretifer* (Hawkeswood 1993). Highly rated fuel for bakers ovens in the past, still used for flooring, small cabinet work, turning etc., and for shingles in restoration of historic buildings (Doran & Hall 1983). Provides small quantities of pollen for honey bees (Clemenson 1985).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT NWS CWS; Qld.

Distribution Sydney area: Widespread, coastal hills and ranges.

Select locations: Yengo Creek, Mooney Money, Lower Hawkesbury, Newport, Pennant Hills, Abbotsbury, Nortons Basin, The Oaks, Nattai, Royal National Park, Macquarie Pass.

Habitat

Habitat: On hillsides, possible in response to clay influence.

Altitude: 0–900 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Understorey in tall open-forest e.g. with *Syncarpia glomulifera*, *Angophora floribunda*, *Eucalyptus piperita*, *E. pilularis* or dry open-forest e.g. with *Eucalyptus crebra*, *E. punctata*.

Substrate: Sandstone and shale/sandstone transition, clayey soils, with moderate fertility.

Higher nutrient soils and moister situations than *Allocasuarina littoralis*. Watertable permanently low, moisture supply intermittent, fresh. Well-drained (A. Bofeldt pers. comm.).

Exposure: Light shade.

Conservation

Conservation: Southern limit is Minnamurra River area (Fuller & Mills 1985). Probably adequately conserved generally.

Allocasuarina verticillata

CASUARINACEAE

Drooping Sheoak

Life history

Growth form: Small tree 4–10 m high, with 9–13 tooth-leaves.

Vegetative spread: Trees coppice vigorously from cut stumps; likely to produce thickets of suckers, where tree is lopped for fodder during drought little regeneration found (Anon 1984).

Longevity:

Primary juvenile period:

Flowers: Male and female flowers on separate plants, April–August.

Fruit/seed: Cones 10–20 mm long with winged seeds 5–6 mm long. Mean seed weight 4.04 mg, mean number of seeds per kg 260,000; seed viability 58% pre storage, 50% viability after 16 years storage (Turnbull & Martensz 1983).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed locally. Temporary seedstore on plant. Germination more than 50% in 11 days with or without light at 11–37° C, 95% 12-hours light, 84% no light, at 7° C (after 51 days) (Turnbull & Martensz 1983). Sticky mass released on germination of seed, possibly evolutionary adaptation to dry conditions (Torrey 1983). Height growth for first 3–5 years usually excellent but needs to be protected from browsing animals, mature tree tolerates lopping (Doran & Hall 1983).

Fire response: Killed, can only regenerate from short-lived seeds (Ladd 1988).

Interaction with other organisms: Seed eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993). Root nodules of type produced by actinomycete *Frankia* reported (Torrey 1983), symbiotic relationship with *Frankia* (L. Johnson pers. comm.). Fungi *Armillaria luteo-bubalina* (as root rot), *Fomes rimosus* and *F. setulosus* (wood rot), *Fuscoporia cryptacantha* (as white rot of timber and stems), *Hexagona decipiens* (as wood rot and wound parasite), *Phellinus badius* and *Poria subweirii* (wood rot), *Phytophthora cinnamomi* reported causing root rot and dieback (Titze & Pennen 1983). Useful fodder plant, attractive to stock, provides excellent fuel, useful for turning, durability as fence posts, formerly used for bullock yokes, wheel spokes, tool handles and shingles (Doran & Hall 1983).

Status/origin: Native.

Botanical subregions: CC SC CT ST CWS SWS NWP SWP; Vic., Tas., S.A.

Distribution Sydney area: Coast and west of area.

Select locations: Upper Burragorang, Bungan Head, Kurnell, Garie Beach, Coalcliff, Bombo, Capertee Valley, Glanmire, Hill End, Mt Jellore, Wombeyan Caves.

Distribution

Habitat: Rocky sea cliffs and dry inland ridges.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Coastal woodland e.g. with *Eucalyptus botryoides*, *Leptospermum laevigatum*, *Banksia integrifolia*; tablelands grassy woodland e.g. with *Eucalyptus dealbata*.

Substrate: Found on wide variety of rock types from basalt to granite and calcarenite with wide range of pH (Ladd 1988). Clay soils on Narrabeen shales, shallow stony soils on conglomerate, igneous rocks, diorite. Generally poor soils (Doran & Hall 1983).

Exposure: Exposed, full sun.

Habitat

Conservation: Coastal populations e.g. Bungan, vulnerable because of small size. Status of other populations unknown.

Conservation

Casuarina cunninghamiana subsp. *cunninghamiana*

CASUARINACEAE

River Oak, River Sheoak

Life history

Growth form: Dioecious tree 15–35 m high.

Vegetative spread: No.

Longevity: Long, 50–100 years.

Primary juvenile period: 3–5 years.

Flowers: Male and female flowers on different trees. Probably wind-pollinated.

Fruit/seed: Cones 6–9 mm long, with winged seeds, shed at maturity, probably March–June. Very limited, temporary seedstore on plant. Seed, pale brown or greyish with a hard coat, without a gelatinous layer, mean seed weight 0.56 mg, mean number of seeds per kg 1,800,000 (Turnbull & Martensz 1983).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed, water-dispersed, probably no dormancy or soil-stored seed. Germination 44–55% in 28–42 days at 20–30° C alternating temperature with 16-h light exposure, no germination at 7° C, at least 50% 12-h light in 2 days (25–35° C) to 13 days (13–37° C), no germination 24-h dark (Turnbull & Martensz 1983), report of 30–85% in 27–42 days (Torrey 1983). Coloniser. Can establish from seed in absence of disturbance possibly due to tolerance of shade and drought (Ladd 1988). Pioneer of disturbed sites, with fast initial growth rate and root nodulation, successful establishment probably dependent on nitrogen fixation (Reddell et al. 1986). Likely to turn chlorotic on highly calcareous soils; seedlings susceptible to browsing damage (Anon 1984).

Fire response: Killed.

Interaction with other organisms: Hybridizes naturally with *C. glauca* where their ranges meet along coastal rivers e.g. Wisemans Ferry–Lower Portland. Root nodulation and nitrogen fixation association with actinomycete *Frankia* (Reddell et al. 1986) (Torrey & Racette 1989). Fungus *Phytophthora cinnamomi* reported on plant (Titze & Pennen 1983). Foliage can be eaten by stock during drought; suitable for ornamental planting; formerly timber used for shingles and bullock yokes and fuel for bakers' ovens (Doran & Hall 1983).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld.

Distribution Sydney area: Nepean–Hawkesbury River and other river systems.

Select locations: Wisemans Ferry, Upper Colo, Penrith, Macquarie Rivulet, Kangaroo River, Berry, Glen Davis, Coxs River, Kowmung River, Abercrombie River, Fish River.

Habitat

Habitat: Banks of freshwater, generally perennial, streams.

Altitude: 0–700 m **Annual rainfall:** above 700 mm

Typical local abundance: Dominant.

Vegetation: Riparian forest and scrub e.g. with *Acacia floribunda*.

Substrate: Alluvial sand and silt from shale, sandstone, limestone, low to moderate fertility.

Watertable permanently high, moisture supply continuous, fresh. Withstands periodic inundation, moderately resistant to salinity (Clemens et al. 1983), not as salt-tolerant as *C. glauca* (Anon 1984) and characteristically absent when salinity is high (L. Johnson p. c.).

Exposure: Light shade to no shade. Can tolerate up to 50 frosts per year (Doran & Hall 1983).

Conservation

Conservation: Valued for ornamental planting, shade, and particularly for protection of streambanks from erosion — must not be felled without a permit (Anon 1984). Conserved in Western Sydney (Benson & McDougall 1991).

Casuarina glauca**CASUARINACEAE**

Swamp Oak

Life history

Growth form: Tree to 10 m, occasionally to 20 m high, also occurs as shrub 2 m high on exposed headlands.

Vegetative spread: Capable of root suckering to form small groves.

Longevity: Long, 100–200 years, promoted by suckering ability, clumps at Royal Botanic Gardens date back to pre-European times.

Primary juvenile period:

Flowers: Male and female flowers on separate plants, August–September, wind-pollinated.

Fruit/seed: Cones 8–20 mm long, retained on tree January–September. Winged seed, pale brown or greyish with a hard coat, without a gelatinous layer; mean seed weight 0.58 mg, mean number of seeds per kg 1,760,000; seed viability 62% pre storage, 48% viability after 14 years storage (Turnbull & Martensz 1983).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed, water-dispersed, buoyant for more than 3 months in both tapwater and seawater. Seeds germinate without special treatment, 8% germination in darkness, 36% in continuous light (Clarke & Hannon 1971). Germination at least 50% without light in 11–17 days at 13–23° C and with 12-hours light 7–17 days at 15–26° C, germination rate retarded without light, no germination at 7° C (Turnbull & Martensz 1983). Seeds fail to germinate in the presence of salt; seedlings have no salt requirement and grow well in nutrient solution (Clarke & Hannon 1970). Seedlings moderately resistant to salinity (Clemens et al. 1983). Litter layer reduces germination of *Casuarina* and *Juncus* seedlings by providing physical difficulties, but there is no evidence for phytotoxic substances (Clarke & Hannon 1971). Coloniser of disturbed sites, with fast initial growth rate and root nodulation, successful establishment is probably dependent on nitrogen fixation (Reddell et al. 1986). Regenerates vigorously from root suckers (Doran & Hall 1983) (Torrey 1983), and cut stumps (Churchill 1983).

Fire response: Resprouts or rootsuckers. Resprouted from trunk and branches after high intensity fire (1/94 at Lane Cove River and Narrabeen Lake, P. Kubiak pers. comm.).

Interaction with other organisms: Hybridizes naturally with *C. cunninghamiana* where their ranges meet along coastal rivers e.g. Wisemans Ferry to Lower Portland (Harden 1990). Host to epiphytic orchid *Dendrobium teretifolium*. Host plant of longicorn beetle *Euryynassa australis* (Hawkeswood 1992b). Root nodulation and nitrogen fixation association with actinomycete *Frankia* (Reddell et al. 1986), mycorrhizal association (Torrey 1983). Fungi reported on plant: *Capnodium anonae* and *C. salicinum* (forming a sooty mould on foliage (Titze & Pennen 1983). Timber hard, strong and durable with very attractive grain, useful for tool handles, furniture etc. (Churchill 1983). Introduced to Haiti for soil stabilisation and for fuel and poles, also Florida as ornamental and windbreak but now a pest due to prolific suckering, crowding out native species, and air-borne pollen suspected to cause respiratory problems (Anon 1984).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CWS; Qld.

Distribution Sydney area: Mainly coastal estuaries, but also along sluggish creeks in western Sydney.

Select locations: Cooranbong, Pearl Beach, Wisemans Ferry, Mona Vale, Homebush Bay, Cooks River, Port Hacking, Lake Illawarra, Quakers Hill, Campbelltown, Kemps Creek.

Habitat

Habitat: Swampy estuarine flats and near creeks with brackish water.

Altitude: 0–100 m **Annual rainfall:** above 700 mm

Typical local abundance: Dominant.

Vegetation: Often in pure stands, adjacent to saltmarsh or mangroves.

Substrate: Alluvial soils from shale and sandstone, moderate nutrients, watertable mostly high, often within 30 cm of surface. Indicative of brackish conditions, and saline ground water (on Cumberland Plain).

Exposure: Full sun, seedlings have high light requirement Tolerant to isolated exposure in strong winds (Churchill 1983).

Conservation

Conservation: Used extensively in horticultural and landscape plantings where it provides good growth on a variety of soils. [Can be propagated from root cuttings (Churchill 1983)]. Conserved in Western Sydney (Benson & McDougall 1991) and elsewhere.

Apatophyllum constablei**CELASTRACEAE****Life history**

Growth form: Diffuse, many-branched, glabrous shrub to 40 cm high. Bark spongy on older branches, waxy coating on young branches (Jones & Vollmer 1994).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Greenish cream, solitary, August–December (Jones & Vollmer 1994).

Fruit/seed: 1–2-seeded capsule 4–5 mm long. Seeds 3 mm long, dark brown, with an aril, mature August–January (Jones & Vollmer 1994).

Dispersal, establishment & growth: Diaspore: seed. Appears to be very slow-growing; may respond to disturbance by regenerating from rootstock (Jones & Vollmer 1994).

Fire response: Probably sensitive to moderate–high intensity fires (Jones & Vollmer 1994).

Interaction with other organisms: Seed eaten by larvae of moth, Yponomeutidae family (Jones & Vollmer 1994).

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT.

Distribution Sydney area: Glen Davis area.

Select locations: Glen Davis, Gaspers Mountain, Glen Alice area (Jones & Vollmer 1994).

Habitat

Habitat: Foot of sandstone cliffs.

Altitude: 500–800 m **Annual rainfall:** 600–700 mm

Typical local abundance: Occasional.

Vegetation: Dry open-forest e.g. with *Eucalyptus piperita*, *E. sparsifolia*, *E. punctata*, *Angophora costata*, *Callitris glaucophylla*, *Banksia serrata*.

Substrate: Skeletal, sandy soil over sandstone and talus.

Exposure:

Conservation

Conservation: Local Sydney area endemic with very small populations. Coded 2E on national rare species list (ROTAP 1995). Inadequately conserved in Wollemi National Park, recommended coding 2ECi on national rare species list (Jones & Vollmer 1994).

Cassine australis* var. *australis

CELASTRACEAE

Red Olive Plum

Life history

Growth form: Shrub or tree to 8 m high (to 15 m in Illawarra, M. Robinson pers. comm.), glabrous; leaves variable in shape, opposite, or occasionally alternate.

Vegetative spread: No.

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Pale green, not scented, September–December. Male and female flowers on different plants.

Fruit/seed: Bright red or orange–red, fleshy fruit, 15 mm diam. Mature March–November, peak April, with 1 or rarely 2, pointed seeds 8–12 mm diam., 1050–1800 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fleshy fruit, vertebrate-adapted dispersal (Westoby et al. 1990). Germination difficult and slow (A. Bofeldt pers. comm.), germination 20–30% in 7–26 months (Floyd 1989).

Fire response: Resprouts from base (M. Robinson pers. comm.).

Interaction with other organisms: Fruit eaten by Pied Currawong (M. Robinson p. c.).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CWS; Qld.

Distribution Sydney area: Mainly coastal.

Select locations: Mt Yengo, Grose Vale, Bouddi, Barrenjoey, Hurstville, Otford, Austinmer, Macquarie Pass, Bass Point, Jamberoo, Kiama, Cambewarra.

Habitat

Habitat: Littoral rainforest.

Altitude: 0–700 m

Annual rainfall: above 700 mm, mostly > 1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Littoral rainforest e.g. with *Glochidion ferdinandi*, *Alectryon subcinereus*, *Backhousia myrtifolia*, *Cissus antarctica*, *Acmena smithii*, *Diospyros australis*; dry rainforest e.g. with *Streblus brunonianus*, *Hymenophyllum flavum*; and open-forest e.g. with *Eucalyptus tereticornis*, *E. bosistoana*, *Syncarpia glomulifera*.

Substrate: Clay soils from shales, basalt, medium–high nutrient, well-drained.

Also coastal sands (M. Robinson pers. comm.).

Exposure: Mid shade to full sun (A. Bofeldt, M. Robinson pers. comm.).

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.

Celastrus australis

CELASTRACEAE

Staff Vine

Life history

Growth form: Small to tall woody climber.

Vegetative spread: No.

Longevity: More than 50 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Yellowish green, October–November. Male and female flowers on different plants.

Fruit/seed: Capsule 3–6 mm long. Seeds 3–4 mm long with a fleshy orange aril, January–June (to as late as August in Illawarra, A. Bofeldt pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, bird-dispersed, germinates easily, 1–3 months (A. Bofeldt pers. comm.).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST NWS CWS; Qld, Vic.

Distribution Sydney area: Widespread.

Select locations: Cattai Creek, Freemans Reach, Abbotsbury, Razorback, Mt Keira, Minnamurra Falls, Cambewarra, Mt Wilson, Mt Tomah, Jenolan Caves, Robertson, Wollondilly River.

Habitat**Habitat:** Rainforest.**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Moist rainforest e.g. with *Acmena smithii*, *Doryphora sassafras*, and dry rainforest/vine thicket e.g. with *Streblus brunonianus*, *Cassine australis*, *Citriobatus pauciflorus*.**Substrate:** Loamy soils from shale, basalt, latite, medium–high nutrients. Budgong Sandstone, Bombo Latite member, Coal Measures in Illawarra (M. Robinson pers. comm.).**Exposure:** Full sun to shade (A. Bofeldt pers. comm.).**Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991), conserved in Illawarra.***Celastrus subspicata*****CELASTRACEAE**

Large-leaved Staff Vine

Life history**Growth form:** Climber with woody stems (A. Bofeldt pers. comm.).**Vegetative spread:** No.**Longevity:** Long-lived (A. Bofeldt pers. comm.).**Primary juvenile period:****Flowers:** Yellowish green, November–December. Male and female flowers on different plants.**Fruit/seed:** Capsule 5–9 mm long. Seeds 4–6 mm long, with a fleshy orange or yellow-green aril, February.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Killed (A. Bofeldt pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT; Qld.**Distribution Sydney area:** Campbelltown, Illawarra.**Select locations:** Campbelltown, Cambewarra.**Habitat****Habitat:** Dry vine scrub.**Altitude:** 0–200 m **Annual rainfall:** above 700 mm**Typical local abundance:** Rare.**Vegetation:** Dry vine scrub e.g. with *Aphanopetalum resinosum*.**Substrate:** Calcareous sandstone, medium nutrients.**Exposure:****Conservation****Conservation:** Regionally rare in Illawarra region (Mills 1988) and possibly confused with *C. australis* (A. Bofeldt pers. comm.). Conservation status unknown.***Maytenus silvestris*****CELASTRACEAE**

Narrow-leaved Orangebark

Life history**Growth form:** Shrub to 4.5 m high, or sometimes a small tree.**Vegetative spread:** Suckers from roots forming colonies (in Illawarra, A. Bofeldt pers. comm.).**Longevity:** More than 30 years (A. Bofeldt pers. comm.).**Primary juvenile period:****Flowers:** Pale green, October–December.**Fruit/seed:** Orange capsule 3–8 mm long, with 1–4 seeds surrounded by an orange aril, mature December–September; 4,525 fruits and 27,000 seeds per kg (Floyd 1989).**Dispersal, establishment & growth:** Diaspore: seed, ant-adapted food body for dispersal (Westoby et al. 1990). Germinates easily, 3–10 weeks (A. Bofeldt pers. comm.).**Fire response:** Stems killed, resprouts from base.**Interaction with other organisms:**

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT NWS CWS; Qld.

Distribution Sydney area: Coast.

Select locations: Mt Kindarun, Kurrajong Heights, Wyong, Wamberal, Newport, Hornsby, Eastwood, Newington, Liverpool, Razorback, Douglas Park, Avondale, Wingello.

Habitat

Habitat: Gullies, rocky slopes, ridges.

Altitude: 0–800 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Moist eucalypt forest e.g. with *Eucalyptus saligna*, *E. pilularis*, *E. deanei*, *E. paniculata*, *Syncarpia glomulifera*, dry eucalypt forest e.g. with *Eucalyptus fibrosa*, Melaleuca swamp e.g. with *Melaleuca styphelioides*. Tall open-forest with rainforest understorey, rainforest/open-forest ecotone and dry rainforest (A. Bofeldt pers. comm.).

Substrate: Clay soil from Wianamatta Shale or shale-enriched sandstone, medium nutrients. Well-drained. On Coal Measures, Budgong Sandstone in Illawarra (A. Bofeldt pers. comm.).

Exposure: Mid-shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Yalwal Creek, Shoalhaven River is southern geographical limit (Mills 1988); rare, vulnerable, and not conserved in Illawarra (A. Bofeldt pers. comm.). Conserved in Western Sydney (Benson & McDougall 1991).

Ceratophyllum demersum**CERATOPHYLLACEAE**

Hornwort

Life history

Growth form: Submerged, unattached, rootless, aquatic perennial to 2 m long with whorled leaves. Finely divided basal stem branches (rhizoid shoots), can anchor the otherwise free-floating plant to the stream bed (Parsons & Cuthbertson 1992).

Vegetative spread: Stem fragments and thickened lateral tops sink to the mud and grow again under favourable conditions.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Greenish, very small, male and female flowers at different nodes, produced in summer, remain fully submerged (Parsons & Cuthbertson 1992). Fertilisation occurs underwater. Stamens separate from plant & float to surface, where pollen is released. Pollen sinks to stigmas of submerged female flowers (Sainty & Jacobs 1981).

Fruit/seed: Hard-skinned black, one-seeded nut, 4.5 mm long, with spines. Fruits sink to the bottom at maturity (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fruit, dispersed by water, sinks to bottom. Also dispersed vegetatively by stem fragments in water, and fruit with hooked spines attaches to birds/animals (Parsons & Cuthbertson 1992). Plant over-winters by thickened lateral tips (turions) that sink to the mud and grow again under favourable conditions; these dormant apices contain increased quantities of starch (Sainty & Jacobs 1981). In spring, new plants produced from axillary buds, and seedling plants, break free from the mud and float to surface; maximum growth rate occurs at 30° C with water depth 2.5–5 m, light intensity 5.5 kilolux (Parsons & Cuthbertson 1992). Grows Summer–winter (Sainty & Jacobs 1981). Covered 5.3 ha at Longneck Lagoon in summer 1977–78 and 1.6 ha in winter 1978 (Pressey 1979).

Fire response: Unlikely to be burnt.

Interaction with other organisms: Foodplant of Black Swan *Cygnus atratus*, Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons* and Freckled Duck *Stictonetta nervosa* (Barker & Vestjens 1989,1990). Oxygenates the water and provides food for aquatic herbivores; plant is rich in protein (23%) with a high calorific level, but potential value as stock food is reduced by high cost of drying and capacity to accumulate sodium, iron, arsenic and strontium (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SWS SWP; Qld, Vic., N.T., W.A., Eur, Asia, Afr., Amer.

Distribution Sydney area: Floodplain wetlands.

Select locations: Richmond, Longneck Lagoon, Wisemans Ferry, Lane Cove.

(Recorded at 7/18 Hawkesbury wetlands Pressey 1979).

Habitat

Habitat: Lagoons & swamps in static or slow moving water.

Altitude: 0–100 m **Annual rainfall:** 800–1200 mm

Typical local abundance: Frequent.

Vegetation: Submerged floating vegetation e.g. with *Hydrilla verticillata*, emergent *Eleocharis sphacelata*.

Substrate: In water to 10 m deep (0.5–1.5 m in Hawkesbury swamps). Generally favours slightly alkaline water & grows best when water is rich in nitrogen. Does not tolerate turbidity or salinity, flourishes in warm, gently flowing water (1 cm per second) at pH 7.6–8.8 (Parsons & Cuthbertson 1992).

Exposure: Sheltered situations, mid shade, tolerant of low light intensity.

Conservation

Conservation: Vulnerable. Few records from Hawkesbury area and susceptible to changes in water quality in swamps, particularly increased turbidity or salinity. Not recently reported from Longneck Lagoon.

Atriplex australasica**CHENOPODIACEAE****Life history**

Growth form: Herb to 40 cm high, with triangular, hastate lower leaves and upper ovate leaves, and shallow taproot.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Male and female flowers on same plant, green, April.

Fruit/seed: Fruiting bracteoles 5–6 mm long, enclosing seed, black, 1 mm diam., April–May.

Dispersal, establishment & growth: Diaspore: fruit, probably water-dispersed? Coloniser, autumn-growing.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC; Qld., Vic., S.A.

Distribution Sydney area: Mainly coastal.

Select locations: Gosford, Buffalo Creek, Woolloomooloo Bay, Nielsen Park, Coogee,

Botany Bay, Cooks River, Greystanes Creek, Carrs Park, Lake Illawarra, Shellharbour,

Minnamurra River.

Habitat

Habitat: Shoreline.

Altitude: 0–100 m **Annual rainfall:** above 800 mm

Typical local abundance: Rare–occasional.

Vegetation: Foreshore herbland, creekside vegetation e.g. with *Eucalyptus tereticornis*, *Melaleuca decora*.

Substrate: Estuarine alluvial soil, sandstone foreshores, clay soil from Wianamatta Shale.

Exposure: Full sun.

Conservation

Conservation: Conservation status unknown.

Atriplex cinerea

CHENOPODIACEAE

Grey Saltbush

Life history**Growth form:** Robust, silver-grey shrub, up to 1 m high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Male and female flowers on different plants.**Fruit/seed:** Fruiting bracteoles, 8–15 mm long, becoming woody at maturity to form a nut.**Dispersal, establishment & growth:** Diaspore: nut.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC; LHI, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Coastal.**Select locations:** Botany Bay, Five Islands.**Habitat****Habitat:** Near the sea.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Botany Bay is northern distributional limit, collected here by Joseph Banks in 1770. No recent collections, and now rare.***Atriplex eardleyae***

CHENOPODIACEAE

Life history**Growth form:** Erect herb to 30 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteole, 6–10 mm long.**Dispersal, establishment & growth:** Diaspore: fruiting bracteole.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic in Central Coast of NSW, but native to other areas of Australia.**Botanical subregions:** *CC NWP SWP NFWP SFWP; Qld, N.T, S.A., W.A.**Distribution Sydney area:** Flemington.**Select locations:** Flemington Saleyards (1968).**Habitat****Habitat:** Saleyard.**Altitude:** 0–100 m**Annual rainfall:** 1000 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Widespread in drier parts of the State. Probably introduced to Coast by stock. Only 1 record, naturalised, for Sydney area (at Flemington) and probably extinct there now.

Atriplex leptocarpa

CHENOPODIACEAE

Slender-fruit Saltbush

Life history**Growth form:** Spreading, to 30 cm high, monoecious.**Vegetative spread:****Longevity:** Short-lived perennial.**Primary juvenile period:****Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteoles cylindrical, 3.5–6 mm long.**Dispersal, establishment & growth:** Diaspore: fruiting bracteole.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic in Central Coast of NSW, but native to other areas of Australia.**Botanical subregions:** *CC NWS CWS NWP SWP NFWP SFWP; Qld, Vic., S.A., W.A.**Distribution Sydney area:** Flemington.**Select locations:** Flemington Saleyards (1968), Liverpool (1909).**Habitat****Habitat:** Saleyards.**Altitude:** 0–100 m**Annual rainfall:** 900–1000 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Widespread in drier areas of the State. Probably introduced to Sydney area with stock and now likely to be extinct there.***Atriplex patula* ***

CHENOPODIACEAE

Life history**Growth form:** Erect shrub to 1 m high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteoles to 10 mm long.**Dispersal, establishment & growth:** Diaspore: fruiting bracteole.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic.**Botanical subregions:** NC CC; Vic., N Hemi.**Distribution Sydney area:** Coastal.**Select locations:** Hornsby (1914), Oak Flats (Lake Illawarra 1993).**Habitat****Habitat:** High tide line of lake.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:****Vegetation:** With estuarine herbs e.g. *Suaeda australis*, *Bolboschoenus caldwellii*, *Chenopodium glaucum*.**Substrate:** Sand, low nutrient.**Exposure:****Conservation****Conservation:** Widespread in Northern Hemisphere but an uncommon introduction in NSW.

***Atriplex prostrata* ***

CHENOPODIACEAE

Life history**Growth form:** Bushy herb to 80 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteole 5–6 mm long, red, but finally black.**Dispersal, establishment & growth:** Diaspore: ?, wind-dispersed (Carr et al. 1992).**Fire response:** Killed by high intensity fire (1/94 at Lane Cove River, P. Kubiak p. c.).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic.**Botanical subregions:** NC CC SC ST; LHI, Vic., Tas., Eur.**Distribution Sydney area:** Coast and Campbelltown–Camden area.**Select locations:** Chittaway Point, Cowan Creek, Dee Why Lagoon, Bradleys Head, Abbotsford (1916), Hurstville (1901), Quibray Bay, Liverpool, Camden, Windang Island, Albion Park.**Habitat****Habitat:** Foreshores, creeks, seacliffs, flood debris.**Altitude:** 0–100 m **Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** Saltmarsh, herbland.**Substrate:** Riverine alluvium, possibly with saline influence, medium nutrient soils. Probably a nitrophile (P. Adam pers. comm.).**Exposure:** Full sun.**Conservation****Conservation:*****Atriplex pseudocampanulata***

CHENOPODIACEAE

Life history**Growth form:** Ascending, succulent herb to 30 cm high.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteole 5–8 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic**Botanical subregions:** *CC *CWS *SWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A.**Distribution Sydney area:** Flemington, Rockdale.**Select locations:** Flemington Saleyards (1968), Rockdale (1895).**Habitat****Habitat:** Saleyards.**Altitude:** 0–100 m **Annual rainfall:** 1000 mm**Typical local abundance:** Occasional.**Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Widespread and common in the drier parts of the State, introduced to coast and western slopes with stock. Probably extinct at Flemington now.

Atriplex pumilio

CHENOPODIACEAE

Slender-fruit Saltbush

Life history**Growth form:** Prostrate, to 15 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteole 2–3 mm long.**Dispersal, establishment & growth:** Diaspore: fruiting bracteole.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic in Central Coast, but native to other areas of Australia.**Botanical subregions:** *CC CWS NWP SWP NFWP SFWP; Vic., S.A., W.A.**Distribution Sydney area:** Flemington.**Select locations:** Flemington Saleyards (1968), only record.**Habitat****Habitat:** Saleyards.**Altitude:** 0–100 m**Annual rainfall:** 1200 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Widespread in inland areas. Probably introduced to Flemington with stock and now likely to be extinct there.***Atriplex semibaccata***

CHENOPODIACEAE

Creeping Saltbush, Berry Saltbush

Life history**Growth form:** Prostrate shrub.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Male and female flowers on same plant.**Fruit/seed:** Fruiting bracteoles, 4–6 mm long, dry or succulent and red, splitting in two to expose 1 seed.**Dispersal, establishment & growth:** Diaspore: fruiting bracteole, coloniser species.**Fire response:****Interaction with other organisms:** Seed eaten by Black Swan *Cygnus atratus*, foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.**Distribution Sydney area:** Western Sydney, Bathurst–Orange.**Select locations:** Epping, Ermington, Flemington Saleyards, Toongabbie, Doonside, Richmond, Campbelltown, Bathurst, Orange.**Habitat****Habitat:** Creekbanks, grassland, tidal margins.**Altitude:** 0–800 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Rare–occasional.**Vegetation:** Grassland with remnant trees e.g. *Eucalyptus tereticornis*, herbland.**Substrate:** Clay soil from Recent alluvium and Wianamatta Shale, medium nutrient. Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Full sun.**Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.

Atriplex spinibractea

CHENOPODIACEAE

Life history

Growth form: Prostrate or decumbent, herb to 30 cm high. Frequently hybridizes with *A. semibaccata*.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Male and female flowers on same plant.

Fruit/seed: Fruiting bracteoles, with spine-like appendages.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ST NWS CWS SWS NWP SWP.

Distribution Sydney area: Bathurst–Capertee.

Select locations: Bathurst (1910), Glen Alice (1983).

Habitat

Habitat: Woodland.

Altitude: 500–800 m

Annual rainfall: 700–1000 mm

Typical local abundance: Occasional.

Vegetation: Woodland e.g. with *Eucalyptus conica*, *E. microcarpa*, *E. albens*.

Substrate: Deep clay soils, medium nutrients. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Conservation status in Sydney area not known but widespread in western NSW in a variety of habitats.

***Beta vulgaris* subsp. *maritima* ***

CHENOPODIACEAE

Wild Beet

Life history

Growth form: Erect herb to 75 cm high, with slender taproot.

Vegetative spread: No.

Longevity: 2 years.

Primary juvenile period: Less than 2 years.

Flowers:

Fruit/seed: Nut ?

Dispersal, establishment & growth: Diaspore: fruit, water-dispersed (Carr et al. 1992).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, coastal regions, native to Europe.

Botanical subregions: CC; Vic., S.A.

Distribution Sydney area: Coast.

Select locations: Pennant Hills (1916), Tempe (1965).

Habitat

Habitat: Riverbanks, saline wetlands (Swarbrick & Skarratt 1994).

Altitude: 0–100 m

Annual rainfall: above 1200 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Gravelly clay soil.

Exposure:

Conservation

Conservation: Uncommon, occasionally naturalised near the coast.

***Chenopodium album* ***

CHENOPODIACEAE

Fat Hen

Life history**Growth form:** Erect herb, to 2.5 m high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Bisexual or female.**Fruit/seed:** Nut enclosed in persistent perianth. Seed black, 1–1.5 mm diam.**Dispersal, establishment & growth:** Diaspore: fruit, grows rapidly in summer and autumn, dying quickly after maturity. Dispersed in mud on cars (Wace 1977).**Fire response:** Probably killed by high intensity fire (1/94 at Lane Cove River and Narrabeen Lake), a few flowers within 4 months of high intensity fire (1/94 at Lane Cove River), and one plant fruiting within 5 months (1/94 at Narrabeen Lake, P. Kubiak p. c.).**Interaction with other organisms:** Pollen known to cause asthma in humans (Bass 1987).Leaves used as vegetable prior to 16th century; palatable to stock, but may cause severe flavour taint in milk if eaten by dairy cows (Auld & Medd 1987). Foodplant of Stubble Quail *Coturnix pectoralis*, seeds eaten by Yellow-throated Scrubwren *Sericornis citreogularis* (Barker & Vestjens 1989,1990). Seed eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).**Distribution****Status/origin:** Naturalised exotic**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A., cosmop.**Distribution Sydney area:** Widespread.**Select locations:** Tumbi Umbi, Hornsby, Northbridge, Royal Botanic Gardens (1899), Centennial Park, Emu Plains, Wollongong, Angus Place, Hill End, Wingecarribee Reservoir, Bigga.**Habitat****Habitat:** Alluvial flats, paddocks, gardens, waste ground.**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** With weeds of waste ground, fill material.**Substrate:** Clay soils from shale, sandy soils, low–medium nutrients.**Exposure:** Full sun.**Conservation****Conservation:** A common weed of cultivation and waste places, valuable when young as a forage plant; once used as spinach for human consumption (Herbarium note 1899).***Chenopodium ambrosioides* ***

CHENOPODIACEAE

Mexican Tea

Life history**Growth form:** Aromatic (ant-like odour), woody herb to 1 m high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:****Fruit/seed:** Seed 1 mm diam., glossy.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:** Reported to have wide variety of medicinal properties but only current commercial use is as fragrance component of cosmetics; extracts show antifungal activity (Paré et al. 1993). Taints dairy products, can poison stock, extracts can poison humans, seeds used as insecticide (Hurst 1942).**Distribution****Status/origin:** Naturalised exotic, native to Tropical America.**Botanical subregions:** NC CC SC NT NWS CWS SWS NWP SWP; Qld, Vic, S.A., W.A.**Distribution Sydney area:** Mainly suburban areas.**Select locations:** Wisemans Ferry, Frenchs Forest, Manly, Cooks River, Kogarah, La Perouse, Doonside, Douglas Park, Wollongong.

Habitat: Riverbanks, creekbanks, wasteland. Altitude: 0–200 m Annual rainfall: above 700 mm Typical local abundance: Occasional. Vegetation: Substrate: Sandy soil. Exposure: Full sun.	Habitat
Conservation: Widespread weed.	Conservation

Chenopodium carinatum

CHENOPODIACEAE

Keeled Goosefoot, Green Crumbweed

Growth form: Prostrate to erect, aromatic, covered with hairs. Vegetative spread: No. Longevity: 1–2 years. Primary juvenile period: Flowers: Bisexual or female, summer. Fruit/seed: Minute nut enclosed in persistent perianth, seed black or dark brown, c. 0.5 mm diam. Dispersal, establishment & growth: Diaspore: fruit. Fire response: Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: NC CC SC NT CT NWS CWS; Qld, Vic. Distribution Sydney area: Select locations: Wollombi, Royal Botanic Gardens (1903), Flemington.	Distribution

Habitat: Creekflats, saleyards. Altitude: 0–200 m Annual rainfall: above 800 mm Typical local abundance: Occasional. Vegetation: Woodland e.g. with <i>Eucalyptus punctata</i> , <i>Angophora floribunda</i> . Substrate: Exposure:	Habitat
Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), probably now extinct at Flemington and Royal Botanic Gardens.	Conservation

Chenopodium cristatum

CHENOPODIACEAE

Crested Goosefoot, Crested Crumbweed

Growth form: Prostrate to ascending, aromatic herb; covered with hairs. Vegetative spread: Longevity: 1 year. Primary juvenile period: Less than 1 year. Flowers: Bisexual or female. Fruit/seed: Nut enclosed in persistent perianth. Seed c. 0.5 mm diam. Dispersal, establishment & growth: Diaspore: fruit. Fire response: Interaction with other organisms: Suspected to be poisonous to stock (Hurst 1942).	Life history
Status/origin: Naturalised exotic in Central Coast of NSW, but native to other areas of Australia. Botanical subregions: *CC NWS CWS NWP SWP NFWP SFWP. Distribution Sydney area: Homebush, Flemington. Select locations: Homebush (1960), Flemington (1968).	Distribution

Habitat

Habitat: Saleyards, paddocks.

Altitude: 0–50 m **Annual rainfall:** 1000 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Clay soil.

Exposure:

Conservation

Conservation: Widespread in drier parts of the State, introduced to Sydney area with stock. Probably extinct there now.

Chenopodium glaucum**CHENOPODIACEAE****Life history**

Growth form: Decumbent to erect herb to 50 cm high; leaves often succulent.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Unisexual and bisexual, mainly autumn.

Fruit/seed: Nut enclosed in persistent perianth. Seed round, brown–black, 1 mm diam.

Dispersal, establishment & growth: Diaspore: fruit, possibly water-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC ST CWS; Vic., Tas., S.A., W.A., Eur., cosmop.

Distribution Sydney area: Coastal estuaries.

Select locations: Cowan Creek, Narrabeen Lake, East Hills, Bunburry, Curran Creek, Kiama.

Habitat

Habitat: Creekbanks, riverflats.

Altitude: 0–100 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation:

Substrate: Damp, alluvial soils, on creek banks and riverflats above normal high tide level but more or less saline.

Exposure:

Conservation

Conservation: Status unknown.

Chenopodium melanocarpum**CHENOPODIACEAE**

Black Crumbweed

Life history

Growth form: Prostrate, aromatic herb, covered with hairs.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Bisexual or female, black or dark brown, spring–summer.

Fruit/seed: Globular, 1.5mm long with perianth segments enclosing the seed and turning black when mature. Seed dull brown, c. 0.5 mm diam.

Dispersal, establishment & growth: Diaspore: fruit, dispersed with stock.

Fire response:

Interaction with other organisms: Unpalatable to stock.

Distribution

Status/origin: Naturalised exotic in Central Coast of NSW, but native to other areas of Australia.

Botanical subregions: *CC CWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area: Flemington, Riverstone.

Select locations: Flemington (1968), Riverstone (1984).

Habitat

Habitat: Saleyards, meatworks.

Altitude: 0–50 m **Annual rainfall:** 700–1000 mm

Typical local abundance: Rare.

Vegetation: Weedy sites.

Substrate: Clay soils associated with intensive stock use.

Exposure: Full sun.

Conservation

Conservation: A common spring and summer annual, often abundant in depleted pastures in drier, western parts of the State. Probably introduced to Sydney area with stock.

Chenopodium multifidum* **CHENOPODIACEAE**

Scented Goosefoot

Life history

Growth form: Spreading, aromatic herb to 1 m high, sometimes sticky and downy.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Bisexual and female, summer.

Fruit/seed: Nut enclosed in persistent, membranous perianth, 2 mm long. Seed reddish-brown.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to South America.

Botanical subregions: NC CC NWS CWS SWS SWP; Qld, Vic., S.A., W.A., Eur.

Distribution Sydney area: Coast and western Sydney.

Select locations: Waterloo (1906), Blackwattle Bay (1913), Bondi Beach, Riverstone, Flemington, Campbelltown.

Habitat

Habitat: Paddocks, saleyards.

Altitude: 0–200 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent to occasional.

Vegetation:

Substrate: Sandy or clay soils.

Exposure:

Conservation

Conservation: Widespread weed of waste places.

Chenopodium murale* **CHENOPODIACEAE**

Nettle-leaf Goosefoot

Life history

Growth form: Erect herb 1 m high.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Bisexual or female.

Fruit/seed: Seed 1–1.5 mm diam., shed with surrounding perianth.

Dispersal, establishment & growth: Diaspore: fruit, possibly animal-dispersed (Carr et al. 1992).

Fire response:

Interaction with other organisms: Taints dairy products (Hurst 1942).

Distribution

Status/origin: Naturalised exotic.

Botanical subregions: NC CC SC CT ST NWS CWS NWP SWP NFWP SFWP;
LHI, Qld, Vic., N.T., S.A., W.A., cosmop.

Distribution Sydney area: Coast and western Sydney.

Select locations: Dural, Hornsby, Beecroft, Botany (1888), Homebush, Flemington Saleyards,
Emu Plains, Windsor.

Habitat

Habitat: Disturbed ground, saleyards, saltmarsh.

Altitude: 0–200 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Wasteland weeds, saltmarsh.

Substrate: Clay soils from Wianamatta Shale, estuarine alluvium, medium nutrient.

Exposure:

Conservation

Conservation: Widespread weed.

Chenopodium nitrariaceum**CHENOPODIACEAE**

Nitre Goosefoot

Life history

Growth form: Spinescent shrub to 2 m high, dioecious or monoecious.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Male and female flowers on same or separate plants, or flowers bisexual.

Fruit/seed: Seed 1 mm diam., reddish brown–black.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Foodplant of Black Swan *Cygnus atratus*
(Barker & Vestjens 1989,1990).

Distribution

Status/origin: Naturalised exotic in Central Coast of NSW, but native to other
areas of Australia.

Botanical subregions: *CC NWP SWP NFWP SFWP; Qld., Vic., N.T., S.A.

Distribution Sydney area: Rockdale, Liverpool.

Select locations: Rockdale (1886), Liverpool (1909).

Habitat

Habitat: Railway line.

Altitude: 0–100 m **Annual rainfall:** above 900 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Widespread in western NSW, probably introduced to Sydney area
by stock. Rarely naturalised.

Chenopodium pumilio**CHENOPODIACEAE**

Small Crumbweed

Life history

Growth form: Prostrate to decumbent, aromatic, covered with hairs.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: Annual or short-lived perennial.

Primary juvenile period:

Flowers: Bisexual or female.

Fruit/seed: Fruiting perianth, crustaceous, white, seed 1 mm long (Wilson 1983), dark brown–black.

Dispersal, establishment & growth: No special dispersal morphology (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977).

Fire response:

Interaction with other organisms: Foodplant of Black Swan *Cygnus atratus* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: Como, Flemington Saleyards, Emu Plains, Berry, Katoomba, Mt Wilson, Glanmire, Wolgan Valley, Hill Top.

Habitat

Habitat: Weedy areas, gardens, cultivated areas.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation:

Substrate: Clay soils. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Status unknown.

***Chenopodium vulvaria* ***

CHENOPODIACEAE

Stinking Goosefoot

Life history

Growth form: Spreading to decumbent, with strong odour similar to decaying fish.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Unisexual and bisexual.

Fruit/seed: Seed 1–2 mm diam.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Medicinal properties, used as an anthelmintic (against intestinal worms) (Hurst 1942).

Distribution

Status/origin: Naturalised exotic

Botanical subregions: CT ST SWS; Vic., S.A., N temp. regions.

Distribution Sydney area: Orange district.

Select locations: Orange (1948).

Habitat

Habitat:

Altitude: 800–1000 m **Annual rainfall:** 800 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Only 1 naturalised record.

Dysphania glomulifera* subsp. *glomulifera

CHENOPODIACEAE

Life history**Growth form:** Prostrate to erect, to 20 cm high, reddish mature leaves and stems.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:** Less than 1 year.**Flowers:** White.**Fruit/seed:** Fruit ovoid, pericarp membranous, seed 0.5 mm long, reddish-brown, frequently falling with the perianth segments.**Dispersal, establishment & growth:****Fire response:** Reported after fire (at Northbridge).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC CWS SWS NWP SWP; Qld, Vic., S.A., W.A.**Distribution Sydney area:****Select locations:** Pennant Hills, Pymble, Northbridge, Lakemba, Flemington, Casula, Richmond, Glenfield, Thirlmere.**Habitat****Habitat:** Creekbanks, stockyards.**Altitude:** 0–200 m **Annual rainfall:** above 700 mm**Typical local abundance:** Rare–occasional.**Vegetation:** Sandstone scrub, pasture weeds.**Substrate:** Moist, sandy soil on sandstone or along creek banks, often associated with stock.**Exposure:****Conservation****Conservation:** Status unknown.***Dysphania littoralis***

CHENOPODIACEAE

Life history**Growth form:** Prostrate plant.**Vegetative spread:****Longevity:** Annual or short-lived perennial.**Primary juvenile period:****Flowers:** Male and female flowers.**Fruit/seed:** Seed 0.3–0.4 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC CWS SWS NWP SWP NFWP SFWP; Qld, W.A.**Distribution Sydney area:** Glenfield.**Select locations:** Glenfield (1965).**Habitat****Habitat:** Sheep yards.**Altitude:** 0–100 m **Annual rainfall:** 900 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991). Only 1 record for Sydney area (at Veterinary Research Station), probably introduced with stock.

Einadia hastata

CHENOPODIACEAE

Berry Saltbush

Life history**Growth form:** Low and shrubby with prostrate or ascending stems to 0.5 m long.**Vegetative spread:** No.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Winter.**Fruit/seed:** Red, fleshy fruit, March.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS NWP SWP; Qld, Vic.**Distribution Sydney area:** Widespread.**Select locations:** Pennant Hills, La Perouse, East Hills, Riverstone, Cobbitty, Bulli, Shellharbour, Berry, Kowmung River, Bathurst, Mittagong.**Habitat****Habitat:** Steep rocky slopes.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Eucalypt forest and woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*, *Eucalyptus botryoides*, *Banksia integrifolia* or coastal saline sites e.g. mangroves. Littoral rainforest (M. Robinson pers. comm.).**Substrate:** Clay loam from shales, basalt, skeletal soils, river alluvium. Also sites exposed to salt spray. Bombo Latite, Budgong Sandstone, Berry Siltstone, Marine deposited sands in Illawarra (M. Robinson pers. comm.).**Exposure:** Full sun to mid-shade.**Conservation****Conservation:** Conserved in Western Sydney (Benson & McDougall 1991). Status elsewhere unknown***Einadia nutans* subsp. *linifolia***

CHENOPODIACEAE

Climbing Saltbush

Life history**Growth form:** Herb with prostrate or twining herbaceous or woody stems, leaves linear, perennial rootstock.**Vegetative spread:** No.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** At any time.**Fruit/seed:** Fruit with inflated succulent, red or yellow pericarp 2–3 mm diam., 1 small seed per fruit, ripe August–April.**Dispersal, establishment & growth:** Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995). Reported to colonise bare soil on roadcuttings.**Fire response:****Interaction with other organisms:** Palatable to stock.**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT NWS CWS SWS NWP SWP; Qld, Vic.**Distribution Sydney area:** Liverpool–Camden area.**Select locations:** Lidcombe, Toongabbie, Casula, Ingleburn, Mt Annan, Camden, Menangle, Picton.

Habitat

Habitat: Grassy woodland.

Altitude: 0–200 m

Annual rainfall: 700–1000 mm

Typical local abundance: Rare–occasional.

Vegetation: Woodland with *Eucalyptus crebra*, *Bursaria spinosa* and grassy groundcover, creekside woodland with *Casuarina glauca*.

Substrate: Clay soil from Wianamatta Shale, medium nutrients.

Exposure: Light shade.

Conservation

Conservation: Status unknown.

Einadia nutans* subsp. *nutans**CHENOPODIACEAE**

Climbing Saltbush

Life history

Growth form: Herb with prostrate or twining herbaceous or woody stems, perennial rootstock, leaves often lobed.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Very late October–November, January–early April (Price 1963).

Fruit/seed: Fruit with inflated succulent red or yellow pericarp, 2–3 mm diam., 1 small seed per fruit, ripe December–March.

Dispersal, establishment & growth: Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995).

Fire response:

Interaction with other organisms: Seeds eaten by Variegated Fairy-wren *Malurus lamberti* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A.

Distribution Sydney area: Mainly coastline and Bathurst area.

Select locations: Five Islands, Bass Point, Bombo, Toongabbie, Richmond, Jenolan Caves, Bathurst, Junction Reefs, Barbers Creek.

Habitat

Habitat: Rocky ledges above seashore, creekbanks, cliffs.

Altitude: 0–1000 m

Annual rainfall: above 600 mm

Typical local abundance: Rare–occasional.

Vegetation: Woodland with *Casuarina glauca*. Dry rainforest scrub margins, coastal heath e.g. with *Westringia fruticosa*, *Leptospermum laevigatum* (M. Robinson p. c.).

Substrate: Alluvium, cliffs of slaty metasediments. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991). Status elsewhere unknown.

Einadia polygonoides**CHENOPODIACEAE****Life history**

Growth form: Prostrate or twining herb.

Vegetative spread:

Longevity: Annual or perennial.

Primary juvenile period:

Flowers: December–February.

Fruit/seed: Fruit with loose pericarp, dry at maturity, April.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC NT NWS CWS SWS NWP SWP; Qld, S.A.**Distribution Sydney area:** Mainly western Sydney.**Select locations:** Homebush Bay, Kogarah, Marayong, Toongabbie, Doonside, Narellan, Campbelltown, Wolgan Valley.**Habitat****Habitat:** Woodland, paddock, stockyards.**Altitude:** 0–700 m **Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** Saltmarsh margins, woodland e.g. with *Eucalyptus tereticornis*, grassland and weedy areas.**Substrate:** Clay soils on shale, medium nutrients.**Exposure:****Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991).***Einadia trigonos* subsp. *trigonos*****CHENOPODIACEAE**

Fishweed

Life history**Growth form:** Plant with prostrate or twining branches.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:****Fruit/seed:** Fruit with a loose pericarp, dry at maturity.**Dispersal, establishment & growth:** Diaspore: fruit, possibly coloniser of disturbed areas.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST; Vic.**Distribution Sydney area:** Widespread.**Select locations:** Mt Warralong, Mountain Lagoon, Cheltenham, Wahroonga, Farm Cove (1902), Dulwich Hill (1965), Cobbitty, Scarborough, Five Islands, Gosper Mtn, Mittagong.**Habitat****Habitat:** Coastal foreshores, disturbed sites.**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:** Dry rainforest and open-forest.**Substrate:** Clay soils from shale, basalt, sandy soil, on foreshores, possibly with calcium influence?**Exposure:** Mid-shade to light shade.**Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991). *Einadia trigonos* subsp. *leiocarpa* reported for CC (Harden 1990) but not confirmed with specimens.***Enchylaena tomentosa*****CHENOPODIACEAE**

Ruby Saltbush

Life history**Growth form:** Shrub to 1 m high, with succulent leaves.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:****Fruit/seed:** Fruit 5–8 mm diam., green, yellow, red or puce, falling when succulent.**Dispersal, establishment & growth:** Diaspore: fruit, probably animal-dispersed.**Fire response:****Interaction with other organisms:** Seed eaten by White-winged Triller *Lalage sueurii* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NWS CWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area: Terrigal, Illawarra coast.

Select locations: Terrigal, Port Kembla, Five Islands, Windang Island, Stack Island, Kiama.

Habitat

Habitat: Rocky coastal foreshore.

Altitude: 0–100 m **Annual rainfall:** above 1100 mm

Typical local abundance: Occasional.

Vegetation: Low exposed coastal heath.

Substrate: Dolerite with skeletal sandy clay soil (Five Is), latite, weathered shale. On Bombo Latite in Illawarra (M. Robinson pers. comm.). Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun, saltspray (M. Robinson pers. comm.).

Conservation

Conservation: Restricted occurrence in Sydney area.

Halosarcia pergranulata* subsp. *pergranulata**CHENOPODIACEAE****Life history**

Growth form: Erect shrub 1.5 m high with swollen succulent branches.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers:

Fruit/seed: Fruiting spikes either remaining intact and breaking down to release seed, or eventually releasing separate fruitlets. Seeds brown–reddish brown–black, 1 mm diam.

Dispersal, establishment & growth: Diaspore: probably seed or separate fruitlets. ? Seedlings establish in October.

Fire response: Not likely to be burnt.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC NWP SWP NFWP SFWP; Vic, NT, SA, WA

Distribution Sydney area: Parramatta River.

Select locations: Duck River (1960), Duck Creek, Newington, Haslams Creek.

Habitat

Habitat: Slight rises in *Sarcocornia* saltmarsh.

Altitude: 0–2 m **Annual rainfall:** above 1200 mm

Typical local abundance: Abundant.

Vegetation: Saltmarsh with *Sarcocornia quinqueflora*, though usually in dry, well-drained sites but sometimes at least seasonally very wet (P. Adam pers. comm.).

Substrate: Alluvial mud derived from shale catchments. Soil fertile. Watertable mostly low, moisture supply intermittent, saline–brackish. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Rare saltmarsh species. First collected in Sydney area in 1960 and assumed to be native though the possibility of the species being introduced through the nearby Flemington stockyards cannot be ruled out (Clarke & Benson 1988). On Commonwealth Military land (1985) used for storage of munitions, and around radio tower on Haslams Creek. Long-term conservation unknown. Haslams Creek population in part of a rehabilitation program (1995).

Maireana microphylla

CHENOPODIACEAE

Life history

Growth form: Shrub to 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:****Fruit/seed:** Fruiting perianth 3–7 mm diam.**Dispersal, establishment & growth:** Diaspore: fruit. Coloniser (Harden 1990).

Early coloniser of disturbed land (Wilson 1975).

Fire response:**Interaction with other organisms:**

Distribution

Status/origin: Native, but introduced to CC, probably by stock.**Botanical subregions:** NC *CC NWS CWS NWP SWP; Qld.**Distribution Sydney area:** Camden–Campbelltown area.**Select locations:** Flemington (1906), Minto (1910), Campbelltown, Camden, Razorback.

Habitat

Habitat: Roadsides, pastures.**Altitude:** 0–400 m**Annual rainfall:** 700–800 mm**Typical local abundance:** Rare.**Vegetation:** Pastures.**Substrate:** Clay loam on Wianamatta Shale, medium nutrient. Recorded on saline sites in western NSW (Semple 1993). Poorer soils.**Exposure:**

Conservation

Conservation: Native to drier areas but probably introduced to Sydney district with stock (Wilson 1975).***Rhagodia candolleana* subsp. *candolleana***

CHENOPODIACEAE

Life history

Growth form: Spreading or erect shrub to 4 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Flowering all year.**Fruit/seed:** Berry with fleshy red perianth, seed 1.5–2.5 mm diam., fruiting at any time.**Dispersal, establishment & growth:** Diaspore: fruit, animal-dispersed.**Fire response:****Interaction with other organisms:** Mycorrhizal association with roots, likely to assist nutrition (Logan et al. 1989).

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Coastal beaches.**Select locations:** Wamberal Beach, Pearl Beach, Manly, Lady Robinsons Beach, Jibbon Beach, Robbinsville Beach, Bass Point, Gerringong, Minnamurra River.

Habitat

Habitat: Beaches, sand dunes.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:****Vegetation:** Dune scrub e.g. with *Leptospermum laevigatum*, *Lomandra longifolia*, *Casuarina glauca*, *Banksia integrifolia*. Swamp forest e.g. with *Casuarina glauca*, also in littoral rainforest and dune scrub margins (M. Robinson, A. Bofeldt pers. comm.).**Substrate:** Foredunes and hind dunes, beach sand, also sandstone boulders, low nutrient.**Exposure:**

Conservation

Conservation: Status unknown.

Rhagodia spinescens**CHENOPODIACEAE****Life history**

Growth form: Shrub to 3 m high. Branches frequently spinescent, leaves variable in shape and texture (Wilson 1983).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Mostly unisexual.

Fruit/seed: Pink or red berry. Black seed 1 mm diam. (Wilson 1983).

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic in Central Coast of NSW, but native to other areas of Australia.

Botanical subregions: *CC NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A.

Distribution Sydney area: Menangle.

Select locations: Menangle–Douglas Park Road (1967).

Habitat

Habitat:

Altitude: 0–200 m

Annual rainfall: 700 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Native to winter-dominated rainfall parts of the arid and semi-arid areas.

Probably introduced to Sydney areas with stock, reported as naturalised in Menangle–Douglas Park area.

Salsola kali var. *kali***CHENOPODIACEAE****Life history**

Growth form: Herbaceous plant to 1 m high, with Kranz (C4) anatomy.

Vegetative spread: No.

Longevity: Annual or biennial.

Primary juvenile period:

Flowers: Spring–autumn.

Fruit/seed: Fruiting perianth 4–7 mm diam., with fan-like wings to 3 mm long.

Dispersal, establishment & growth: Diaspore: fruit, usually remaining attached; plants die off after one or two years growth and blow away, intact, to gather against fences etc.

Coloniser (Harden 1990) of bare, and eroded soils in western NSW.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A., Eur.

Distribution Sydney area: Coastal beaches, Campbelltown area (possibly introduced to Campbelltown area prior to 1966 (E.J. McBarron, Herbarium note).

Select locations: Avoca, Wamberal, Palm Beach, Kurnell, Ingleburn, Razorback, Douglas Park, Austinmer, Five Islands, Kiama.

Habitat

Habitat: Coastal beaches.

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation: Margin of saltmarsh.

Substrate: Beach sand, clay soil from Wianamatta Shale.

Exposure:

Conservation

Conservation: Conservation status unknown, native along beaches.

Sarcocornia quinqueflora subsp. *quinqueflora*

CHENOPODIACEAE

Life history

Growth form: Decumbent, spreading herb to 30 cm high, occasionally to 50 cm, with succulent jointed stems, rooting at the nodes.

Vegetative spread: Stems root at nodes.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Minute, bisexual, but occasionally unisexual.

Fruit/seed: Fruiting perianth, dry and falling with the fruit, seed 1 mm diam.

Dispersal, establishment & growth: Diaspore: fruiting perianth; water-dispersed, seeds buoyant for more than 3 months in seawater and 8 days in tapwater. Germination occurs when salinity is low. Seed germination 6% in tapwater and 8% in 20% seawater (Clarke & Hannon 1970). Seedlings intolerant of low light conditions. Patchy red-green colour distribution of plants in the field associated with variation in microtopography and salinity. The red-green colour change occurs after flowering and is associated with the onset of high salinity conditions in late summer. They die back in winter, and commence new growth in late winter after rain and high tides. Mature and seedling stages are indifferent to waterlogging level in vegetative stages (Clarke & Hannon 1970).

Fire response: Burnt (on Hawkesbury 1994), recovery poor (P. Adam pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; L.H.I., Qld, Vic., Tas., S.A., W.A.

Distribution Sydney area: Coastal and estuaries.

Select locations: Cattaway Point, Berowra Creek, Bayview, Narrabeen, Middle Harbour, Homebush Bay, Wheeny Bay, Cronulla, East Hills, Five Islands, Lake Illawarra, Shellharbour.

Habitat

Habitat: Estuaries, between tidal limits, occasionally on sea cliffs.

Altitude: 0–30 m

Annual rainfall: above 1000 mm

Typical local abundance: Frequent–dominant.

Vegetation: Saltmarsh with *Suaeda australis*, *Sporobolus virginicus*, between mangrove and *Juncus* zones Occasionally on seacliffs e.g. with *Selliera radicans* (at Coogee, Maroubra, P. Adam p. c.).

Substrate: On sand and sloppy wet loam on clay alluvium periodically inundated by saltwater. Tolerant of waterlogging (Clarke & Hannon 1971). Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Conservation status unknown, much saltmarsh habitat has been destroyed by landfill and remaining areas are very limited. *Sarcocornia* populations are vulnerable to invasion by mangroves, *Avicennia marina*, along tidal channels and from exotic saltmarsh species particularly *Juncus acutus*.

Scleroblitum atriplicinum

CHENOPODIACEAE

Purple Goosefoot

Life history

Growth form: Prostrate or decumbent herb.

Vegetative spread:

Longevity: Annual or short-lived perennial.

Primary juvenile period:

Flowers:

Fruit/seed: Seed 0.5 mm long, fused to pericarp.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms: Foodplant of Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Naturalised exotic in CC, but native to other areas of Australia.

Botanical subregions: *CC NWS CWS NWP SWP NFWP SFWP; Qld, Vic., S.A.

Distribution Sydney area: Flemington.

Select locations: Flemington Saleyards (1968).

Habitat

Habitat: Saleyards.

Altitude: 0–100 m

Annual rainfall: 1000 mm

Typical local abundance: Rare.

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Widespread colonising species of the inland, only 1 record (naturalised) for Sydney area (at Flemington) and is probably extinct there now.

Sclerolaena bicornis var. *horrida*

CHENOPODIACEAE

Goathead Burr

Life history

Growth form: Erect to spreading, 80 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers:

Fruit/seed: Fruiting perianth, 5 mm diam., with 2 spines 15 mm long.

Dispersal, establishment & growth: Diaspore: fruiting perianth, animal-dispersed, attached to wool, hair etc.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic in Central Coast of NSW, but native to other areas of Australia.

Botanical subregions: *CC CWS NWP NFWP.

Distribution Sydney area: Flemington.

Select locations: Flemington Saleyards (1969).

Habitat

Habitat:

Altitude: 0–100 m

Annual rainfall: 1000 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Widespread, particularly in overgrazed areas of the inland. Probably introduced to coast by stock. Only 1 record (naturalised) for Sydney area (at Flemington) and probably extinct there now.

Sclerolaena calcarata

CHENOPODIACEAE

Redburr

Life history

Growth form: Plant to 30 cm high, with narrow, succulent leaves.

Vegetative spread:

Longevity: Short-lived perennial (Harden 1990).

Primary juvenile period:

Flowers:

Fruit/seed: Fruiting perianth 2.5 mm long, with 5–6 spines, 1–2 mm long.

Dispersal, establishment & growth: Diaspore: fruit, animal dispersed in wool and hair.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic in Central Coast of NSW, but native to other areas of Australia.

Botanical subregions: *CC NWP SWP NFWP SFWP; Qld, S.A.

Distribution Sydney area: Flemington.

Select locations: Flemington Saleyards (1968), only record.

Habitat

Habitat: Cattleyards.

Altitude: 0–100 m **Annual rainfall:** 1000 mm

Typical local abundance: Occasional.

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Widespread on heavier soils in inland areas, probably introduced to Flemington with stock. Probably now extinct there.

Sclerolaena muricata var. *semiglabra*

CHENOPODIACEAE

Black Rolypoly

Life history

Growth form: Shrub to 1 m high, hairy. Taproot slender with numerous lateral roots (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: Short-lived perennial.

Primary juvenile period: Less than 1 year ? (Parsons & Cuthbertson 1992).

Flowers: Numerous and inconspicuous, solitary in leaf axils, summer (Parsons & Cuthbertson 1992).

Fruit/seed: Burr 1–2.5 mm long, with 5 spines; single seed brown, smooth, rounded, 1–2 mm diam., mature in summer (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: burr, animal-dispersed in wool, hair etc., also water-dispersed, seed dispersed from detached plants blown along as tumble weeds, against fences, in channels; seeds germinate after autumn rains, extensive roots develop during winter, allowing plant to withstand summer drought (Parsons & Cuthbertson 1992). Coloniser of bare areas.

Fire response:

Interaction with other organisms: Overgrazing encourages spread; close-growing clumps harbour rabbits etc. (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic in Central Coast and Central Tablelands of NSW, but native to other parts of Australia.

Botanical subregions: *CC *CT NWS CWS SWS NWP SWP SFWP; Qld, Vic., S.A.

Distribution Sydney area: Western Sydney.

Select locations: Flemington Saleyards, Blacktown (1912), Penrith, Campbelltown, Camden, Bathurst (1909).

Habitat

Habitat: Overgrazed or overstocked areas on heavy soils.

Altitude: 0–1000 m **Annual rainfall:** 700–1000 mm

Typical local abundance: Rare.

Vegetation: Pasture e.g. with *Cynodon dactylon*, *Paspalum dilatatum*.

Substrate: Clay soils from Wianamatta Shale, medium nutrients.

Exposure:

Conservation

Conservation: Widespread colonising species. Probably introduced to Sydney area with stock, and occasionally naturalised.

Sclerolaena muricata* var. *villosa**CHENOPODIACEAE**

Black Rolypoly

Life history**Growth form:** Shrub to 1 m high, hairy.**Vegetative spread:** No.**Longevity:** Short-lived perennial.**Primary juvenile period:** Less than 1 year ? (Parsons & Cuthbertson 1992).**Flowers:** Numerous and inconspicuous, solitary in leaf axils, summer (Parsons & Cuthbertson 1992).**Fruit/seed:** Burr 1–2.5 mm long, with 5 spines; single seed brown, smooth, rounded, 1–2 mm diam., mature in summer (Parsons & Cuthbertson 1992).**Dispersal, establishment & growth:** Diaspore: burr, animal-dispersed in wool, hair etc., also water-dispersed, seed dispersed from detached plants blown along as tumble weeds, against fences, in channels; seeds germinate after autumn rains, extensive roots develop during winter, allowing plant to withstand summer drought (Parsons & Cuthbertson 1992). Coloniser of bare areas.**Fire response:****Interaction with other organisms:** Overgrazing encourages spread; close-growing clumps harbour rabbits etc. (Parsons & Cuthbertson 1992).**Distribution****Status/origin:** Naturalised exotic in Central Coast of NSW, but native to other parts of Australia.**Botanical subregions:** *CC ST NWS CWS SWS NWP SWP NFWP; Qld, Vic., N.T., S.A.**Distribution Sydney area:** Camden.**Select locations:** Flemington Saleyards (1969), Camden (1913).**Habitat****Habitat:** Overgrazed or overstocked areas on heavy soils.**Altitude:** 0–200 m **Annual rainfall:** 700–1000 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:** Clay soils from Wianamatta Shale, medium nutrients. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Widespread colonising species. Probably introduced to Sydney area with stock, and occasionally naturalised.***Suaeda australis*****CHENOPODIACEAE****Life history****Growth form:** Glabrous or spreading herb to 1 m high, with succulent leaves.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Spring–Summer**Fruit/seed:** Mostly succulent perianth 1.5–2 mm diam.**Dispersal, establishment & growth:** Diaspore: fruiting perianth, water-dispersed, seeds buoyant in tapwater and seawater for 10 days. Positive but small salt requirement. Tolerant of high salinities for germination and growth. 30% germination in tapwater and 2% in 80% seawater. (Clarke & Hannon 1970). Seedlings intolerant of low light (Clarke & Hannon, 1971). High mortality and retarded growth in freely-draining conditions suggest that germination and early growth are favoured in wet situations but that older plants are favoured by areas free of excess moisture (Clarke & Hannon 1970).**Fire response:** Unlikely to be burnt.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Shoreline.**Select locations:** Cowan Creek, Berowra Creek, Parramatta River, Homebush Bay, Cooks River, Botany Bay, Georges River, Audley, Bass Point, Shoalhaven River.

Habitat

Habitat: Coastal or estuarine shorelines, often on drift lines.

Altitude: 0–20 m **Annual rainfall:** above 1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Saltmarsh, behind mangroves, *Casuarina glauca* woodland.

Substrate: Clayey, estuarine sediments, around basalt boulders with humic, black soil. Possibly a nitrophile (P. Adam pers. comm.). Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Conservation status unknown, conserved at Towra Point.

Chloanthes glandulosa**CHLOANTHACEAE****Life history**

Growth form: Shrub to 30–90 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Greenish yellow, July–December.

Fruit/seed: Dry 4-locular drupe, separating into 2 segments each with 2 seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC CWS.

Distribution Sydney area: Springwood–Kurrajong, rare.

Select locations: Kurrajong Heights, Burrell Creek, Linden Creek, Springwood, Murphys Glen.

Habitat

Habitat: Moist forest.

Altitude: 0–600 m **Annual rainfall:** 1000–1200 mm

Typical local abundance: Frequent.

Vegetation: Moist, tall open-forest e.g. with *Eucalyptus deanei*, *E. piperita*, *Angophora costata*, *Syncarpia glomulifera*.

Substrate: Sandy soil on sandstone, low nutrients.

Exposure: Sheltered.

Conservation

Conservation: Rare, conservation status uncertain, some populations are probably in Blue Mountains National Park.

Chloanthes parviflora**CHLOANTHACEAE****Life history**

Growth form: Shrub 30–90 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pale mauve with purple spots, spring.

Fruit/seed: Dry, 4-locular fruit, with 4 seeds.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC SC NT CT ST NWS CWS NWP; Qld.

Distribution Sydney area:

Select locations: Rylstone.

Habitat

Habitat:

Altitude: 800–1000 m **Annual rainfall:** 800 mm

Typical local abundance: Rare.

Vegetation: Sclerophyll forest and heath.

Substrate:

Exposure:

Conservation

Conservation: Status unknown.

Chloanthes stoechadis**CHLOANTHACEAE****Life history**

Growth form: Shrub 30–90 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Greenish yellow or greenish blue, March–December, peak July–August.

Fruit/seed: Dry 4-locular drupe, separating into 2 segments each with 2 seeds.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Killed by fire, recruitment from soil-stored seedbank (Fox 1988). Killed, vigorous recruitment of seedlings after high intensity fire (1/94 at Smiths Creek, L.McD.). Seedlings in scattered locations, locally abundant, one plant flowering within 11 months of high intensity fire (1/94 at Narrabeen Lake, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT CWS; Qld, W.A.

Distribution Sydney area: Coast and Blue Mountains.

Select locations: Colo Heights, Gosford, Hornsby, Narrabeen, Oatley, The Woolwash, Mt Keira, Bargo, Bilpin, Mt Tomah, Mt Coricudgy.

Habitat

Habitat: Rocky hillsides.

Altitude: 0–1000 m **Annual rainfall:**

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest and woodland e.g. with *Eucalyptus piperita*, *E. gummifera*, *E. sparsifolia*.

Substrate: Sandy soils on sandstone, low nutrients.

Exposure: Full sun–light shade.

Conservation

Conservation: Widespread species, probably adequately conserved.

Spartothamnella juncea**CHLOANTHACEAE****Life history**

Growth form: Erect or scrambling shrub 1–3 m high with slender, green, 4-angled branches.

Vegetative spread: No.

Longevity: Probably more than 10 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White, at any time of year, but mainly summer.

Fruit/seed: Orange succulent fruit, 2–4 mm diameter, separates into 4, 1-seeded fruitlets (Munir 1976), maturing in summer.

Dispersal, establishment & growth: Diaspore: fruitlets, probably bird-dispersed. No dormancy, germinates without treatment, more than 70%, 1–3 months (A. Bofeldt p. c. 1993).

Fire response: Killed (A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NWS CWS NWP; Qld.

Distribution Sydney area: Razorback Range.

Select locations: Razorback Range.

Habitat

Habitat: Steep, rocky hillsides.

Altitude: 0–300 m **Annual rainfall:** 700 mm

Typical local abundance: Occasional.

Vegetation: Dry rainforest, vine-scrub, open-forest e.g. with *Eucalyptus tereticornis*, *Brachychiton populneus*, *Alphitonia excelsa*.

Substrate: Loose, rocky sandstone scree on western aspect, medium nutrient soils, well-drained.

Exposure: Full sun–mid-shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Razorback population (southern limit) not conserved.

Hypericum androsaemum *

CLUSIACEAE

Tutsan

Life history

Growth form: Woody shrub 30–60 cm high; crushed leaves give scent of curry.

Numerous shallow roots to 30 cm deep (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period: 2 years (Parsons & Cuthbertson 1992).

Flowers: Yellow, late spring–early summer (Parsons & Cuthbertson 1992).

Fruit/seed: Purple–black, fleshy berry, 7–10 mm long. Fruit changes from green to red to black as it matures, by late summer; seed brown, numerous, 1 mm long (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fleshy fruit, bird and water-dispersed. Seed readily contaminates agricultural produce, and disperses in mud on vehicles etc.; seeds germinate in autumn (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms: Suspected of poisoning stock but is unpalatable (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to Asia, Europe, Africa. Introduced as ornamental.

Botanical subregions: CC NT CT ST; Vic., Tas.

Distribution Sydney area: Locally abundant in some areas of Blue Mountains.

Select locations: Penrith (1933), Burragarang, Wentworth Falls, Jenolan Caves (1932), Little River, Yetholme.

Habitat

Habitat: Creek banks, on disturbed sites.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Open-forest.

Substrate: Sandy riverbank alluvium and creek edges on soils from basalt and shale/slate.

Exposure: Shady places.

Conservation

Conservation: Reported to be a major weed in Jenolan Caves area (in 1984) and probably spreading in other areas of the Blue Mountains. Can establish in undisturbed bushland and compete with native plants (Parsons & Cuthbertson 1992).

Hypericum gramineum

CLUSIACEAE

Small St. John's Wort

Life history**Growth form:** Erect herb 10–40 cm high.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** 5–20 years (D. Keith pers. comm.).**Primary juvenile period:****Flowers:** Yellow–orange, October–March.**Fruit/seed:** Black capsule, to 7 mm long, with many minute seeds.**Dispersal, establishment & growth:** Diaspore: seed, mobile (McIntyre et al. 1995), probably wind-dispersed. Recruitment mainly after fire (D. Keith pers. comm.).**Fire response:** Resprouts, secondary juvenile period 1 year (D. Keith pers. comm.).

Resprouting plants fruiting within 3 months of high intensity fire (at Lane Cove River 1/94, P. Kubiak pers. comm.).

Interaction with other organisms:**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP NFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Coast and Blue Mountains.**Select locations:** Kincumber, Hornsby, Centennial Park, Oatley, Royal NP, Londonderry, Springwood, Yerranderie, Blackheath, Winburndale, Carcoar.**Habitat****Habitat:** Ridges and hillsides.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Open-forest e.g. with *Eucalyptus eugenioides*, *Angophora costata*, *Eucalyptus fibrosa*, *E. sclerophylla* and grassland.**Substrate:** Clay loam from shale, granite, Tertiary alluvium, medium–low nutrients.**Exposure:** Mid–light shade.**Conservation****Conservation:** Conserved in Western Sydney (Benson & McDougall 1991), and probably elsewhere.***Hypericum japonicum***

CLUSIACEAE

Life history**Growth form:** Prostrate or decumbent herb to 15 cm high**Vegetative spread:** Yes (McIntyre et al. 1995), forming dense mats.**Longevity:****Primary juvenile period:****Flowers:** Yellow–orange, October–March, peak February.**Fruit/seed:** Capsule, to 7 mm long, with many minute seeds.**Dispersal, establishment & growth:** Diaspore: seed, mobile (McIntyre et al. 1995), probably wind and water-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST SWS SWP; Qld, Vic., Tas., S.A., Asia.**Distribution Sydney area:** Widespread.**Select locations:** Culoul Range, Popran Creek, Eastlakes, Minto, Campbelltown, The Oaks, Kowmung River, Bathurst, Oberon, Wildes Meadow. Wingecarribee Swamp (P. Kodela p. c.).**Habitat****Habitat:** Moist places in grassland and swamps.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.

Vegetation: Creek beds, moist forest e.g. with *Eucalyptus saligna*, edge of rainforest, upland mire (Kodala et al. 1992), and sedgeland/grassland.

Substrate: Damp places with boulders and rocks e.g. of basalt, clay soils, medium-high nutrient.

Exposure: Mid-shade.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991).

Hypericum perforatum *

CLUSIACEAE

St. John's Wort

Life history

Growth form: Erect, several-branched shrub to 1 m high, with broad leaves, and taproot penetrating vertically 0.7 m into soil. Two intergrading varieties in Australia differing in size of leaves.

Vegetative spread: Spread by adventitious roots, lateral roots 5–8 cm under soil surface produce buds from which new crowns develop. New aerial growth develops each year from crowns and surface rhizomes (Parsons & Cuthbertson 1992).

Longevity:

Primary juvenile period: Indefinite. Usually 2 years (Parsons & Cuthbertson 1992).

Flowers: Yellow-orange, October–March, peak December; November (Parsons & Cuthbertson 1992).

Fruit/seed: Sticky 3-celled capsule, 5–10 mm long, seed brown 1 x 0.5 mm, 0.14 mg, 7 million kg⁻¹ (Campbell & Delfosse 1984). Single plant can produce 33,000 seeds in a season (Parsons & Cuthbertson 1992). Mature April–May.

Dispersal, establishment & growth: Diaspore: fruit/seed, adheres to animals (Campbell & Delfosse 1984). Wind-dispersed along roadsides possibly assisted by turbulence from heavy vehicles (A. Rodd pers. comm. 1994). Water-dispersed. Seeds germinate in autumn, winter or spring; two distinct growth forms, at first procumbent stems with dense foliage smothering other plants, then erect woody, flowering stems that die in late summer (Parsons & Cuthbertson 1992). Germination following after-ripening period 4–6 months, maximum germination at 12 months. Germination October–March, germination of variable proportion of seedbank in response to light, temperature and rainfall favour survival. May lie dormant 6–10 years in soil (Campbell & Delfosse 1984).

Fire response: Resprouted from base after high intensity fire (at Lane Cove River 1/1994), flowering and fruiting within 1 year (P. Kubiak pers. comm.). Resprouted after low intensity fire (R. Buchanan pers. comm.).

Interaction with other organisms: Fresh or dry plant causes 'photosensitisation' when eaten by stock when other feed is scarce; Introduced *Chrysolina* insects provide effective control in some areas (Parsons & Cuthbertson 1992). Significant damage caused by mite *Aculus hyperici* released in 1991 (Tanner 1993). Insects released here have not achieved control. Seed eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993).

Distribution

Status/origin: Naturalised exotic, native to Asia, Europe and Africa. Introduced as ornamental.

Botanical subregions: NC CC NT CT ST NWS CWS SWS SWP; Qld, Vic., Tas., S.A.

Distribution Sydney area: Mainly higher elevations.

Select locations: Epping, Northbridge, Glenfield, Wallacia, Faulconbridge, Campbelltown, Lithgow, Hartley, Orange, Carcoar (1922).

Habitat

Habitat: Hilly forest areas, roadsides, rough pastures.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Roadside weeds e.g. with *Chloris gayana*, *Bidens pilosa*, and open eucalypt woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*.

Substrate: Variable, sandy-gravelly clay soil, on shale, granite, no correlation with soil type (Campbell & Delfosse 1984).

Exposure: Full sun.

Conservation

Conservation: By 1905, occurred as far apart in NSW as Tumbarumba and Mudgee, spreading to 188,000 ha in 1976 with the heaviest infestations on the ST and CT (Campbell & Delfosse 1984).

Calystegia marginata**CONVOLVULACEAE****Life history**

Growth form: Glabrous twining plant, 1–3 m high.

Vegetative spread: Roots at nodes (M. Robinson pers. comm.).

Longevity: Short-lived perennial.

Primary juvenile period:

Flowers: White to pale mauve, October–December, March.

Fruit/seed: Capsule 5–7 mm long, December–May.

Dispersal, establishment & growth: Diaspore: seed, water-dispersed, germination variable (A. Bofeldt pers. comm.).

Fire response: Probably killed by high intensity fire (at Lane Cove River 1/94), flowering within 10 months from seed (P. Kubiak pers. comm.). Stem from seedling 50–70 cm high, 9 months after fire (M. Robinson pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld, Vic.

Distribution Sydney area: Coast and ranges.

Select locations: Culoul Range, Greystanes Creek, Cabramatta Creek, Cobbitty, Cheltenham, Hurstville, Mt Keira, Saddleback Mountain, Cambewarra, upper Kangaroo River, Bundanoon, Mt Coricudgy, Mt Tomah.

Habitat

Habitat: Moist gullies, creekbanks. Escarpment slopes (M. Robinson pers. comm.).

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Rare–occasional.

Vegetation: Moist sclerophyll forest e.g. with *Eucalyptus deanei*, and moist and dry rainforest margins, and floodplain forest e.g. with *Casuarina glauca*, *Eucalyptus baueriana*. Open-forest *Eucalyptus tereticornis*, *E. pilularis*, disturbed rainforest and margins (M. Robinson, A. Bofeldt pers. comm.).

Substrate: Clay soils from alluvium, shale, basalt, occasionally sandstone gullies, medium to high nutrients. Budgong Sandstone, Coal Measures in Illawarra (M. Robinson p. c.).

Exposure: Sheltered sites, full sun–mid shade, dies out in prolonged heavy shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Status not known.

Calystegia sepium**CONVOLVULACEAE****Life history**

Growth form: Glabrous twining plant.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: White or tinged with pink, December–February.

Fruit/seed: Capsule 7–8 mm long, December–February.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC SWS SWP; Vic., Tas., S.A., W.A., N.Z., temp. regions of Eur., Afr., Amer.

Distribution Sydney area: Mainly near coast.

Select locations: Wisemans Ferry, Lane Cove River, St Ives, Wollongong, Windang, Minnamurra River, Saddleback Mtn.

Habitat

Habitat: Moist forest.

Altitude: 0–200 m **Annual rainfall:** above 800 mm

Typical local abundance: Occasional.

Vegetation: Margins of rainforest and moist eucalypt forest. Swamp forest e.g. with *Casuarina glauca*, and *Phragmites* reedland/swamp forest (at Terragong Swamp, M. Robinson, A. Bofeldt pers. comm.).

Substrate: Variable, clay soils, alluvium, sand dunes.

Exposure:

Conservation

Conservation: Appears to be rare in Sydney area and poorly conserved. Wisemans Ferry is northern geographical limit.

Calystegia silvatica* **CONVOLVULACEAE****Life history**

Growth form: Glabrous twining plant.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: White with pink, October–December.

Fruit/seed: Capsule 1–1.2 mm long.

Dispersal, establishment & growth: Diaspore: seed ? / vegetative, in garden refuse.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S Europe. Introduced as ornamental.

Botanical subregions: NC CC CT; Vic., Tas.

Distribution Sydney area: Wahroonga, Bowral.

Select locations: Wahroonga (1951), Bowral (1972) only records.

Habitat

Habitat:

Altitude: 0–600 m **Annual rainfall:** above 900 mm

Typical local abundance:

Vegetation: Edge of bush with *Canna* and *Tropaeolum*.

Substrate: Clay soil.

Exposure:

Conservation

Conservation: Uncommon, garden escape via refuse dumping.

Calystegia soldanella**CONVOLVULACEAE****Life history**

Growth form: Glabrous twining plant.

Vegetative spread: Roots along stems (Clarke 1989).

Longevity: Short-lived, less than 5 years (Clarke 1989).

Primary juvenile period: Less than 1 year.

Flowers: White, pink or purplish, October–December, peak October.

Fruit/seed: Capsule 12–15 mm long, October–November.

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology, seed viable after burial for short periods, vegetative dispersal by landslip, secondary sand coloniser (Clarke 1989).

Fire response:

Interaction with other organisms: Mycorrhizal association with roots, likely to assist nutrition (Logan et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; LHI, Qld, Vic., Tas.

Distribution Sydney area: Coastline.

Select locations: Bilgola Beach (1925), Manly (1886), Lady Robinsons Beach (1912), Garie Beach, Shellharbour, Bass Point, Gerringong.

Habitat

Habitat: Sandy and rocky coastal areas, foredunes.

Altitude: 0–50 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent.

Vegetation: Hind beach vegetation along seepage areas, swampy e.g. in *Typha* thicket (A. Bofeldt pers. comm.).

Substrate: Marine sands, medium–low nutrient, poor drainage, seepage areas, permanent moisture supply.

Exposure: Seedlings shade-intolerant, sun-tolerant, older plants shade-tolerant (A. Bofeldt pers. comm.).

Conservation

Conservation: Rare in immediate Sydney area i.e. Palm Beach to Port Hacking. Vulnerable in Illawarra area, only 3 sites (A. Bofeldt pers. comm.). Conservation status elsewhere unknown. Mainly South Coast (Clarke 1989).

Convolvulus arvensis* **CONVOLVULACEAE****Life history**

Growth form: Trailing and twining plant to 2 m long, with white, fleshy taproot and numerous horizontal roots to 2 m deep (mostly 60 cm) (Parsons & Cuthbertson 1992).

Vegetative spread: Patches increase by prolific, vigorous root development, shoots can push through asphalt paths, and root segments spread by cultivation machinery (Parsons & Cuthbertson 1992).

Longevity: Perennial.

Primary juvenile period: Less than 2 years (Parsons & Cuthbertson 1992).

Flowers: Funnel-shaped, white or pink, flowers close in dark or dull conditions and individuals last 1 day; late spring–summer (Parsons & Cuthbertson 1992).

Fruit/seed: Capsule, 4–6 cm diam., with 1–4 granular seeds; in dense stands seedbank estimated at 20 million seeds/ha, up to 500 seeds produced per plant, 80 % of seeds with a hard, impermeable coat, dormant in soil at least 20 years, or more than 50 years stored indoors (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: seed/vegetative. Seed dispersed as contaminant of grain, and in animal (including bird) faeces, seeds germinate at any time with adequate moisture (peaks in spring, early summer and autumn), extensive root system to 2 m deep developed within 7 months, allowing plants to persist despite cultivation and moisture stress; aerial growth dies off in cold weather and regrows in spring from roots and crowns (Parsons & Cuthbertson 1992).

Fire response: Probably resprouts.

Interaction with other organisms: Alternate host for viruses that cause diseases of potatoes, tomatoes, and hosts several arthropods and nematodes, suspected of causing photosensitisation in susceptible animals, pigs poisoned after eating roots (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to Europe and Asia.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS SWP.

Distribution Sydney area: Widespread.

Select locations: Chatswood (1912), Eastwood, Enfield, Richmond, Campbelltown, Mittagong, Lucknow, Blayney (1917).

Habitat

Habitat: Cultivated areas, roadsides, railway lines, waste ground.

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Grows on any type of soil, but deep, well-drained, fertile loams most favourable, does not survive on waterlogged soils (Parsons & Cuthbertson 1992).

Exposure: Full sun, intolerant of waterlogging.

Conservation

Conservation: Widespread weed of cultivation (Harden 1992).

Convolvulus erubescens**CONVOLVULACEAE****Life history**

Growth form: Creeper with trailing and twining branches.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Pink, at any time of year, mainly September–May.

Fruit/seed: Capsule round, 4–6 mm diam., with black seeds, October–May.

Dispersal, establishment & growth: No particular dispersal morphology (McIntyre et al. 1995). Soil-stored seedbank (Fox 1988).

Fire response: Killed by fire (Fox 1988). Observed flowering and fruiting within 1 year of high intensity fire (at Lane Cove River 1/94, P. Kubiak pers. comm.).

Interaction with other organisms: Foodplant of Black Swan *Cygnus atratus*, Freckled Duck *Stictonetta nervosa* and Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990). Toxic to stock (E. McBarron, quoted by K. Mair, Herbarium notes).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.

Distribution Sydney area: Widespread in drier areas.

Select locations: Toongabbie, Doonside, Rossmore Camden, Campbelltown, Menangle, Shellharbour, Minnamurra, Capertee, Perthville.

Habitat

Habitat: Woodland and grassland, disturbed sites.

Altitude: 0–800 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassland e.g. with *Themeda australis*, and woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*, *E. amplifolia*, *E. eugenioides*, *E. longifolia* (M. Robinson p. c.).

Substrate: Clay soils on Wianamatta Shale, basalt, medium–high nutrient soils. Berry Siltstone, Bombo Latite in Illawarra (M. Robinson pers. comm.).

Exposure: Full sun to light shade.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991).

Cuscuta australis**CONVOLVULACEAE**

Australian Dodder

Life history

Growth form: Annual, parasitic twiner lacking chlorophyll, with slender yellow–brown stems, leaves reduced to small scales, attaching to host with haustoria (suckers), and lacking roots except as a seedling. Blunt-tipped corolla lobes distinguish it from exotic *Cuscuta campestris* (Auld & Medd 1987).

Vegetative spread: No.

Longevity: Less than 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Cream or white, January–April.

Fruit/seed: Capsule, with lid releasing seed.

Dispersal, establishment & growth: Diaspore: seed; attachment to host plant within days of germination is essential, then root dies (Trounce 1990).

Fire response: Probably killed.

Interaction with other organisms: Parasitic on native and naturalised herbs especially *Persicaria* spp. (Harden 1992).

Distribution

Status/origin: Native.

Botanical subregions: NC CC NWS; Qld, Vic.

Distribution Sydney area: Mainly coastal.

Select locations: Longneck Lagoon, Lower Kowmung River.

Habitat

Habitat: Wetlands.

Altitude: 0–400 m

Annual rainfall: 700–1000 mm

Typical local abundance: Rare.

Vegetation: Floodplain swamp vegetation e.g. with *Juncus usitatus*, *Melaleuca linariifolia*, *Persicaria* spp.

Substrate: Floodplain alluvium, medium nutrients.

Exposure: Full sun.

Conservation

Conservation: Rare, status unknown.

Cuscuta campestris *

CONVOLVULACEAE

Golden Dodder

Life history

Growth form: Annual, parasitic climber lacking chlorophyll, with rich golden stems, leaves reduced to small scales, attaching to host with haustoria (suckers), and lacking roots except as a seedling. Pointed-tipped corolla lobes distinguish it from native *Cuscuta australis* (Auld & Medd 1987).

Vegetative spread: Stem fragments spread on farm equipment or by water, even withered fragments can re-establish if in contact with healthy host (Parsons & Cuthbertson 1992).

Longevity: 1 year. Differs from most other dodders in that stem segments can survive winter on perennial hosts (Parsons & Cuthbertson 1992).

Primary juvenile period: Seeds may be set on plants only 3 weeks old, continuing for several months (Parsons & Cuthbertson 1992).

Flowers: Cream or white, summer. Flowering in young plant, continues for several months (Parsons & Cuthbertson 1992).

Fruit/seed: Capsule, with four seeds, 1 mm diam. Prolific seeder, March–May.

Dispersal, establishment & growth: Diaspore: seed/vegetative. Seed 1–2 mm diam., with roughened coat; water-dispersed, and as contaminant of lucerne and clover seed, animal-dispersed — seeds remain viable in the digestive tracts of animals e.g. cows, sheep, goats, kangaroos, and spread in mud on feet of birds, may be dormant in soil for at least 5 years (Parsons & Cuthbertson 1992). Can be spread in grain, hay or vehicles; seeds germinate spring–autumn, attachment to host plant within days of germination is essential, then root dies; grows rapidly, flowering and seeding continuously (Trounce 1990).

Fire response: Killed by fire.

Interaction with other organisms: Recorded on more than 80 hosts, most commonly *Polygonum* spp. and *Xanthium* spp., stock poisoning not significant in Australia (Parsons & Cuthbertson 1992). Parasitic on cultivated plants especially Asteraceae species, also Lucerne *Medicago sativa* and naturalised herbs including *Bidens pilosa*, *Sisymbrium*, *Chenopodium*.

Distribution

Status/origin: Naturalised exotic, native to America. Introduced as a contaminant of agricultural seed (Parsons & Cuthbertson 1992).

Botanical subregions: NC CC NT NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., S.A.

Distribution Sydney area: Coast and western Sydney.

Select locations: Glenorie, Richmond (1913), Berkshire Park, Flemington, Vaucluse, Maroubra.

Habitat

Habitat: Garden, saleyard.

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation: Cultivated and weed plants.

Substrate: Clay soils.

Exposure:

Conservation

Conservation: Declared noxious weed in NSW (Trounce 1990), rarely recorded in Sydney area. Identification of dodders previously confused, *Cuscuta campestris* now regarded as the most important weedy dodder in Australia, not *C. epithymum* which may not occur, or is rare here (Parsons & Cuthbertson 1992).

Dichondra repens

CONVOLVULACEAE

Kidney Weed

Life history

Growth form: Creeping herb.

Vegetative spread: Rooting at the nodes. (McIntyre et al. 1995).

Longevity: Perennial.

Primary juvenile period:

Flowers: September–February, peak November.

Fruit/seed: Capsule, opening irregularly, 2 valved each with 1–2 seeds.

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990), dispersed in mud on cars (Wace 1977). Growing period Summer. Coloniser.

Fire response: Probably resprouts, from stolons.

Interaction with other organisms: Seed eaten by Pacific Black Duck *Anas superciliosa* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS SWP; Qld, Vic., Tas., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: Matcham, Richmond, Newington, Camden, Douglas Park, Appin, Albion Park, Mt Toinhiny, Mt Wilson, Kowmung River, Mt Jellore.

Habitat

Habitat: Woodland, creek-flats.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Creek-flat woodland e.g. with *Eucalyptus elata*, *Melaleuca linariifolia*. Dry rainforest, woodland e.g. with *Eucalyptus eugenoides*, *E. longifolia* (at Yallah, M. Robinson p. c.).

Substrate: Clay soils or sandy soils with clay influence e.g. from Wianamatta Shale, basalt, medium-high nutrient. Bombo Latite, Budgong Sandstone, Berry Siltstone, Marine sands in Illawarra (M. Robinson pers. comm.). Recorded on saline sites in western NSW (Semple 1993).

Exposure: Mid to light shade.

Conservation

Conservation: Widespread, conservation probably adequate, conserved in Western Sydney (Benson & McDougall 1991).

Dichondra species A

CONVOLVULACEAE

Kidney Weed

Life history

Growth form: Herb with creeping stems.

Vegetative spread: Yes (McIntyre et al. 1995), creeping stems rooting at the nodes.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Pale greenish yellow, spring–summer.

Fruit/seed: 2-lobed capsule, each lobe with 1–2 seeds.

Dispersal, establishment & growth: Diaspore: seed/fruit. No particular dispersal mechanism (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution**Status/origin:** Native.**Botanical subregions:** CC NT CT ST NWS CWS SWS NWP SWP; Qld.**Distribution Sydney area:** Widespread.**Select locations:** Otford, Camden, Bathurst (1909).**Habitat****Habitat:** Woodland, often on alluvial flats.**Altitude:** 0–800 m**Annual rainfall:** above 600 mm**Typical local abundance:****Vegetation:** Woodland.**Substrate:** Alluvial flats.**Exposure:****Conservation****Conservation:** Few records, status unknown.***Evolvulus alsinoides* var. *decumbens*****CONVOLVULACEAE****Life history****Growth form:** Subshrub or herb, with hairy, erect or ascending branches to 40 cm long.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Blue, throughout the year.**Fruit/seed:** Capsule 3–4 mm diam.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NWS CWS SWS NWP SWP NFWP; Qld, N.T., S.A., W.A., SE Asia & Pacif.**Distribution Sydney area:** Burragorang Valley.**Select locations:** The Sheepwalk (Jooriland Creek) (1967).**Habitat****Habitat:****Altitude:** 0–200 m**Annual rainfall:** 800 mm**Typical local abundance:** Frequent.**Vegetation:** Grassy woodland.**Substrate:** Rock ledges at tops of road cuttings, soft sandstone.**Exposure:****Conservation****Conservation:** Rare, only 1 record for Sydney area. Widespread elsewhere, but usually not common (Harden 1992).***Ipomoea cairica* *****CONVOLVULACEAE**

Morning Glory

Life history**Growth form:** Trailer, climber, rooting at nodes, leaves palmatisect.**Vegetative spread:** Trailing stems rooting at nodes.**Longevity:** Perennial, 5–30 years (Clarke 1989).**Primary juvenile period:** Less than 1 year (Clarke 1989).**Flowers:** Funnel-shaped, violet–purplish violet, rarely white, September–June.**Fruit/seed:** Papery capsule, 9–11 mm diam., splitting into 4 valves each containing 1 brown seed with long white silky hairs attached (R. Buchanan pers. comm.), throughout the year (Clarke 1989).

Dispersal, establishment & growth: Diaspore: seed/vegetative. Prolific seeder and germinator, dispersed by wind, gravity and vegetatively by stolons through dumping of rubbish (R. Buchanan pers. comm.). Seeds not viable after burial, secondary and tertiary sand coloniser (Clarke 1989).

Fire response: Resprouted from base after high intensity fire (at Narrabeen Lake 1/94, P. Kubiak pers. comm.).

Interaction with other organisms: Mycorrhizal association with roots (Logan et al. 1989). Used medicinally in Fiji (Cambie & Ash 1994).

Distribution

Status/origin: Naturalised exotic, native to tropical Africa & Asia. Introduced as an ornamental.

Botanical subregions: NC CC SC NFWP; L.H.I., Qld, Vic., S.A., W.A.

Distribution Sydney area: Coastal areas.

Select locations: Avoca, Narrabeen, Manly (1887, 1902), Lane Cove, Botany, Windang Island, Shellharbour, Gerringong, Kiama, Jamberoo.

Habitat

Habitat: Headlands, sea cliffs, fore dunes, back dunes. Creeks, riverbanks, roadside.

Altitude: 0–100 m **Annual rainfall:** above 1100 mm

Typical local abundance: Frequent.

Vegetation: Littoral rainforest.

Substrate: Marine sands, Budgong Sandstone in Illawarra (M. Robinson pers. comm.).

Exposure: Seedlings sun-tolerant, shade intolerant (Clarke 1989).

Conservation

Conservation: Widely cultivated as an ornamental, and frequently naturalised along the coast, for example on the Pittwater Peninsular where it is a problem weed.

***Ipomoea indica* ***
CONVOLVULACEAE

Blue Morning Glory

Life history

Growth form: Twiner, to 30 m (R. Buchanan pers. comm.).

Vegetative spread: Yes, stem fragments.

Longevity: Perennial.

Primary juvenile period:

Flowers: Funnel-shaped, violet-blue, mainly spring–autumn.

Fruit/seed: Fruit not set in Australia (Harden 1992)

Dispersal, establishment & growth: Diaspore: stem fragments, dispersed with dumped garden refuse.

Fire response: Resprouted from base after high intensity fire (at Lane Cove River, Narrabeen Lake 1/94), flowering in 4–7 months (P. Kubiak pers. comm.). Resprouts from buried nodes after low intensity fire (R. Buchanan pers. comm.).

Interaction with other organisms: Smothers large trees (R. Buchanan p. c.).

Distribution

Status/origin: Naturalised exotic, widely cultivated. Native to tropical regions.

Botanical subregions: NC CC NWP; Qld, Vic., S.A.

Distribution Sydney area: Coastal.

Select locations: Eastwood, Curl Curl, Northbridge, McMahons Pt (1915), Hurstville, Wheeny Bay, Campbelltown, Coledale Beach, Albion Park, Mt Coolangatta.

Habitat

Habitat: Creeks, drainage lines.

Altitude: 0–200 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Swamp forest e.g. climbing on *Casuarina glauca*, moist forest along creeks, and in sedgeland e.g. with *Phragmites* communities.

Substrate: Clay soil on alluvium, sandy soils on sand dunes, sandstone gullies, low–medium nutrient. On Budgong Sandstone, Unanderra Coal member in Illawarra (M. Robinson p. c.).

Exposure: Full sun–light shade.

Conservation

Conservation: Widely cultivated, naturalised and spreads over native and introduced plants.

Ipomoea pes-caprae* subsp. *brasiliensis**CONVOLVULACEAE**

Morning Glory

Life history**Growth form:** Trailing plant, rooting at nodes.**Vegetative spread:** Trailing stems rooting from nodes.**Longevity:** Short-lived perennial (less than 5 years) (Clarke 1989).**Primary juvenile period:** Less than 1 year.**Flowers:** Funnel-shaped, rose-purple, throughout the year.**Fruit/seed:** Capsule, 10–18 mm diam., splitting into 4 valves.**Dispersal, establishment & growth:** Diaspore: seed. Prolific seeder and germinator, dispersed by gravity or water (Anon 1991), vegetative dispersal absent (Clarke 1989), secondary sand coloniser.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC; L.H.I., Qld, N.T., W.A.**Distribution Sydney area:** Port Hacking.**Select locations:** Jibbon Beach (1947, 1952).**Habitat****Habitat:** Coastal sand dunes, incipient foredunes.**Altitude:** 0–50 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:** Marine sand.**Exposure:** Seedlings sun-tolerant, shade intolerant (Clarke 1989).**Conservation****Conservation:** Status unknown.***Ipomoea purpurea* *****CONVOLVULACEAE**

Morning Glory

Life history**Growth form:** Twiner, with hairy branches.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Funnel-shaped, white, purplish violet, or violet blue, January–June.**Fruit/seed:** Capsule 8–10 mm diam., splitting into 3 valves, January–August.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to tropical & subtropical America.

Introduced as an ornamental.

Botanical subregions: NC CC SC SWP; Qld.**Distribution Sydney area:** Suburbs.**Select locations:** Hornsby (1914), Cheltenham, Mascot, Ermington, McGraths Hill,

Liverpool, Mulgoa, Elderslie, Campbelltown, Wollongong.

Habitat**Habitat:** Roadsides, rubbish dumps, wasteland.**Altitude:** 0–200 m**Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** With roadside weeds.**Substrate:** Sandy and clayey soils, volcanic necks, low–medium nutrient soils.**Exposure:****Conservation****Conservation:** Garden escape, reported as 'causing much trouble to orchardists in this district by taking possession of the land under crop', at Hornsby (Herbarium specimen 1914).

Polymeria calycina**CONVOLVULACEAE****Life history**

Growth form: Prostrate, pubescent creeper with trailing and twining stems.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Pink, purple-violet, September–January.

Fruit/seed: Capsule, 4–6 mm diam., seeds hairy.

Dispersal, establishment & growth: Diaspore: seed. Germination after mechanical disturbance e.g. after grading (M. Robinson pers. comm.).

Fire response: Prolific growth in less than 6 months, ?from seed, after high intensity fire (1/95 at West Head L. McD.). Resprouted after high intensity fire (at Narrabeen Lake 1/94), fruiting within 13 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; Qld, N.T., W.A.

Distribution Sydney area: Mainly coast.

Select locations: Avoca, Pearl Beach, Hornsby, Avalon, St Ives, Homebush Bay, Cooks River, Albion Park, Shellharbour, Wallacia, Bimlow.

Habitat

Habitat: Disturbed sites e.g. cleared, burnt, roadsides, and swampy areas.

Altitude: 0–200 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Moist open-forest e.g. with *Eucalyptus saligna*, *E. pilularis*; woodland e.g. with *Eucalyptus fibrosa*, *E. punctata*, *E. tereticornis*, *Angophora costata*, *E. longifolia*, *Melaleuca decora*.

Substrate: Medium nutrient clay soils from shale, siltstone, lagoon margins.

Exposure: Open areas, full sun.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), not conserved in Illawarra where it is rare/uncommon (M. Robinson pers. comm.), status elsewhere unknown.

Wilsonia backhousei**CONVOLVULACEAE****Life history**

Growth form: Perennial subshrub with procumbent branches to 15 cm high, mat-forming.

Vegetative spread: Roots from prostrate, elongating stems to form prostrate mat to 2 m across.

Longevity:

Primary juvenile period:

Flowers: Flowers October–December.

Fruit/seed: Indehiscent capsule with 1–2 seeds, mature December.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; Vic., Tas., S.A., W.A.

Distribution Sydney area: Parramatta River, Georges River, coastline.

Select locations: Parramatta River at Ermington, Homebush Bay, Hen and Chicken Bay (1917), Cooks River (1905), Salt Pan Creek, Clovelly.

Habitat

Habitat: Tidal flats of rivers and on sea cliff tops.

Altitude: 0–25 m **Annual rainfall:** above 1200 mm

Typical local abundance: Occasional.

Vegetation: Saltmarsh and cliff top.

Substrate: Silt and clay deposit of tidal river flats. Watertable mostly high, moisture supply continuous, saline.

Exposure: Indifferent to exposure, no shade.

Conservation

Conservation: Rare saltmarsh species, possibly once more frequent but now needing protection (Adam 1981).

***Bryophyllum delagoense* *** (*Kalanchoe tubiflora*)**CRASSULACEAE**

Mother-of-millions

Life history

Growth form: Slender, succulent, erect herb to 1 m high, stems cylindrical, pinkish brown or greyish.

Vegetative spread: Plantlets formed at leaf apex.

Longevity: Perennial.

Primary juvenile period:

Flowers: Tubular, salmon-coloured to scarlet.

Fruit/seed: 4 clustered follicles, many-seeded.

Dispersal, establishment & growth: Diaspore: local dispersal by plantlets, in dense masses, longer distance dispersal in dumped garden refuse.

Fire response:

Interaction with other organisms: Caused death in cattle, also toxic to humans (Auld & Medd 1987).

Distribution

Status/origin: Naturalised exotic, native to S Africa, Madagascar, introduced as ornamental.

Botanical subregions: NC CC SC NWS NWP.

Distribution Sydney area: Mainly coastal.

Select locations: Hardys Bay, Barrenjoey, Curl Curl, Northbridge (1951), Watsons Bay, La Perouse, Ingleburn (1967), Minnamurra Sand Spit.

Habitat

Habitat: Roadsides, headlands, foreshores.

Altitude: 0–300 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Scrub and woodland.

Substrate: Clay soils from shale, sandy soils from sandstone, low–medium nutrients.

Exposure:

Conservation

Conservation: Naturalised, often in locally dense patches, and capable of invading bushland.

Bryophyllum pinnatum* **CRASSULACEAE**

Live Plant, Resurrection Plant

Life history

Growth form: Glaucous, succulent shrub 0.3–2 m high, suckering at base.

Vegetative spread: Rhizomatous.

Longevity: Perennial.

Primary juvenile period:

Flowers: Reddish, October.

Fruit/seed: 4 clustered follicles, many-seeded.

Dispersal, establishment & growth: Diaspore: probably roots from stem fragments.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, probably native to Africa.

Botanical subregions: NC CC NWP; Qld.

Distribution Sydney area: Bouddi, Manly.

Select locations: Bouddi NP (1986), Manly Dam (1984).

Habitat

Habitat: Disturbed sites, beside tracks.

Altitude: 0–100 m **Annual rainfall:** above 1200 mm

Typical local abundance: Occasional.

Vegetation: Eucalypt woodland.

Substrate: Shallow sandy soil, low nutrients.

Exposure:

Conservation

Conservation: Escape from cultivation, not common (Harden 1990).

Crassula decumbens* var. *decumbens**CRASSULACEAE****Life history**

Growth form: Erect or decumbent herb with stems 3–10 cm long, much-branched.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: White to cream.

Fruit/seed: Dehiscent capsule (follicle), with 4–12 seeds.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC NT ST NWS CWS SWS SWP; Vic., Tas., S.A., W.A., S Afr.

Distribution Sydney area: Coastal.

Select locations: Watsons Bay, Bradleys Head, Kogarah, Kurnell, Nowra.

Habitat

Habitat: Moist places.

Altitude: 0–100 m **Annual rainfall:** above 1200 mm

Typical local abundance:

Vegetation:

Substrate: Shallow sand over rock, bare areas, low nutrients, in moist places, recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Possibly now rare in Sydney area, mostly old records, pre 1960.

Crassula helmsii**CRASSULACEAE**

Swamp Stonecrop

Life history

Growth form: Decumbent or ascending aquatic herb, with stems to 30 cm long when rooting at nodes or floating in water, or ascending to 12 cm long. Submerged plants produce long branches that float on surface, on moist soil they form small cushions with densely clustered leaves (Toelken 1981).

Vegetative spread: Stems root at nodes.

Longevity: 1 year.

Primary juvenile period: Less than 1 year. Reported as perennial in Victoria (Aston 1977).

Flowers: White.

Fruit/seed: Dehiscent follicle, with 4–10 seeds.

Dispersal, establishment & growth: Diaspore: seed/possibly stem fragments.

Fire response:

Interaction with other organisms:

Distribution**Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST SWS SWP; Vic., Tas., S.A., W.A., N.Z.**Distribution Sydney area:****Select locations:** Manly, Ingleburn, Cooks River (1906), Lithgow.**Habitat****Habitat:** Permanently wet areas, dams, ditches.**Altitude:** 0–1000 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:****Substrate:** Clay soils, moist or submerged, medium nutrients.**Exposure:****Conservation****Conservation:** Rare, only 4 records for Sydney area.***Crassula multica* *****CRASSULACEAE****Life history****Growth form:** Decumbent herb with stems to 40 cm long.**Vegetative spread:** yes (seeds not usually formed)**Longevity:****Primary juvenile period:****Flowers:** Cream, tinged with red, July–November.**Fruit/seed:** Dehiscent follicle, with 12–20 seeds, but usually not formed.**Dispersal, establishment & growth:** Diaspore: stem fragments, probably dispersed by dumping of garden refuse.**Fire response:** Possibly resprouting after high intensity fire (at Narrabeen Lake 1/94), flowering within 10 months (P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S Africa, introduced as ornamental.**Botanical subregions:** CC; S.A.**Distribution Sydney area:** Widespread.**Select locations:** Boudi NP, Northbridge (1951), Yarramundi, Albion Park.**Habitat****Habitat:** Gardens, bushland margins.**Altitude:** 0–200 m**Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:****Substrate:** Sandy soil, low nutrients.**Exposure:****Conservation****Conservation:** Naturalised around Sydney Harbour on disturbed bushland margins (Harden 1990, and Illawarra (M. Robinson pers. comm.).***Crassula sarmentosa* var. *sarmentosa* *****CRASSULACEAE****Life history****Growth form:** Prostrate herb, with irregularly shaped tubers that produce stems to 80 cm long, scarcely branched.**Vegetative spread:** Probably by tuber expansion.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Star-shaped, white or tinged with red,**Fruit/seed:** Dehiscent follicle, with 12–16 seeds. No information on whether viable seeds are developed in Australia.**Dispersal, establishment & growth:** Diaspore: seed?/tuber.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to S Africa.

Botanical subregions: CC SC.

Distribution Sydney area: Bouddi, Nowra.

Select locations: Bouddi NP (1986), Nowra.

Habitat

Habitat:

Altitude: 0–100 m **Annual rainfall:** above 1200 mm

Typical local abundance: Rare.

Vegetation: Eucalypt open-forest e.g. with *Eucalyptus maculata*, *E. paniculata*, *E. longifolia*.

Substrate: Sandy soil, low nutrient.

Exposure:

Conservation

Conservation: Uncommon, a garden escape occasionally locally naturalised from dumping of garden refuse.

Crassula sieberiana**CRASSULACEAE**

Australian Stonecrop

Life history

Growth form: Erect or decumbent herb, with stems to 20 cm long. Some botanists recognise several subspecies.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: Annual or perennial. Possibly short-lived 1–3 years.

Primary juvenile period:

Flowers: Pale yellow to red, July–February.

Fruit/seed: Dehiscent capsule (follicle), with 2 seeds.

Dispersal, establishment & growth: Diaspore: seed, mobile (McIntyre et al. 1995).

Growing in winter (Glenorie '93).

Fire response: Probably killed, seedlings recorded less than 1 year after fire (Purdie 1977), flowering within 7 months after high intensity fire (at Lane Cove River 1/94, P. Kubiak p. c.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP

SFWP; L.H.I., Qld, Vic., Tas., N.T., S.A., W.A., N.Z.

Distribution Sydney area: Coast and mountains.

Select locations: West Head, Naremburn, La Perouse, Port Hacking, Razorback, Mt Towingingy, Mt Wilson, Nellies Glen, Mt Canobolas, Hill Top, Bowral, Kowmung River.

Habitat

Habitat: On hillsides and rocks.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: In moss mats in open-forest e.g. with *Casuarina*.

Substrate: Damp rocks on basalt, trachyte, sandstone.

Exposure:

Conservation

Conservation: Status unknown.

Crassula tetragona* subsp. *robusta***CRASSULACEAE****Life history**

Growth form: Erect herb 30–50 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Cream or white, summer.

Fruit/seed: Dehiscent follicle, with 6–10 seeds.

Dispersal, establishment & growth: Diaspore: seed?

Fire response:

Interaction with other organisms:

_____ **Distribution**

Status/origin: Naturalised exotic, native to S Africa.

Botanical subregions: NC CC; S.A.

Distribution Sydney area: Camden.

Select locations: Brownlow Hill (1970).

_____ **Habitat**

Habitat: Road cutting.

Altitude: 0–300 m

Annual rainfall: 700 mm

Typical local abundance: Frequent.

Vegetation: Open-forest e.g. with *Eucalyptus moluccana*.

Substrate: Steep road cuttings on shale, medium nutrients.

Exposure:

_____ **Conservation**

Conservation: Occasionally naturalised around habitation (Harden 1990).

Sedum acre *

CRASSULACEAE

_____ **Life history**

Growth form: Creeping or ascending herb, with yellow-green stems 5–25 cm long.

Vegetative spread: Mat-forming.

Longevity:

Primary juvenile period:

Flowers: Yellow,

Fruit/seed: Capsule (follicle) to 2.5 mm long.

Dispersal, establishment & growth: Diaspore: probably stem fragments.

Fire response:

Interaction with other organisms:

_____ **Distribution**

Status/origin: Naturalised exotic, native to Europe, introduced as ornamental.

Botanical subregions: NT CT ST; Vic., Tas.

Distribution Sydney area: Clarence.

Select locations: Clarence (1915).

_____ **Habitat**

Habitat:

Altitude: 1100 m

Annual rainfall: 1100 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

_____ **Conservation**

Conservation: Infrequent garden escape, rarely recorded in Sydney area

Sedum dendroideum *

CRASSULACEAE

_____ **Life history**

Growth form: Erect or decumbent shrub, with stems to 2 m high, or trailing to 5 m long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, June–November.

Fruit/seed: Capsule (follicle) to 2.5 mm long.

Dispersal, establishment & growth: Diaspore:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to tropical America, introduced as ornamental.

Botanical subregions: CC.

Distribution Sydney area: Mainly south-west Sydney.

Select locations: Kurrajong, Northbridge (1951), Lugarno (1953), Camden, Maldon.

Habitat

Habitat: Roadsides, rocky slopes.

Altitude: 0–300 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent.

Vegetation: Open-forest e.g. with sandstone species or *Eucalyptus moluccana*.

Substrate: Rocky areas or sandstone, or shale cuttings.

Exposure:

Conservation

Conservation: Cultivated, occasionally naturalised (Harden 1990). Spreading from old cultivation sites downslope into bushland.

Citrullus lanatus *

CUCURBITACEAE

Wild Melon, Camel Melon, Bitter Melon

Life history

Growth form: Trailing plant, with hairy stems and tendrils, stout taproot with numerous laterals. Unpleasant odour when crushed (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 9 months.

Primary juvenile period: 3–6 months.

Flowers: Yellow, separate male and female flowers on same plant, summer.

Fruit/seed: Fleshy melon fruit, 12–30 cm diam., hairy, green mottled with pale green or yellowish, with numerous seeds, 9–10 mm long, autumn.

Dispersal, establishment & growth: Diaspore: fruit. Seeds retained within dried fruit which is blown by wind and carried on water, once seeds are shed they are spread by wind and water, and on cultivation equipment, seeds known to stick to feathers of some birds, cattle cause some spread; seeds probably dormant for several years (Parsons & Cuthbertson 1992). Growth commences from seed in spring or summer and the plant matures during autumn. Established plants are extremely drought-tolerant and rarely die without fruiting (Cunningham et al. 1981).

Fire response:

Interaction with other organisms: Commercial melon and pie melon are selections of this species, believed to be the melon which, in biblical times, the Israelites regretted leaving in Egypt (Numbers 11.5); 'good melon years' made crossing of Kalahari Desert possible (Parsons & Cuthbertson 1992). Seed eaten by Sulphur-crested Cockatoo *Cacatua galerita* (Lepschi 1993).

Distribution

Status/origin: Naturalised exotic, native to tropical and southern Africa, introduced through nursery trade (in Tasmania 1836), also possibly introduced with Afghan camels in 1860s (Parsons & Cuthbertson 1992).

Botanical subregions: NC CC SC ST CWS SWP NWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area: Sydney suburbs.

Select locations: Cheltenham (1946), Narellan, Campbelltown.

Habitat

Habitat: Garden.

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance: Rare.

Vegetation: Cultivated area.

Substrate: Clay soils. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Mostly in semi-arid areas, a few records for gardens in Sydney area.

Cucumis myriocarpus* **CUCURBITACEAE**

Paddy Melon

Life history

Growth form: Climber or trailer with tendrils, and stems to 2 m long. Taproot with numerous fibrous surface roots (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 9 months.

Primary juvenile period: 3–6 months.

Flowers: Yellow, separate male and female flowers on same or different plants, summer–autumn.

Fruit/seed: Fleshy, indehiscent fruit, 15–25 mm diam., usually with hooked bristles, yellow when ripe, containing a fleshy pulp and numerous oblong pale yellow seeds, 3.5–4 mm long.

Dispersal, establishment & growth: Diaspore: fruit, spread by cultivation equipment and birds (Parsons & Cuthbertson 1992). May be introduced with cattle. In western NSW, often abundant after summer rains (Cunningham et al. 1981).

Fire response:

Interaction with other organisms: Foodplant of Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons* and Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990). (Barker & Vestjens 1989, 1990). Sparingly grazed by stock. Fruit bitter, acts as an emetic, some reports of stock poisoning (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to S Africa.

Botanical subregions: CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., N.T., S.A.

Distribution Sydney area: Tablelands.

Select locations: Homebush (1895), Flemington Saleyards, Kowmung River, Glen Davis, Sofala.

Habitat

Habitat: Cultivated or disturbed areas, roadsides.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Grassy flats.

Substrate: Usually on sandy soils. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Widespread weed in cultivated or disturbed areas in drier parts of the State. Probably extinct in Homebush–Flemington area.

Cucurbita maxima* **CUCURBITACEAE**

Pumpkin

Life history

Growth form: Sprawling herb, with scabrous stems several metres long with tendrils.

Vegetative spread: No.

Longevity: 6 months.

Primary juvenile period: 3 months.

Flowers: Yellow, separate male and female flowers on the same plant, spring–summer.

Fruit/seed: Fleshy, indehiscent, 10–40 cm diam., with numerous, flattened seeds, 1.5 mm long.

Dispersal, establishment & growth: Diaspore: seed, dispersed in garden refuse.

Fire response: Killed.

Interaction with other organisms: Widely cultivated for its edible fruit. Pollinated by honey bees, valuable source of pollen during drought (Clemenson 1985).

Distribution

Status/origin: Naturalised exotic, native to America. Introduced as a crop plant.

Botanical subregions: NC CC SWP.

Distribution Sydney area: Sydney suburbs.

Select locations: Roseville East (1951), Glenfield, Leumeah.

Habitat

Habitat: Roadsides, vacant land.

Altitude: 0–50 m **Annual rainfall:** above 800 mm

Typical local abundance: Rare.

Vegetation: Roadside weeds.

Substrate: Clay soils on shale.

Exposure: Full sun.

Conservation

Conservation: Garden plant occasionally naturalised near habitation, rubbish dumps or along road, not invasive of bushland.

Sicyos australis**CUCURBITACEAE****Life history**

Growth form: Herb, stems several metres long with tendrils, climbing over shrubs.

Vegetative spread: No.

Longevity: 1–5 years.

Primary juvenile period: Less than 1 year.

Flowers: Whitish, separate male and female flowers on the same plant.

Fruit/seed: Green, fleshy fruit, 7–12 mm long, bristly, 1-seeded. Fruit dries out developing into a burr (M. Robinson pers. comm.). Seeds 6 mm long, March–July. Long viability of soil-stored seed (A. Bofeldt pers. comm.).

Dispersal, establishment & growth: Diaspore: burr, animal-dispersed by attachment

Fire response: Probably killed. Reported growing over burnt scrub (Herbarium specimen Cambewarra). Prolific germination after fire and other disturbance (A. Bofeldt pers. comm.).

Interaction with other organisms: Wollongong University is assessing fruit for pharmaceutical compounds (M. Robinson pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; Qld, Vic., Tas., N.Z.

Distribution Sydney area: Mainly coastal (Harden 1990).

Select locations: Putty, Kowmung River, Kurrajong Heights, Abbotsbury, Razorback Range, Bulli, Woonoona, Kiama, Jamberoo, Kangaroo Valley.

Habitat

Habitat: Steep slopes often dry and rocky, escarpments, creek banks, gullies.

Altitude: 0–500 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Margins of warmer rainforest e.g. with *Pisonia umbellifera*, *Dendrocnide excelsa*, and dry rainforest e.g. with *Streblus brunonianus*, *Ehretia acuminata*, *Alphitonia excelsa*, *Ficus rubiginosa*. Dry rainforest, sub-tropical rainforest and rainforest/open-forest ecotone in Illawarra (A. Bofeldt pers. comm.).

Substrate: Clay loam from volcanics, laterite, shale, sandstone, alluvium, medium–high nutrients, well-drained. On Budgong Sandstone, Bombo Member Latite in Illawarra (M. Robinson pers. comm.).

Exposure: Full sun–mid-shade (M. Robinson pers. comm.).

Conservation

Conservation: Rare in Western Sydney, uncommon in the Illawarra region (Mills, Herbarium specimen note 1988). Lowland rainforest habitat not conserved in Illawarra (A. Bofeldt pers. comm.).

Acrophyllum australe**CUNONIACEAE****Life history**

Growth form: Small shrub 1–2 m high, multistemmed from lignotuber, with whorled leaves in 3s.

Vegetative spread: No

Longevity: Medium.

Primary juvenile period:

Flowers: White, November–December.

Fruit/seed: Capsule, 3 mm long.

Dispersal, establishment & growth: Diaspore: seed, seedling flowered at 2 years in cultivation (Herbarium note).

Fire response: Probably resprouts from lignotuber.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Mid Blue Mountains, very restricted.

Select locations: Burrell Swamp, Springwood, Linden, Woodford, Hazelbrook.

Habitat

Habitat: Damp crevices and rock faces on sandstone, usually near waterfalls, soaks.

Altitude: 350–700 m

Annual rainfall: 1000–1100 mm

Typical local abundance: Rare–occasional.

Vegetation: Wet rock vegetation e.g. with *Gleichenia rupestris*, *G. microphylla*, *Callicoma serratifolia*, *Sticherus*, *Allania endlicheri*.

Substrate: In crevices of damp rocks, moist clayey soil on Hawkesbury Sandstone, with damp humus accumulation, low nutrient, permanent moisture.

Exposure: Mid-shade, sheltered southerly aspects.

Conservation

Conservation: Restricted local endemic species, inadequately conserved, partly in Blue Mountains NP. Coded 2VCi on national rare species list (ROTAP 1995).

Aphanopetalum resinosum

CUNONIACEAE

Gum Vine

Life history

Growth form: Straggling climber with shining leaves.

Vegetative spread: Possibly.

Longevity:

Primary juvenile period:

Flowers: Pale green September–December.

Fruit/seed: One-seeded nut 2–3 mm long, surrounded by a persistent calyx, mature December.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST CWS; Qld.

Distribution Sydney area: Coast e.g. Royal NP, Razorback, Hunter Valley.

Select locations: Kincumber, Eastwood, Kogarah, Stanwell Park, Grose Vale, Razorback, Robertson, Foxground, Wombeyan Caves, Katoomba, Kanangra.

Habitat

Habitat: Levee banks, rocky slopes (M. Robinson pers. comm.).

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation: Most types of rainforest or vine thicket, wet gullies, often a straggling shrub in more open sites or along streams in open-forest.

Substrate: Localised enriched pockets, high nutrient soils, e.g. from shales, basalt, rocky sites. On Budgong Sandstone, Bombo Latite in Illawarra (M. Robinson pers. comm.).

Exposure: Mid–light shade.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.

Caldcluvia paniculosa

CUNONIACEAE

Soft Corkwood, Rose-leaf Marara

Life history**Growth form:** Small to medium-sized tree 10–20 m with thick, corky bark.

Leaves with 3–7 leaflets.

Vegetative spread:**Longevity:** Long-lived, more than 100 years (A. Bofeldt pers. comm.).**Primary juvenile period:****Flowers:** White, early summer.**Fruit/seed:** Capsule, 2–3 mm long, seeds hairy, very small and light.**Dispersal, establishment & growth:** Diaspore: seed, wind and water-dispersed, germination 1–3 months (A. Bofeldt pers. comm.). Establishes on margins of rainforest as a pioneer species, sometimes persisting as a canopy species (Harden 1990).**Fire response:** Killed (A. Bofeldt pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC; Qld.**Distribution Sydney area:** Ourimbah northwards.**Select locations:** Palmdale, Ourimbah Creek.**Habitat****Habitat:** Water-courses, moist sheltered gullies (A. Bofeldt pers. comm.).**Altitude:** 0–100 m **Annual rainfall:** 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Sub-tropical, warm temperate, and riverine rainforest (A. Bofeldt p. c.).**Substrate:** Yellow-brown sandy clay to sandy loams, from Narrabeen sandstone, alluvium, medium nutrient, well-drained.**Exposure:** Sheltered, mid to full shade, mature tree tolerates full sun, intolerant of hot dry conditions (A. Bofeldt pers. comm.).**Conservation****Conservation:** Southern limit is Ourimbah and poorly conserved there (A. Bofeldt p. c.).***Callicoma serratifolia***

CUNONIACEAE

Black Wattle

Life history**Growth form:** Tall shrub or small tree to 15 m (occasionally 20 m) high. Leaves reported to contain small quantity of saponin (Hurst 1942).**Vegetative spread:** No.**Longevity:** More than 50 years (A. Bofeldt pers. comm.).**Primary juvenile period:** ? 3–5 years.**Flowers:** Flower heads yellowish, probably insect-pollinated, October–December, peak October.**Fruit/seed:** Capsule, clustered in heads c. 15 mm diam., seeds 1.5 mm long, 1–4 per fruit, mature ? December–August.**Dispersal, establishment & growth:** Diaspore: seed, probably water-dispersed or wind-dispersed locally. Possibly soil-stored seedbank 1–3 years, germination usually 1–3 months, often on mossy rocks and trunks of tree ferns (A. Bofeldt pers. comm.). Quick-growing coloniser; frost-tender (APSG). Not drought tolerant and dies quickly without adequate soil moisture.**Fire response:** Resprouted from base after high intensity fire (at Killarney Hts 12/1990, Deep Creek 1/1994, Katandra 1/1994, L.McD.), seedlings observed within 4 months of high intensity fire (at Lane Cove River 1/94, P. Kubiak pers. comm.).**Interaction with other organisms:** Most usual larval food plant of butterfly Eastern Flat *Netrocoryne repandra repandra*; it creates a shelter by rolling the leaf and devours the whole leaf except the midrib (Common & Waterhouse 1982). Food plant of moths *Aenetus splendens*, *Cryptophasa albacosta*, Emperor Moth *Opodiphthera astrophela* (Common 1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT; Qld.

Distribution Sydney area: Widespread.

Select locations: Laughtondale, Gosford, Galston, Cheltenham, Mona Vale, Bellevue Hill, Waterfall, Mt Kembla, Berry, Glenbrook, Bargo, Coricudgy Creek, Blackheath, Belmore Falls.

Habitat

Habitat: Banks of perennial creeks, moist gullies. Moist cliff faces, escarpment slopes (M. Robinson pers. comm.).

Altitude: 0–1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Warm temperate rainforest e.g. with *Ceratopetalum apetalum*, *Doryphora sassafras*, *Cryptocarya glaucescens*, riparian scrubs e.g. with *Tristaniopsis laurina*, *Ceratopetalum apetalum*, *Backhousia myrtifolia*.

Substrate: Sandy soils along rocky sandstone creeks, in rocky gullies on sandstone, well-drained, low nutrient soil. Indicative of moist conditions. Hawkesbury Sandstone, Narrabeen series, Crinarite and alluvium in Illawarra (M. Robinson pers. comm.).

Exposure: Sheltered–exposed, full sun–deep shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Widespread in major national parks and adequately conserved, however may be threatened by changes to creek flow and water quality, invasion of exotic species such as *Ligustrum* spp. and *Ageratina* spp. that shade out seedlings, and reduction in creek flow causing periodic drying out of habitat.

Ceratopetalum apetalum**CUNONIACEAE**

Coachwood

Life history

Growth form: Multi-stemmed shrub or small to tall tree to 30 m, with stem diam. to 0.6 m and fine circumferential ridges around the stem, smooth greyish bark that is fragrant when broken.

Vegetative spread: No.

Longevity: Up to 200 years.

Primary juvenile period:

Flowers: White, petals absent, December–January.

Fruit/seed: One-seeded nut 3 mm across, surrounded by a persistent calyx, that turns red and enlarges during fruit formation. Mature December–February. 41,000 fruits per kg, seed stored dry at 2° C viable for less than 1 year, but at -4° C still viable after 5 years (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Seeds flutter down from tree, but only a few metres sideways (Buchanan 1989). Germinates easily, 1–3 months (A. Bofeldt pers. comm.), from fresh seed after 16 days, 37% after 28 days (Floyd 1989).

Seedlings can remain dormant for a long period until habitat changes favour growth e.g. storm damage to mature trees, increasing light at ground level.

Fire response: Resprouted from base after high intensity fire (1/1994 at Lane Cove, some juvenile leaves 3-foliolate, L.McD.).

Interaction with other organisms: Timber is of commercial value and many stands have been logged. Foodplant of chrysomelid beetles (Lowman 1982).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT; Qld.

Distribution Sydney area: Widespread.

Select locations: Wyong, Gosford, Cheltenham, Leumeah, Helensburgh, Mt Keira, Macquarie Pass, Kangaroo Valley, Nortons Basin, Bargo, Mt Coricudgy, Clarence, Katoomba, Robertson.

Habitat

Habitat: Gullies, creeks, escarpment slopes, watercourses.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–dominant.

Vegetation: Warm temperate rainforest (as tree) e.g. with *Doryphora sassafras*, *Acmena smithii*, riparian scrub (as multistemmed shrub) e.g. with *Tristaniopsis laurina*, *Lomatia silaifolia*, also subtropical and riverine rainforest (A. Bofeldt pers. comm.).

Substrate: Fertile soils or locally enriched gullies, on basalt, shale and sandstone, high to medium nutrient soils, and on low nutrient soils where adequate moisture and shelter is available. On high nutrient at altitudes above 600 m (A. Bofeldt pers. comm.).

Exposure: Sheltered, mid-shade–full shade, seedlings intolerant of full sun (A. Bofeldt pers. comm.).

Conservation

Conservation: Probably adequate.

Ceratopetalum gummiferum**CUNONIACEAE**

Christmas Bush

Life history

Growth form: Tall shrub or small tree, to 5 m high, occasionally to 10 m, often multistemmed. Leaves 3-foliolate.

Vegetative spread: No.

Longevity: Medium-long, up to 100 years?

Primary juvenile period:

Flowers: White, November–December. Probably pollinated by short-tongued insects.

Fruit/seed: One-seeded nut is surrounded by a persistent calyx, which turns red and enlarges during fruit formation, mature December–January. Germination 1–3 months, high percentage of seed viability (A. Bofeldt pers. comm.). Unlikely to be any soil-stored seedbank.

Dispersal, establishment & growth: Diaspore: fruit; wind-dispersed. Seeds flutter down from tree, but only a few metres sideways (Buchanan 1989).

Fire response: Resprouts from base, flowered within 1 year after high intensity fire (at Lane Cove River, Narrabeen Lake 1/94, P. Kubiak pers. comm.).

Interaction with other organisms: Larvae of butterfly *Candalides consimilis* reared on plant (Common & Waterhouse 1982).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT.

Distribution Sydney area: Widespread on Sydney sandstone.

Select locations: Mt Tayer, Colo River, Gosford, Hornsby, Mosman, Long Bay, Helensburgh, Campbelltown, Thirlmere, Grose Vale, Springwood, Katoomba, Tallong.

Habitat

Habitat: Steep hillsides, gullies, riverbanks, rocky slopes.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Shrubby open-forest, tall open-forest, open-forest, and woodland e.g. with *Eucalyptus gummifera*, *Angophora costata*, *Eucalyptus piperita*. Mixed rainforest/open-forest in protected sites e.g. near cliffs/waterfalls (A. Bofeldt pers. comm.).

Substrate: Deep sandy soils, podsols, on sandstone and sand dunes, very low nutrients. Well-drained.

Exposure: Full sun–light shade. Sheltered sites.

Conservation

Conservation: Probably adequate.

Schizomeria ovata**CUNONIACEAE**

Crabapple

Life history

Growth form: Small to large tree to 40 m high with trunk to 1 m diameter (M. Robinson pers. comm.), bark finely fissured, hard-corky.

Vegetative spread: Limited root suckering (M. Robinson, A. Bofeldt pers. comm.).

Longevity: Long.

Primary juvenile period:

Flowers: White, October–November.

Fruit/seed: Succulent fruit (drupe), white, 10–15 mm diam., January–May.

Dispersal, establishment & growth: Diaspore: fleshy fruit, vertebrate-adapted dispersal (Westoby et al. 1990). Seed hard-coated, germination difficult, 6–24 months. Soil-stored seedbank (Floyd 1990).

Fire response: Resprouted from base after high intensity fire (at Lane Cove River, Narrabeen Lake 1/94, P. Kubiak pers. comm.).

Interaction with other organisms: Host plant of Cerambycid beetles *Phlyctaenodes pustulatus*, *Tricheops ephippiger* (Hawkeswood 1993).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT; Qld.

Distribution Sydney area: Coast.

Select locations: Gosford, Muogamarra NR (L.McD.), Kurrajong, North Rocks, Narrabeen (L.McD.), Cheltenham, Lane Cove, Hurstville, Audley, Bulli Pass, Macquarie Pass, Jamberoo.

Habitat

Habitat: Moist gullies, on creekbanks, escarpment slopes.

Altitude: 0–650 m

Annual rainfall: above 1000 mm

Typical local abundance: Occasional.

Vegetation: Simple warm temperate rainforest e.g. with *Ceratopetalum apetalum*, occasionally subtropical and riverine rainforest (M. Robinson, A. Bofeldt pers. comm.).

Substrate: Sandy loam soils from sandstone, enriched with shale runoff, volcanic necks, alluvium, medium nutrient soils. On Bombo Latite, Narrabeen series, Coal Measures in Illawarra (M. Robinson pers. comm.).

Exposure: Mid-shade–full sun, sheltered sites.

Conservation

Conservation: Conservation status unknown. Not common on Illawarra Escarpment (Fuller & Badans 1980), but quite common in warm temperate and subtropical rainforest in adjacent water catchment area (A. Bofeldt pers. comm.).

Adrastraea salicifolia (Hibbertia salicifolia)

DILLENIACEAE

Life history

Growth form: Shrub with loose reddish bark on branches.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, spring–early autumn.

Fruit/seed: Dehiscent fruit.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coast.

Select locations: Tuggerah Lakes (1904), Alexandria Swamps (1888), Royal NP.

Habitat

Habitat: Coastal swamps.

Altitude: 0–100 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent.

Vegetation: Wet heath and sedge swamp e.g. with *Banksia robur*, *Gymnoschoenus sphaerocephalus*, *Gleichenia dicarpa*, *Xyris operculata*.

Substrate: Peaty soil, low nutrient, permanently wet.

Exposure:

Conservation

Conservation: Uncommon, Royal NP is southern geographical limit, other populations in Sydney area are now probably extinct.

Hibbertia acicularis

DILLENIACEAE

Life history

Growth form: Diffuse, prostrate or erect shrub 30–150 cm high.

Vegetative spread: No (McIntyre et al. 1995).

Longevity:

Primary juvenile period:

Flowers: Yellow, October–December, peak November.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore seed, no particular dispersal mechanism (McIntyre et al. 1995). Soil-stored seedbank (Fox 1988).

Fire response: Killed by fire (Fox 1988).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS; Qld, Vic., Tas., S.A.

Distribution Sydney area: Mainly Blue Mountains.

Select locations: Howes Mountain, Avoca Vale, Bowens Creek, Nortons Basin, Pennant Hills, Matraville, Mt Wilson, Clarence, Abercrombie Caves, Mt Canobolas, Mittagong, Robertson.

Habitat

Habitat: Ridges, slopes.

Altitude: 0–1200 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland and open-forest e.g. with *Eucalyptus gummifera*, *E. sieberi*, *E. punctata*, *E. eximia*, *E. sparsifolia*, *Angophora costata*.

Substrate: Sandy soil on sandstone, low nutrients.

Exposure: Full sun.

Conservation

Conservation: Widespread species, probably adequately conserved. Conserved in Western Sydney (Benson & McDougall 1991).

Hibbertia aspera

DILLENIACEAE

Life history

Growth form: Ascending or erect shrub to 50 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, mainly summer.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990).

Fire response: Stems killed, resprouts from base. Flowering within 1 year of high intensity fire (at Lane Cove River 1/94, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT; Qld, Vic., Tas., S.A.

Distribution Sydney area: Widespread.

Select locations: Avoca, South Maroota, Cheltenham, Newport, Sefton, Liverpool, Londonderry, The Woolwash, Albion Park, Silverdale, Thirlmere, Hilltop, Mt Cambewarra.

Habitat

Habitat: Shallow–steep slopes, creek banks.

Altitude: 0–500 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest and woodland e.g. with *Eucalyptus punctata*, *Allocasuarina torulosa*, *Eucalyptus gummifera* or e.g. with *Eucalyptus longifolia*, *E. bosistoana*, *E. eugenioides*, *E. tereticornis*, *E. pilularis*, *Melaleuca decora* (A. Bofeldt, M. Robinson pers. comm.), and heath e.g. with *Angophora hispida*, *Banksia ericifolia*.

Substrate: Sandy loam with clay influence on sandstone, or clayey loam on shale, low to medium nutrients. Budgong Sandstone and Berry Siltstone in Illawarra (M. Robinson p. c.).

Exposure: Full sun–light shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991), vulnerable in Illawarra, status elsewhere unknown.

Hibbertia bracteata**DILLENIACEAE****Life history**

Growth form: Erect, diffuse shrub to 1 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, September–October.

Fruit/seed: Dehiscent fruit, seed with aril, October–November.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990, Rice & Westoby 1981).

Fire response: Resprouted from base after high intensity fire (at Lane Cove River, Narrabeen Lake 1/94), flowering within 10 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Coast and lower Blue Mountains.

Select locations: Mangrove Mountain, Wisemans Ferry, Galson, Hornsby, Pymble, Helensburgh, Maroota, Kurrajong Heights, Woodford, Lawson.

Habitat

Habitat: Hillsides and creekbanks.

Altitude: 0–800 m

Annual rainfall: above 1000 mm

Typical local abundance: Frequent.

Vegetation: Moist open-forest e.g. with *Eucalyptus piperita*, *Syncarpia glomulifera*, and woodland e.g. with *Eucalyptus gummifera*, *E. punctata*, *Angophora costata*.

Substrate: Sandy soil with clay influence, on sandstone, low–medium nutrients.

Exposure: Sheltered.

Conservation

Conservation: Endemic to Sydney area, conservation status unknown.

Hibbertia circumdans**DILLENIACEAE****Life history**

Growth form: Erect shrub to 60 cm high. Closely related to *H. monogyna*.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, August–November.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT NWS CWS.

Distribution Sydney area:

Select locations: Brooklyn, Cataract River, Clarence, Gen Davis.

Habitat

Habitat: Hillslopes and near creeks.

Altitude: 0–1200 m **Annual rainfall:** above 600 mm

Typical local abundance: Occasional.

Vegetation: Open-forest e.g. with *Angophora costata*, *Eucalyptus eximia*, *E. umbra*.

Substrate: Sandy soil over sandstone, low nutrients.

Exposure:

Conservation

Conservation: Rare, conservation status unknown.

Hibbertia cistiflora**DILLENIACEAE****Life history**

Growth form: Ascending shrub to 1 m high, with stout stems.

Vegetative spread:

Longevity:

Primary juvenile period: 3 years (Benson 1985).

Flowers: Yellow, spring.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990).

Fire response: Stems killed, resprouts from base, also recruits from soil-stored seedbank.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT ST; Vic.

Distribution Sydney area: Blue Mountains.

Select locations: South Maroota, Nortons Basin, Mt Irvine, Mt Banks, Shipley Plateau.

Habitat

Habitat: Ridges, steep slopes.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Occasional.

Vegetation: Open-woodland e.g. with *Eucalyptus gummifera*, *E. sclerophylla*, *Angophora hispida*.

Substrate: Shallow, sandy soil on sandstone, low nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Hibbertia cistoidea**DILLENIACEAE****Life history**

Growth form: Erect shrub to 1 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, July.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT NWS; Qld.

Distribution Sydney area: Yerranderie to Hunter Range (Harden 1990).

Select locations: Mt Coricudgy–Mt Baker, Yerranderie.

Habitat

Habitat:

Altitude: 600–1000 m **Annual rainfall:** 900 mm

Typical local abundance: Rare.

Vegetation: Open-forest e.g. with *Eucalyptus dives*, *E. cypellocarpa*.

Substrate: Sandy soil over sandstone, low nutrients.

Exposure:

Conservation

Conservation: Rare, conservation status unknown. The Sydney populations (CC & CT) have shorter leaves and may be a separate taxon (Harden 1990).

Hibbertia dentata**DILLENIACEAE**

Twining Guinea Flower

Life history

Growth form: Twiner with wiry stems to 2–3 m long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, July–November. Nectarless, sometimes with faint citrus odour (P. Bernhardt pers. comm.).

Fruit/seed: Dehiscent fruit, seed with aril. Fruit mature November–January (L. Parkinson pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990, Rice & Westoby 1981).

Fire response: Resprouting from base and flowering within 10 months, after high intensity fire (1/1994 at Lane Cove River), some seedlings seen within 10 months (P. Kubiak p. c.).

Interaction with other organisms: Appear to be pollinated (at RNP 1990–2) by naturalised honeybee *Apis mellifera*, large syrphid flies *Melangyna* species, and females of native, short-tongue bees < 7 mm long in families Halictidae and Colletidae (P. Bernhardt pers. comm., in press).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld, Vic.

Distribution Sydney area: Widespread, coast and upper Blue Mountains.

Select locations: Grassy Hill, Woy Woy Creek, Cheltenham, Baulkham Hills, Kentlyn, Bulli, Albion Park, Katoomba Falls, Fitzroy Falls, Budderoo.

Habitat

Habitat: Sheltered slopes.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Moist tall open-forest e.g. with *Eucalyptus cypellocarpa*, *E. piperita*, *E. obliqua*, *Angophora costata*, *Syncarpia glomulifera*, and scrub. Coastal scrub e.g. with *Leptospermum laevigatum*, warm temperate rainforest and margins, rainforest/open-forest ecotone (M. Robinson, A. Bofeldt pers. comm.).

Substrate: Clay soil from basalt and volcanic necks, sandstone, and shale, medium to high nutrients, well-drained. Narrabeen series, Hawkesbury sandstone in Illawarra (A. Bofeldt pers. comm.).

Exposure: Usually sheltered, full sun to shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Probably adequately conserved.

Hibbertia diffusa**DILLENIACEAE****Life history**

Growth form: Decumbent or prostrate shrub to 30 cm high, often forming mats to 50 cm diam. Coastal headland plants are much-branched and stunted with leaves 4–5 mm long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, September–February. Nectarless (P. Bernhardt pers. comm.).

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Probably resprouted, flowers seen within 6 months of high intensity fire (at Lane Cove River 1/1994, P. Kubiak pers. comm.).

Interaction with other organisms: Appear to be pollinated (at Londonderry 1991–2) by females of short-tongue bees *Leioproctus* species that shake pollen from the anther tuft (P. Bernhardt pers. comm., in press).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST; Qld, Vic.

Distribution Sydney area:

Select locations: Bouddi, Wisemans Ferry, Londonderry, Marsden Park, Linden, Leumeah, Menangle, Bargo, Mt Coolangatta, Bundanoon.

Habitat

Habitat: Heath and woodland.

Altitude: 0–700 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Heath e.g. with *Banksia ericifolia*, woodland e.g. with *Eucalyptus sclerophylla*, *Angophora bakeri*, *Eucalyptus fibrosa*, *E. crebra*, *E. piperita*, *E. punctata*. Open-forest e.g. with *Eucalyptus maculata*, *E. eugenioides*, *E. tereticornis*.

Substrate: Deep sandy loam on Tertiary alluvial sediments, and gravelly clay on shale.

Exposure: Full sun–light shade.

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991).

Hibbertia empetrifolia**DILLENIACEAE****Life history**

Growth form: Ascending or erect shrub to 40 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, at any time of year. Flowers in February after fire.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990), (Rice & Westoby 1981).

Fire response: Resprouts from base (Girrakool, Marramarra NP, L.McD.), flowered 14 months after fire (Girrakool).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT CWS SWS; Qld, Vic., Tas

Distribution Sydney area: Widespread.

Select locations: Kariong, Ingleside, Cheltenham, Darkes Forest, Barrengarry, Bilpin, Judge Dowling Range, Yerrinbool, Hazelbrook, Blackheath, Gaspers Mountain, Rylstone, Mittagong, Wingello.

Habitat: Altitude: 0–1000 m Annual rainfall: above 800 mm Typical local abundance: Occasional. Vegetation: Dry open-forest e.g. with <i>Eucalyptus gummiifera</i> , <i>E. haemastoma</i> . Substrate: Clayey to sandy soil on sandstone, low nutrients. Exposure:	Habitat
Conservation: Probably adequately conserved.	Conservation

Hibbertia fasciculata**DILLENIACEAE**

Growth form: Small erect or diffuse shrub to 40 cm high. Vegetative spread: Longevity: Primary juvenile period: Flowers: Yellow, winter–early summer. Nectarless, populations at Royal NP have tiny flowers with only 3 stamens, the anthers with a combined sweet and dung-like scent (P. Bernhardt pers. comm.). Fruit/seed: Dehiscent fruit, seed with aril. Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Rice & Westoby 1981). Soil-stored seedbank (Fox 1988). Fire response: Killed and re-establishes from seed (Benson 1981, Fox 1988), flowers seen within 14 months after high intensity fire (at Lane Cove River 1/1994, P. Kubiak p. c.). Interaction with other organisms: Pollinated (in Victoria) by female short-tongue bees <i>Lasioglossum</i> species that vibrate the anther tuft to remove pollen (Bernhardt 1986).	Life history
Status/origin: Native. Botanical subregions: NC CC SC CT ST; Qld. Distribution Sydney area: Widespread. Select locations: Mellong Swamp, Asquith, Willoughby, North Head, La Perouse, Waterfall, Mt Keira, Agnes Banks.	Distribution
Habitat: Altitude: 0–200 m Annual rainfall: above 700 mm Typical local abundance: Frequent–occasional. Vegetation: Heath and open-forest e.g. with <i>Eucalyptus piperita</i> , <i>Angophora costata</i> , <i>Eucalyptus sclerophylla</i> , <i>Banksia serrata</i> , with shrubby understorey. Substrate: Sandy, low-nutrient soil on old dunes (e.g. at Agnes Banks), and on sandstone where it is less common. Exposure: Light shade–full sun.	Habitat
Conservation: Conserved in Western Sydney (Benson & McDougall 1991), conservation status elsewhere not known.	Conservation

Hibbertia hermanniifolia**DILLENIACEAE**

Growth form: Erect shrub to 1.5 m high. Vegetative spread: Longevity: ? medium Primary juvenile period: Flowers: Yellow, February. Fruit/seed: Dehiscent fruit, seed with aril, February. Dispersal, establishment & growth: Diaspore: seed. Fire response: Interaction with other organisms:	Life history
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Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT; Vic.

Distribution Sydney area: Only known from Bents Basin SRA in Sydney area,

Select locations: Bents Basin.

Habitat

Habitat: On rocky benches on steep NW facing hillside,

Altitude: 0–200 m **Annual rainfall:** 950 mm

Typical local abundance: Occasional.

Vegetation: In woodland e.g. with *Eucalyptus eximia*, *Angophora costata*, *Eucalyptus pilularis*, *E. punctata*.

Substrate: Shallow, sandy soil over sandstone, low nutrients.

Exposure: Light shade to full sun.

Conservation

Conservation: Confined to Bents Basin, Yarrowitch district and the coastal ranges south from Wadbilliga National Park (Harden 1990). Coded 3RCa on national rare species list (ROTAP 1995). Total population at Bents Basin SRA is approximately 500 individuals (Thomas, Burkitt & Benson 1984).

Hibbertia linearis**DILLENIACEAE****Life history**

Growth form: Erect or diffuse shrub 50–200 cm high, extremely variable.

Vegetative spread: No (McIntyre et al. 1995).

Longevity:

Primary juvenile period:

Flowers: Yellow, March–December.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990, Rice & Westoby 1981).

Fire response: Killed by high intensity fire (at Lane Cove River, Narrabeen Lake, 1/1994), seedlings seen within 7 months, flowering within 18 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT CWS; Qld.

Distribution Sydney area: Widespread.

Select locations: Yarramalong, Wondabyne, Cheltenham, Frenchs Forest, La Perouse, Moorebank, Helensburgh, Bass Point, Rydal, Mt Jellore, Tuena.

Habitat

Habitat: Ridgetops, hillsides.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Rare–frequent.

Vegetation: Heath e.g. with *Boronia ledifolia*, *Grevillea speciosa*, *Eriostemon buxifolius*; open-forest e.g. *Eucalyptus gummifera*/*E. piperita*/*Angophora costata* (L.McD.); open-forest on lateritic soil e.g. with *Eucalyptus sieberi*, *E. gummifera*, *E. capitellata*, *Angophora costata*, woodland e.g. with *Eucalyptus haemastoma*, *E. racemosa* (Sheringham & Sanders 1993) or with *Eucalyptus blaxlandii*; shrubland e.g. with *Leptospermum laevigatum*, *Banksia integrifolia* (M. Robinson pers. comm.).

Substrate: Sandy soil on sandstone, clay loam on trachyte, low–medium nutrients.

Exposure: Mid-shade to full sun.

Conservation

Conservation: Conservation status unknown.

Hibbertia monogyna**DILLENIACEAE****Life history**

Growth form: Erect shrub to 60 cm high.
Vegetative spread:
Longevity:
Primary juvenile period: 4 years (Benson 1985).
Flowers: Yellow, spring–autumn.
Fruit/seed: Dehiscent fruit, seed with aril.
Dispersal, establishment & growth: Diaspore: seed.
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: CC SC CT ST NWS CWS.
Distribution Sydney area: Coast and upper Blue Mountains.
Select locations: Oatley (1888), Audley, Wattamolla, Wilton, Bomaderry Creek, Mt Coricudgy, Glen Alice, Newnes Plateau, Gibraltar Rocks, Bundanoon.

Habitat

Habitat:
Altitude: 0–1000 m **Annual rainfall:** above 600 mm
Typical local abundance: Occasional.
Vegetation: Eucalypt open-forest e.g. with *Eucalyptus sclerophylla*, *E. sieberi*, *E. globoidea*, *E. gummifera*, shrubby understorey.
Substrate: Deep sandy loam on sandstone, and on rocky outcrops, low nutrients, well-drained.
Exposure: Light shade.

Conservation

Conservation: Status not known

Hibbertia nitida**DILLENIACEAE****Life history**

Growth form: Erect, diffuse shrub to 1 m high.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: Yellow, October.
Fruit/seed: Dehiscent fruit, seed with aril.
Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990).
Fire response: Killed by high intensity fire (at Killarney Heights, Roseville Bridge 12/90 L.McD.).
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: CC.
Distribution Sydney area: Roseville–O Hares Creek.
Select locations: Roseville, Upper Lane Cove River, Oatley, Jannali, Kentlyn, Waterfall, Woronora, O'Hares Creek, Bargo.

Habitat

Habitat: Near fresh and saltwater creeks (L.McD.)
Altitude: 0–200 m **Annual rainfall:** above 800 mm
Typical local abundance: Frequent–occasional.
Vegetation: Open-forest and woodland e.g. with *Angophora costata*, *Eucalyptus piperita*, *E. gummifera*, with shrubby understorey.
Substrate: Sandy loam on sandstone, low nutrients.
Exposure: Mid to light shade.

Conservation

Conservation: Endemic to Sydney region and once apparently common around Georges River area. Recorded from Garigal NP (Main Creek, Middle Harbour Creek, Bungaroo) and Royal National Park. Coded 2RC- on national rare species list (ROTAP 1995), conservation status uncertain.

Hibbertia obtusifolia* sensu stricto*DILLENIACEAE****Life history**

Growth form: Erect or diffuse shrub to 60 cm high, with greyish stems and leaves, an extremely variable species.

Vegetative spread: No (McIntyre et al. 1995).

Longevity:

Primary juvenile period:

Flowers: Yellow, October–May.

Fruit/seed: Dehiscent fruit, seed with aril, January.

Dispersal, establishment & growth: Diaspore: seed. No particular dispersal mechanism (McIntyre et al. 1995).

Fire response: Regrowth and suckers from rootstocks and lateral roots, seedlings recorded less than 1 year after fire (Purdie 1977).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic.

Distribution Sydney area: Widespread, particularly on Tablelands.

Select locations: Woy Woy, Towlers Bay, Kurnell, Appin, Bents Basin, Clarence, Capertee, Mt Werong, Winburndale, Cadia, Mt Jellore, Wingello.

Habitat

Habitat: Ridges and slopes.

Altitude: 0–1200 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Dry open-forest e.g. with *Eucalyptus eximia*, *E. melliodora*, *E. goniocalyx*, *E. macrorrhyncha*, *E. mannifera*.

Substrate: Sandy, skeletal soils on alluvium, sandstone conglomerate to clay soils on basalt, diorite, Devonian metasediments, dune sand, low–medium nutrients.

Exposure:

Conservation

Conservation: Status unknown.

Hibbertia pedunculata**DILLENIACEAE****Life history**

Growth form: Diffuse, prostrate or erect shrub, glabrous except for pubescent young branches.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, October–February.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT ST NWS CWS SWS; Qld, Vic.

Distribution Sydney area: Mainly southwest Sydney.

Select locations: Rookwood, Bankstown, East Hills, Woronora River, St Marys, Warragamba Dam.

Habitat

Habitat: Open-forest.

Altitude: 0–100 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Rare–occasional.

Vegetation: Open-forest e.g. with *Eucalyptus globoidea*, *E. fibrosa*, *Themeda australis*.

Substrate: Dry gravelly clay soils, sometimes 'lateritic', on shaley Tertiary alluvium.

Exposure:

Conservation

Conservation: Probably poorly-conserved. Mostly confined to small patches of remnant vegetation. Vulnerable in Western Sydney (Benson & McDougall 1991).

Hibbertia procumbens**DILLENIACEAE****Life history**

Growth form: Prostrate shrub.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, summer, October.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC; Vic.

Distribution Sydney area: Mangrove Mtn area.

Select locations: Strickland State Forest, Mangrove Mountain.

Habitat

Habitat: Ridgetop, plateau.

Altitude: 0–300 m

Annual rainfall: above 1000 mm

Typical local abundance:

Vegetation: Heath e.g. with *Banksia ericifolia*, *Allocasuarina distylla*.

Substrate: Skeletal sandy soil over sandstone.

Exposure:

Conservation

Conservation: Rare, Mangrove Mountain is only NSW occurrence (Harden 1990). Conservation status unknown.

Hibbertia riparia sensu lato**DILLENIACEAE****Life history**

Growth form: Shrub to 60 cm high, a variable species complex including several taxa yet to be defined.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: More than 60 years (D. Keith pers. comm.).

Primary juvenile period:

Flowers: Yellow, spring–summer.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990), no particular dispersal mechanism (McIntyre et al. 1995).

Fire response: Resprouts from base (D. Keith pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., S.A., W.A.

Distribution Sydney area: Mainly coast.

Select locations: Mellong Swamp, Pitt Town, East Hills, Georges River, Royal NP station, Bargo River Gorge, Mt Canobolas.

Habitat

Habitat: Flat areas and steep rocky slopes.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-woodland e.g. with *Eucalyptus sclerophylla*, *Angophora bakeri*.

Substrate: Sandy soils on Tertiary alluvium deposits, or sandstone.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.

Hibbertia rufa**DILLENIACEAE****Life history**

Growth form: Shrub with wiry trailing stems to 35 cm long, supported by other plants.

Vegetative spread: No (McIntyre et al. 1995).

Longevity:

Primary juvenile period:

Flowers: Yellow, March.

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Rice & Westoby 1981).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT ST; Qld, Vic.

Distribution Sydney area: Widespread but rare.

Select locations: Hornsby (1914), Waterfall, Clarence, Penrose.

Habitat

Habitat:

Altitude: 0–1200 m **Annual rainfall:** above 1000 mm

Typical local abundance: Occasional.

Vegetation: Shrub swamp e.g. with *Leptospermum obovatum*, *L. lanigerum*.

Substrate: Deep sandy soil, permanent moisture, low nutrients.

Exposure: Mid to light shade.

Conservation

Conservation: Rare, conservation status unknown.

Hibbertia saligna**DILLENIACEAE****Life history**

Growth form: Diffuse or erect shrub to 200 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, August–October, peak September. Nectarless (P. Bernhardt pers. comm.).

Fruit/seed: Dehiscent fruit, seed with aril.

Dispersal, establishment & growth: Diaspore: seed. Ant-adapted food body for dispersal (P. Bernhardt pers. comm.).

Fire response:

Interaction with other organisms: Scarabaeid beetle *Diphucephala quadratigera* observed (at Mt Tomah) mating and feeding on petals and stamens, often decapitating the anthers (Hawkeswood 1992). In August flowers visited at first by worker honeybees *Apis mellifera* for pollen, then by native bees *Exoneura* species that vibrate the anther tuft to remove pollen (P. Bernhardt pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT ST CWS.

Distribution Sydney area: Blue Mountains.

Select locations: Drews Creek, Buralow Creek, Mt Irvine, Mt Wilson, Lawson, Bedford Creek.

Habitat

Habitat: Moist gullies, disturbed sites at road edge to undisturbed forest.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Moist open-forest e.g. with *Eucalyptus piperita*, *E. oreades*, *Angophora floribunda*.

Substrate: Sandy loam from sandstone and shale.

Exposure: Sheltered sites.

Conservation

Conservation: Status unknown.

Hibbertia scandens**DILLENIACEAE**

Climbing Guinea Flower

Life history

Growth form: Climber with stems to 4–10 m long, plants near the sea tend to be densely hairy.

Vegetative spread: No.

Longevity: 5–30 years (Clarke 1989).

Primary juvenile period:

Flowers: Yellow, April–November. Flowers nectarless, with musty odour like ‘dung and honey’, individual flowers have lifespan of 3–4 days (P. Bernhardt pers. comm.).

Fruit/seed: Dehiscent fruit, c. 40 mm diam., seeds 3–7 mm diam., mature January–April (Cooper & Cooper 1994). Seed enclosed by orange-reddish aril, flesh is distasteful, appears packed with crystals of oxalic acid (P. Bernhardt pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, with vertebrate-adapted dispersal (Westoby et al. 1990), bird-dispersed (A. Bofeldt pers. comm.). Soil-stored seedbank (Fox 1988). Germination 3–12 weeks (A. Bofeldt pers. comm.). Secondary, tertiary sand coloniser (Clarke 1989).

Fire response: Resprouted from base after high intensity fire (1/1994 at Lane Cove River, Narrabeen Lake, P. Kubiak pers. comm.).

Interaction with other organisms: Root infected by mycorrhiza, likely to assist nutrition (Logan et al. 1989). Beetle *Diphucephala bernhardti* feeds and mates on the petals (Hawkeswood 1992). Adult beetles found within the flowers include *Eleale pulchra*, *Ethon corpulentum*, *Meriphys humeralis*, *M. lateroalbus*; flowers visited for pollen by female bees in long-tongue families Anthophoridae, Apidae and short-tongue families Colletidae and Halictidae (at RNP 1990–2), Eastern Rosella parrots observed (at Royal NP 1990) eating seed (P. Bernhardt p. c.). Seeds with aril eaten by Fruit-pigeons and other birds (Cooper & Cooper 1994).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld.

Distribution Sydney area: Coast.

Select locations: Mooney Mooney Creek, Barrenjoey, Avalon, Hurstville, Cape Solander, Bundeena, Bola Creek, Mt Keira, Bass Point, Cambewarra, Kangaroo Valley.

Habitat

Habitat: Coastal dunes, foredune and backdune, talus slopes.

Altitude: 0–100m **Annual rainfall:** above 1200 mm

Typical local abundance: Frequent.

Vegetation: Seacliff scrub. In littoral, dry, warm temperate, and margins of subtropical rainforest (A. Bofeldt pers. comm.).

Substrate: Sandy soil on sand dunes, sandstone, latite near the sea, low–medium nutrients, intolerant of salinity. Narrabeen Series, Bombo Latite, and Coal Measures in Illawarra (M. Robinson pers. comm.).

Exposure: Seedlings sun-tolerant, adults wind-tolerant, drought-tolerant (Clarke 1989). Full sun–mid-shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Probably adequately conserved.

Hibbertia sericea

DILLENIACEAE

Life history

Growth form: Erect shrub to 1 m high.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: Yellow, most of the year.
Fruit/seed: Dehiscent fruit, seed with aril.
Dispersal, establishment & growth: Diaspore: seed.
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC NT CT ST CWS SWS SWP; Qld, Vic., S.A.
Distribution Sydney area:
Select locations: Wallerawang (1917), Bundanoon (1995).

Habitat

Habitat: Sandstone ledges.
Altitude: 600–1000 m **Annual rainfall:** 600–1200 mm
Typical local abundance: Frequent.
Vegetation: Eucalypt open-forest.
Substrate: Deep sand on sandstone, low nutrients.
Exposure:

Conservation

Conservation: Appears to be rare in Sydney area.

Hibbertia serpyllifolia

DILLENIACEAE

Life history

Growth form: Decumbent or prostrate shrub with branches to 30 cm long.
Vegetative spread:
Longevity: More than 60 years (D. Keith pers. comm.).
Primary juvenile period:
Flowers: Yellow, spring–summer.
Fruit/seed: Dehiscent fruit, seed with aril.
Dispersal, establishment & growth: Diaspore: seed, with ant-adapted food body (Westoby et al. 1990).
Fire response: Resprouts, secondary juvenile period 2 years (D. Keith pers. comm.).
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC CC SC NT CT ST NWS; Vic, Tas.
Distribution Sydney area: Coast, but mainly Blue Mountains.
Select locations: Ingheside, Cooks River (1900), Waterfall–Bulli Pass Rd, Kings Tableland, Leura, Katoomba Cascade, Clarence, Hassans Walls, Mt Werong.

Habitat

Habitat: Exposed plateaus and cliff edges.
Altitude: 0–1200 m **Annual rainfall:** above 800 mm
Typical local abundance: Frequent.
Vegetation: Exposed heath e.g. with *Banksia ericifolia*, *Allocasuarina nana*; mallee e.g. with *Eucalyptus gregsoniana*.
Substrate: Skeletal sandy loam on sandstone, low nutrients.
Exposure:

Conservation

Conservation: Rare on coast, adequately conserved in Blue Mountains.

Hibbertia vestita

DILLENIACEAE

Life history**Growth form:** Prostrate shrub to 30 cm high, with long trailing stems.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow, at any time of year.**Fruit/seed:** Dehiscent fruit, seed with aril.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC NT NWS SWP; Qld.**Distribution Sydney area:** Mainly Lake Macquarie area.**Select locations:** Kanwal, Morisset, Doyalson, Dunns Swamp (Kandos).

Habitat**Habitat:** Heath.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:****Vegetation:** Coastal heath, or montane heath e.g. with *Calythrix tetragona*, *Grevillea evansiana*.**Substrate:** Skeletal sandy soil on sandstone, low nutrients.**Exposure:**

Conservation**Conservation:** Wyong is southern geographical limit, conservation status unknown.***Hibbertia virgata* subsp. *virgata***

DILLENIACEAE

Life history**Growth form:** Erect or diffuse shrub to 150 cm high, stems with crinkly hairs.**Vegetative spread:****Longevity:** ? medium**Primary juvenile period:****Flowers:** Yellow, spring, September.**Fruit/seed:** Dehiscent fruit, seed with aril.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Probably resprouts.**Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** CC SC SWP SFWP.**Distribution Sydney area:** Eastlakes but now very rare.**Select locations:** Randwick (1886), Centennial Park (1900), Eastlakes (1984),

Botany Swamps (1909), La Perouse (1958).

Habitat**Habitat:** Heath on sand dunes.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Rare.**Vegetation:** Heath with *Banksia aemula*.**Substrate:** Deep sands on sand dunes.**Exposure:** Full sun.

Conservation**Conservation:** Previously common in Eastern suburbs, now rare and not conserved (Benson & Howell 1994). Randwick is northern geographical limit of species.

***Dipsacus fullonum* subsp. *fullonum* ***

DIPSACACEAE

Wild Teazle

Life history

Growth form: Stout, spinose, herb to 2 m high, with rosette leaves and stem leaves to 35 cm long. Fleshy, yellow taproot to 75 cm deep (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 2 years, biennial.

Primary juvenile period: 2 years or more.

Flowers: Purplish–white, summer, January.

Fruit/seed: Dry, indehiscent, 1-seeded fruit, 2–3 mm long; yellow–greyish brown, rectangular, with an appendage which is shed at maturity; about 800 seeds per head, remaining viable for at least 6 years (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fruit, no special adaptation for dispersal but long bracts surrounding heads may be flicked by passing animals thus scattering seeds, may also be spread in agricultural products, on vehicles animals, floating on water along streams; germination high, independent of light, but may be restricted by allelopathy of other species; seedlings emerge after autumn rains, or at other times following soil disturbance if moisture is adequate and develop into large rosettes by spring. Flowering stems produced in second or later years, when rosette reaches a critical size; plants die in autumn leaving stems standing (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms: Dry flower heads (teasels) used in textile industry until recent development of suitable machinery; once used for grooming of animals, now popular in dried flower arrangements (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to Europe. Probably introduced to Australia for commercial use, earliest record 1870 (Parsons & Cuthbertson 1992).

Botanical subregions: CT ST; Vic., Tas.

Distribution Sydney area: South from Moss Vale.

Select locations: Shoalhaven River (1928), Exeter, Berrima, Moss Vale.

Habitat

Habitat: Pastures, roadsides, streambanks.

Altitude: 0–700 mm

Annual rainfall: above 1000 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Clay soils, moderate–high fertility.

Exposure: Full sun.

Conservation

Conservation: Weed in pastures.

***Scabiosa atropurpurea* ***

DIPSACACEAE

Pincushion

Life history

Growth form: Erect herb to 60 cm high.

Vegetative spread:

Longevity: Annual to perennial.

Primary juvenile period:

Flowers: Dark-purple to white, December–May.

Fruit/seed: Egg-shaped, burr-like fruit, 1–3 cm long, 1 cm diam., February–April.

Dispersal, establishment & growth: Diaspore: single segment (achene), adhesive, probably dispersed by animals and in mud.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, cultivated as an ornamental, native to Mediterranean. Reported as ‘probably introduced from Italy with seed’ (Herbarium specimen Bathurst 1911).

Botanical subregions: NC CT ST CWS SWS; Tas., S.A.

Distribution Sydney area: Kandos–Bathurst, Mittagong–Moss Vale.

Select locations: Kandos, Portland, Wallerawang, Angus Place, Yetholme, Bathurst (1911), Mittagong, Moss Vale.

Habitat

Habitat: Roadsides, lawns, vacant land.

Altitude: 600–1000 m **Annual rainfall:** 600–1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: With roadside weeds e.g. *Plantago lanceolata*, *Paspalum*, edges of grassy woodland e.g. with *Eucalyptus polyanthemos*, *E. rossii*.

Substrate: Medium–low nutrient soils.

Exposure: Full sun.

Conservation

Conservation: Cultivated as an ornamental, sometimes naturalised on roadsides. Kandos is current northern geographical limit (Harden 1992).

Drosera auriculata**DROSERACEAE**

Sundew

Life history

Growth form: Slender, erect, carnivorous herb, with flowering stems to 20 cm high and tuberous rootstock. Basal rosette and cauline pale green leaves, covered with glandular hairs that trap insects. Only plentiful during cooler months of the year, perennates by subterranean tubers. Usually 1 tuber produced each season to replace the previous tuber, not related to flower production (Vickery 1933). Yellow/red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread: New plants can form from epiphyllous shoots on cauline leaves;

Longevity: Indefinite.

Primary juvenile period:

Flowers: White, June–March, peak August.

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore: seed, germination in 14 days without special treatment (Vickery 1933). Plants may flower and fruit in a few weeks and die down to the ground in a short period if moisture conditions are unfavourable (Vickery 1933).

Fire response: May flower within 2 months. Flowering may be enhanced (Juniper et al. 1989).

Interaction with other organisms: Yellow/red pigment in leaves and glands, may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects; carnivory may increase rate of photosynthesis and benefit seed production; pollen grains falling on cauline leaves may be alternate source of nutrition; extracts from *Drosera* spp. important in pharmaceutical preparations (plumbagin major component of *D. auriculata* leaves and glands), chemicals may have allelopathic effect inhibiting growth of other plants and repelling predators (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST NWS CWS SWS; Qld, Vic., Tas., S.A., N.Z.

Distribution Sydney area: Widespread

Select locations: Calga, Crosslands, Narrabeen, Centennial Park, Royal NP, Kanangra Valley, Londonderry, Linden, Katoomba Falls, Jenolan Caves, Bowral.

Habitat

Habitat: Moist places, creekbanks.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Woodland, open-woodland, grassland e.g. with *Eucalyptus sclerophylla*, *Angophora bakeri*.

Substrate: Moist sandy, acid soil from sandstone, clay soils, alluvium, very infertile, poorly-drained. Moister sites than *Drosera peltata* (Vickery 1933).

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.

Drosera binata**DROSERACEAE****Life history**

Growth form: Carnivorous herb 10-60 cm high with fibrous roots. Radical, erect, forked leaves, upper surface covered with glandular hairs that trap insects; petioles 4–30 cm long. In colder areas will go into dormancy during Autumn and not reappear until mid spring (Gilbert 1984). Yellow / red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread:

Longevity: Indefinite.

Primary juvenile period:

Flowers: White, October–May, main flowering post-fire. Flowering promoted by insect digestion (Juniper et al. 1989).

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore: seed, germinates easily without stratification Gilbert (1984). Experiments showed that denial of insects did not decrease growth, plants responded to addition of nutrients to soil (Stewart & Nilsen). Pollen grains falling on cauline leaves may provide alternate source of nutrition; insects valuable as source of nitrogen and phosphorous (Juniper et al. 1989).

Fire response: Stems killed and resprouts from base. Needs fire to induce vigorous growth and flowering (Gill 1981), though occasional plants flower in absence of fire. Plant generally scarce, but prolific and flowering within one month of high intensity fire (1 / 1994 at Salvation Creek swamp, L.McD.).

Interaction with other organisms: Yellow / red pigment in leaves and glands (quercetin major component), may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects; carnivory may increase rate of photosynthesis and benefit seed production (Juniper et al. 1989). Not an obligate insectivore but insectivory provides an alternative source of nutrients unavailable to competitors (Stewart & Nilsen 1993). Parasitic insect, *Setocoris* sp. (Miridae), steals prey caught by plant, relationship species specific (G. Cassis pers. comm.). Chemicals may have allelopathic effect inhibiting growth of other plants and repelling predators (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST; Qld, Vic., S.A., Asia.

Distribution Sydney area: Coast and upper Blue Mountains.

Select locations: Somersby, West Head (Salvation Creek swamp), Narrabeen, Eastlakes, Long Bay, Helensburgh, Avon River, Bilpin, Blackheath, Lithgow, Robertson.

Habitat

Habitat: Swamps and creek banks in wet sand and sandy peat, also occasionally wet cliff faces.

Altitude: 0–1200 mm

Annual rainfall: above 1200 mm

Typical local abundance: Frequent.

Vegetation: Swampland e.g. with *Gleichenia*, *Banksia robur*, *Gahnia clarkei*, moist cliff ledges.

Substrate: Peaty humus-rich soil, sandy peat and wet sand or sandstone, very infertile, poorly drained, acid soils, moisture supply continuous. May grow in nutrient-rich soil (Stewart & Nilsen 1993).

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation

Conservation: Probably adequately conserved though susceptible to change in water quality and flow rate in catchments.

Drosera burmannii**DROSERACEAE****Life history**

Growth form: Small carnivorous herb with short stems and green rosette leaves. Yellow / red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread: No.

Longevity: 3–6 months.

Primary juvenile period:

Flowers: White or pink, 1–3 inflorescences with 3–10 flowers, August–October.

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore: seed. Seedling recruitment not fire-related. Grows in response to wet periods, sometimes second crop in season (P. Hind pers. comm.).

Fire response: Probably killed.

Interaction with other organisms: Yellow / red pigment in leaves and glands, may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects; chemicals may have allelopathic effect inhibiting growth of other plants and repelling predators (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: CC CT NWS CWS; Qld, N.T.

Distribution Sydney area: Castlereagh.

Select locations: Upper Cudgegong, Agnes Banks, Castlereagh State Forest, Menangle Park.

Habitat

Habitat: Edges of wetland.

Altitude: 0–700 m

Annual rainfall: 700–1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: With shrubs and sedges e.g. *Leptospermum polygalifolium*, *Baumea acuta*, *Eleocharis minuta*, *E. atricha*, *Ranunculus inundatus*.

Substrate: Infertile, acid soil. Moist sites, moisture supply intermittent, fresh.

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991).

Drosera glanduligera**DROSERACEAE**

Pimpernel Sundew

Life history

Growth form: Carnivorous herb with short stems 5–10 cm high and leafy rosette, fibrous roots. Yellow / red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread: No.

Longevity: Probably less than 1 year.

Primary juvenile period:

Flowers: August–November.

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Probably killed.

Interaction with other organisms: Yellow / red pigment in leaves and glands, may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: CC SC NWS CWS SWS SWP; Vic., Tas., S.A., W.A.

Distribution Sydney area: Castlereagh.

Select locations: Castlereagh State Forest.

Habitat

Habitat: Eucalypt woodland.

Altitude: 0–50 m

Annual rainfall: 700–800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland with *Eucalyptus parramattensis*, *E. fibrosa*, *Melaleuca decora* and shrubby understorey.

Substrate: Sandy clay from Tertiary gravels, infertile, acid soils. Calcifuge (Juniper et al. 1989).

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), only known from Castlereagh area.

Drosera peltata**DROSERACEAE**

Sundew

Life history

Growth form: Slender erect carnivorous herb, with flowering stems to 50 cm high and tuberous rootstock. Basal rosette and cauline leaves, pale green to deep red, covered with glandular hairs that trap insects. Only plentiful during cooler months of the year, perennate by subterranean tubers. Tuber depth about 5 cm (2–10 cm) depending on moisture (Vickery 1933). Yellow/red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread: No (McIntyre et al. 1995). New plants can develop from epiphyllous shoots on cauline leaves (Vickery 1933).

Longevity: Indefinite.

Primary juvenile period:

Flowers: White, June–November.

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990), mobile (McIntyre et al. 1995). Germinate in 14 days without special treatment (Vickery 1933). Coloniser. Plants may flower and fruit in a few weeks and die down to ground level in a short period if moisture conditions are unfavourable; usually 1 tuber produced each season, to replace previous one — tuber production independent of flower production (Vickery 1933). Pollen grains falling on cauline leaves may be alternate source of nutrition (Juniper et al. 1989).

Fire response: Resprouts; secondary juvenile period 2 years (D. Keith pers. comm.). Flowered March–April after January fire (at West Head, L.McD.).

Interaction with other organisms: Yellow/red pigment in leaves and glands, may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects; carnivory may increase rate of photosynthesis and benefit seed production; extracts from *Drosera* spp. important in pharmaceutical preparations (plumbagin major component of *D. peltata* leaves); chemicals may have allelopathic effect inhibiting growth of other plants and repelling predators (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., S.A., W.A., Asia.

Distribution Sydney area: Widespread.

Select locations: Somersby, Collaroy, Willoughby, Kurnell, Penshurst, Glenfield, Wedderburn, Corrimal, Bomaderry, Kangaroo Valley, Mt Wilson, Yetholme.

Habitat

Habitat: Moist places, damp pasture and open-forest.

Altitude: 0–1000 m

Annual rainfall: above 1000 m

Typical local abundance: Frequent.

Vegetation: Heathland and open woodland e.g. with *Eucalyptus gummiifera*, *E. racemosa* and shrubby understorey (or with e.g. *Eucalyptus longifolia*, *E. eugenioides*, M. Robinson pers. comm.), also with grasses and mosses.

Substrate: Damp sandy soil, peaty swamps, very infertile, poorly-drained, acid soils, also clay soils (Vickery 1933).

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation: Probably adequately conserved, except in Illawarra. **Conservation**

Drosera pygmaea

DROSERACEAE

Life history

Growth form: Tiny carnivorous, rosette herb to 5 cm high, with fibrous roots. Yellow / red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Pink, November–April, peak November.

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore: seed / gemmae, asexual propagules similar to seeds, dispersal up to 2 m, triggered by raindrops etc. (Lowrie 1989).

Fire response: Resprouts, secondary juvenile period 1 year (D. Keith pers. comm.).

Interaction with other organisms: Yellow / red pigment in leaves and glands, may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects; release of chemicals may have allelopathic effect inhibiting growth of other plants and repelling predators; carnivory may increase rate of photosynthesis and benefit seed production (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT; Qld, Vic., Tas., S.A., W.A., N.Z.

Distribution Sydney area: Coast, Castlereagh, Kanangra.

Select locations: Terrey Hills, Turramurra, Northbridge, Botany Bay, Sutherland, Castlereagh SF, Shane Park, Royal NP, Kanangra Walls.

Habitat

Habitat: Moist places.

Altitude: 0–1200 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Swamps and heath e.g. with *Banksia oblongifolia*.

Substrate: Bare moist sand, wet peaty soil, localised very infertile, acid soil.

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991). Probably adequately conserved.

Drosera spatulata**DROSERACEAE****Life history**

Growth form: Small carnivorous herb with rosette of reddish leaves, tuberous roots (Elliot & Jones 1984). Yellow / red pigments in leaves and glands may protect plant tissues by absorption of UV (Juniper et al. 1989).

Vegetative spread: Clumps may increase by vegetative reproduction (Elliot & Jones 1984).

Longevity: ? indefinite.

Primary juvenile period:

Flowers: Inflorescence one-sided, white, pink or red, (sporadic), September–March.

Fruit/seed: Capsule, with tiny black seeds, February.

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990), probably wind-dispersed locally. Coloniser.

Fire response: Resprouts, secondary juvenile period 1 year (D. Keith pers. comm.).

Interaction with other organisms: Parasitic insect, *Setocoris* sp. (family Miridae) steals prey caught by plant, relationship species specific (G. Cassis pers. comm.). Yellow / red pigment in leaves (quercetin major component) and glands, may attract insects; in response to stimulus, stalked glands (tentacles) bend and produce mucilage to trap and digest insects; carnivory may increase rate of photosynthesis and benefit seed production; extracts from *Drosera* spp. important in pharmaceutical preparations (ramenaceone major component of *D. spatulata* leaves and shoots), chemicals may have allelopathic effect inhibiting growth of other plants and repelling predators (Juniper et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT; Qld, Vic, Tas, N.Z., E Asia.

Distribution Sydney area: Widespread.

Select locations: Somersby, Turramurra, La Perouse, Audley, Agnes Banks, Thirlmere, Bomaderry, Mt Coricudgy, Newnes Plateau, Long Swamp (Kodala 1992).

Habitat

Habitat: Edge of swamps, rock ledges, sides of tracks.

Altitude: 0–1200 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Wet heath e.g. with *Kunzea ambigua*, shrub swamp e.g. with *Grevillea acanthifolia*, *Gymnoschoenus sphaerocephalus*, *Xyris*.

Substrate: Shallow, poorly drained, low-nutrient, acid, sandy, loam soil (L.McD.). Wet places.

Exposure: Full sun. *Drosera* spp. generally intolerant of shade, and require specific light intensity and temperature for successful establishment and flowering (Juniper et al. 1989).

Conservation

Conservation: Conserved.

Diospyros australis**EBENACEAE**

Black Plum

Life history

Growth form: Shrub or tree (often 10–20 m high in Illawarra, A. Bofeldt pers. comm.), with small leaves with yellowish undersurface.

Vegetative spread: No.

Longevity: More than 50 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Male and female flowers on different plants, October–December.

Fruit/seed: Succulent berry, 10–15 mm diam, yellowish, turning red and black, with a single seed about 8 mm diam., sometimes splitting into two (Floyd 1989), mature February–August, peak March–April.

Dispersal, establishment & growth: Diaspore: fleshy fruit, vertebrate-adapted dispersal (Westoby et al. 1990). Bird-dispersed, germinates easily, 1–2 months (A. Bofeldt pers. comm.).

Fire response: Probably killed (A. Bofeldt pers. comm.).

Interaction with other organisms: Host plant of Cerambycid beetle *Piesarthrius frenchi* (Hawkeswood 1993).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld.

Distribution Sydney area: Mainly coast.

Select locations: Calga, Kurrajong Heights, Palm Beach, Peakhurst (1898), Stanwell Park, Picton (1895), Bass Point, Kangaroo Valley, Minnamurra River, Robertson.

Habitat

Habitat: Coastal rainforest. Sometimes in disturbed areas e.g. edge of farmland (M. Robinson pers. comm.).

Altitude: 0–600 m

Annual rainfall: above 1100 mm

Typical local abundance: Occasional–frequent.

Vegetation: Warmer rainforest e.g. with *Cassine australis*, *Acronychia oblongifolia*, *Guioa semiglauca*, occasionally cooler rainforest e.g. with *Doryphora sassafras*, *Ceratopetalum apetalum*, *Acacia melanoxylon*. Dry, littoral and subtropical rainforest (M. Robinson pers. comm.).

Substrate: Clay loam on basalt, shales, occasionally sandstone gully, medium to high nutrients. Well-drained soil. On Budgong Sandstone, Bombo Laterite in Illawarra (M. Robinson pers. comm.).

Exposure:

Conservation

Conservation: Conservation status unknown.

Diospyros pentamera**EBENACEAE**

Myrtle Ebony

Life history

Growth form: Small to medium-sized tree to 20 m high in better sites, rather spindly in poorer sites, grey or black bark.

Vegetative spread: No.

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Pink–white, March.

Fruit/seed: Succulent berry, yellow, turning dark red, 10–18 mm diam., with 2–5 seeds, ripens in summer.

Dispersal, establishment & growth: Diaspore: fruit, probably bird and animal-dispersed.

Germination variable 1–12 months, slow growing (A. Bofeldt pers. comm.).

Fire response:

Interaction with other organisms: Host plant of Cerambycid beetle *Phacodes longicollis* (Hawkeswood 1993).

Distribution

Status/origin: Native.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Gosford–Wyong, Illawarra.

Select locations: Ourimbah, Matcham, Bouddi NP, Bola Creek, Mt Keira, Wollongong, Bass Point, Kiama, Minnamurra Falls.

Habitat

Habitat: Gullies, slopes, escarpments, benches, dry rocky scree slopes (A. Bofeldt p. c.).

Altitude: 0–400 m

Annual rainfall: above 1200 mm

Typical local abundance: Rare–occasional.

Vegetation: Subtropical, dry and littoral rainforest (M. Robinson, A. Bofeldt pers. comm.) e.g. with *Ceratopetalum apetalum*, *Glochidion ferdinandi*, *Archontophoenix cunninghamiana*, *Synoum glandulosum*.

Substrate: Clay soils from alluvium, Narrabeen series shales, latite, coastal sands, medium–high nutrients. Budgong Sandstone and Bombo Latite in Illawarra (M. Robinson pers. comm.).

Exposure: Sheltered, mid to full shade.

Conservation

Conservation: Inadequately conserved in Illawarra (A. Bofeldt pers. comm.) where typical lowland rainforest habitat is not protected, conservation status elsewhere unknown. Southern geographical limit Pebbly Beach, Murramarang NP (Mills 1988).

Elaeocarpus holopetalus**ELAEOCARPACEAE**

Black Olive Berry

Life history

Growth form: Small-tall tree 4–25 m high (A. Bofeldt pers. comm.), stiff serrated leaves have tiny claws on each tooth, undersurface of leaves felted with short tangled hairs (Nicholson 1994).

Vegetative spread: No.

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White, November–December.

Fruit/seed: Black, succulent fruit, 8–10 mm diam., January–May.

Dispersal, establishment & growth: Diaspore: fruit. Bird-dispersed, germination difficult and slow, very slow-growing (A. Bofeldt pers. comm.), germination may take years (Nicholson 1994).

Fire response: Possibly killed (A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: SC NT CT ST; Vic.

Distribution Sydney area: Mainly upper Blue Mountains, Robertson Plateau.

Select locations: Leura, Blackheath, Mt Wilson, Clarence, Minnamurra Falls, Robertson NR, Knights Hill.

Habitat

Habitat: Cool wet gullies and slopes at high altitudes (A. Bofeldt pers. comm.).

Altitude: 300–1100 m **Annual rainfall:** above 1000 mm

Typical local abundance: Occasional–dominant.

Vegetation: Cool temperate rainforest e.g. with *Atherosperma moschatum*, *Quintinia sieberi*, *Callicoma serratifolia*, *Doryphora sassafras*. Warm temperate rainforest (A. Bofeldt p. c.).

Substrate: Sandy alluvium with peat, over sandstone, or clay soils from basalt. Only on basalt in Illawarra (A. Bofeldt pers. comm.).

Exposure: Sheltered, shady sites. Also exposed sites, occasionally an emergent on windy exposed ridges (A. Bofeldt pers. comm.).

Conservation

Conservation: Regionally rare in Illawarra region, being restricted to the high parts of the Robertson Plateau, above 600 m. Once more common before the clearing of the 'Yarrawa Brush' around Robertson from 1860 and now only occurring in rainforest remnants and amongst roadside vegetation where it faces threats from road building (Mills 1988). Recorded from Robertson NP (inadequately conserved, only 2 trees) and Budderoo NP (only 20 trees) (A. Bofeldt pers. comm.). Conservation status elsewhere unknown

Elaeocarpus kirtonii**ELAEOCARPACEAE**

Silver Quandong, White Quandong

Life history

Growth form: Buttressed tree to 30 m, with pale smooth bark; leaves 1-foliolate. Vivid, beautiful, new growth foliage in spring.

Vegetative spread: No.

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White, January–March.

Fruit/seed: Pale blue, succulent fruit, 10–15 mm long. 8100 fruits per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fruit, probably bird-dispersed. Germination erratic (Floyd 1989), may take 1–2 years (A. Bofeldt pers. comm.).

Fire response: Killed (A. Bofeldt pers. comm.).

Interaction with other organisms: Fruit eaten by Figbird, Green Catbird, Regent Bowerbird, Rose-crowned Fruit-dove, Topknot Pigeon, Wompoo Pigeon (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld.

Distribution Sydney area: Gosford, Illawarra.

Select locations: Gosford, Bulli, Cambewarra, Robertson NR.

Habitat

Habitat: Moist gullies, slopes, escarpment, benches, rocky slopes (A. Bofeldt pers. comm.).

Altitude: 0–700 m **Annual rainfall:** above 1200 mm

Typical local abundance: Rare–occasional.

Vegetation: Subtropical rainforest e.g. with *Cassine australis*, *Podocarpus elatus*, *Dendrocnide excelsa*, *Ficus superba* var. *henniana* or warm temperate/cool temperate rainforest e.g. with *Ceratopetalum apetalum*, *Doryphora sassafras* (at Robertson). Occasionally dry rainforest in Illawarra (M. Robinson, A. Bofeldt pers. comm.).

Substrate: Sandy soils or more clayey soil on basalt. High fertility soils from volcanic rocks, well-drained; on Budgong Sandstone, Bombo Latite, Narrabeen series and Coal Measures in Illawarra (A. Bofeldt, M. Robinson pers. comm.).

Exposure: Mid to full shade, young plants do not tolerate full sun (A. Bofeldt pers. comm.).

Conservation

Conservation: Conservation status unknown.

Elaeocarpus obovatus**ELAEOCARPACEAE**

Hard Quandong

Life history

Growth form: Small tree to tall strongly buttressed tree, with domatia on most leaves.

Vegetative spread: No.

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White, spring.

Fruit/seed: Blue, succulent fruit, 10 mm long.

Dispersal, establishment & growth: Diaspore: fruit, bird-dispersed, slow and difficult to germinate, can take 1–18 months (A. Bofeldt pers. comm.).

Fire response: Possibly killed (A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CWS; Qld.

Distribution Sydney area: North from Gosford.

Select locations: Minmi, Munmorah SRA, Wyong.

Habitat

Habitat: Riverine and swampy areas.

Altitude: 0–200 m **Annual rainfall:** above 1100 mm

Typical local abundance: Common/occasional/rare (A. Bofeldt pers. comm.).

Vegetation: Littoral rainforest e.g. with *Melaleuca quinquenervia*, *Syzygium paniculata*, *Rhodomyrtus*. Riverine forest e.g. with *Casuarina glauca*, dry rainforest (in Watagan Mountains, A. Bofeldt pers. comm.).

Substrate: Grey sandy soil on coastal sand. Low to medium nutrient, well–poorly-drained (A. Bofeldt pers. comm.).

Exposure: Full shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Wyong is southern geographical limit. Inadequately conserved, not protected at Wyong (A. Bofeldt pers. comm.).

Elaeocarpus reticulatus**ELAEOCARPACEAE**

Blueberry Ash

Life history

Growth form: Generally a small tree or large shrub to 6 m high, but sometimes 20-30 m high in Illawarra (A. Bofeldt pers. comm.).

Vegetative spread: No.

Longevity: More than 50 years (A. Bofeldt pers. comm.).

Primary juvenile period: ? 3 years.

Flowers: Cream/white, occasionally pink, November–December. Flowers licorice-scented (Floyd 1989).

Fruit/seed: Blue fleshy fruit, ovoid to globose, to 8–12 mm long, maturing March–April and shed progressively to December. 4,700 fruit per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fruit, bird-dispersed. Fruit reported from pellets of Currawongs (Buchanan 1989). Germination 30%, difficult and slow, sometimes 1–2 years (Floyd 1989). Seedlings up to 50 cm high in *Leptospermum laevigatum*–*Banksia ericifolia* scrub unburnt for 30 years (North Head).

Fire response: Resprouts from base after high-intensity fire (at Bantry Bay 12/1991, Narrabeen 1/1994). Seedlings probably killed.

Interaction with other organisms: Fruit eaten by Crimson Rosella, Figbird, Olive-backed Oriole, Regent Bowerbird, Wonga Pidgeon, White-headed Pidgeon (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST CWS; Qld, Vic., Tas.

Distribution Sydney area: Widespread

Select locations: Coricudgy, St Albans, Wondabyne, Cheltenham, Waverton, Kurnell, Royal NP, Macquarie Pass, Minnamurra Falls, Cambewarra, Glenbrook, Bargo, Wentworth Falls, Moss Vale.

Habitat

Habitat: Creek banks, gullies, slopes.

Altitude: 0–800 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt open-forest e.g. with *Angophora costata*, *Eucalyptus pilularis*, *Syncarpia glomulifera*, *Eucalyptus saligna*, *Glochidion ferdinandi*, or littoral, and warm temperate rainforest (M. Robinson, A. Bofeldt pers. comm.).

Substrate: Clay loam on sandstone and shales, to sandy loam over sandstone, medium to low nutrients, well-drained. On Coal Measures, Hawkesbury Sandstone, Narrabeen Series in Illawarra (A. Bofeldt pers. comm.).

Exposure: Sheltered, mid–light shade, seedlings shade-tolerant.

Conservation

Conservation: Adequately conserved.

Sloanea australis**ELAEOCARPACEAE**

Maiden's Blush

Life history

Growth form: Medium-sized tree to 30 m high, irregularly buttressed, crooked, and often with coppice shoots near base of trunk. Large obovate adult leaves, new foliage often reddish.

Vegetative spread: Suckers from roots, forming thickets (A. Bofeldt pers. comm.).

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Cream, November–December; fragrant, sweet (A. Bofeldt pers. comm.).

Fruit/seed: Light brown woody capsules 12 mm long, with soft bristles, opening by 3–5 woody valves. Seeds black, 6 mm long, 1 or 2 per valve, with bright orange-red aril. Matures May–August. Fresh seeds 6,700 per kilo, dried seeds 15,350 per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, bird-dispersed. Germination 5–12 weeks, slow-growing (A. Bofeldt pers. comm.). Germination from fresh seed within a few weeks (Floyd 1989).

Fire response:

Interaction with other organisms: Fruit eaten by Australian King Parrot, Brown Cuckoo-dove, Figbird, Lewin's Honeyeater, Olive-backed Oriole, Paradise Riflebird, Regent Bowerbird and Silvereye (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT; Qld.

Distribution Sydney area: Gosford, Illawarra area.

Select locations: Calga, Mona Vale (Katandra), Egan Gully, Hacking River, Mt Keira, Saddleback, Cambewarra Range.

Habitat

Habitat: Rainforest, particularly along watercourses, seepage areas.

Altitude: 0–400 m

Annual rainfall: above 1200 mm

Typical local abundance: Occasional–frequent.

Vegetation: Subtropical and warm temperate rainforest (A. Bofeldt pers. comm.). Canopy stratum.

Substrate: High nutrient soils from Narrabeen Shale, basalt, volcanics. Poor to well-drained soil, watertable mostly high with permanent water supply in seepage areas, soaks, watercourses, or very high rainfall areas (A. Bofeldt pers. comm.).

Exposure: Sheltered situations, mid-shade.

Conservation

Conservation: Conservation status unknown, but not conserved in southern part of its range i.e. south of Budderoo National Park (A. Bofeldt pers. comm.). Cambewarra Mountain is southern geographical limit.

Elatine gratioloides**ELATINACEAE**

Waterwort

Life history

Growth form: Aquatic herb, with erect stems when submerged, prostrate and creeping when on wet mud, rooting at lower nodes.

Vegetative spread: Stems root at nodes.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Pink, November–March.

Fruit/seed: Capsule 1–3 mm long, seeds 0.5–0.7 mm long, November–March.

Dispersal, establishment & growth: Diaspore: seed, probably water-dispersed.

Fire response: Not likely to be burnt

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., N.T., S.A.

Distribution Sydney area: Widespread, coast and adjacent plateaus.

Select locations: Pitttown, Llandillo, Doonside, Glenfield, Centennial Park, Dapto, Albion Park, Narellan, Cataract River, Lithgow, Oberon, Mittagong.

Habitat

Habitat: In or on the margins of stationary or slow flowing water to about 40 cm deep.

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation: Wetland, herbland e.g. with *Triglochin procerum*, *Alternanthera denticulata*, *Cotula coronopifolia*.

Substrate: Mud and wet sand on lagoon margins, low to medium nutrients. Also submerged in water to depths of 40 cm, the branches rising erect from the bottom (Aston 1977).

Exposure: Full sun.

Conservation

Conservation: Often poorly collected because of size, it is nevertheless becoming less frequent in the Sydney area because of destruction of habitat. Vulnerable in Western Sydney (Benson & McDougall 1991).

Acrotriche aggregata

EPACRIDACEAE

Life history

Growth form: Erect, spreading shrub 0.4–1.2 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pale green, cream or white, September–October.

Fruit/seed: Succulent fruit (drupe), 7 mm diam., red, mature December–February.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms: Fruit edible (Cooper & Cooper 1994).

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT; Qld.

Distribution Sydney area: Blue Mountains.

Select locations: Boorai Ridge, Colo Heights, Yerranderie Peak, McMahons Lookout, Blackheath, Kanangra.

Habitat

Habitat: Dry hillsides and ridges.

Altitude: 400–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Rare–occasional.

Vegetation: Dry eucalypt forest e.g. with *Eucalyptus sieberi*, *E. piperita*.

Substrate: Steep rocky sandstone hillsides and ridges, shallow sandy soils, well-drained, low nutrient.

Exposure:

Conservation

Conservation: Yerranderie is southern geographical limit. Conservation status unknown.

Acrotriche divaricata

EPACRIDACEAE

Life history

Growth form: Erect, bushy shrub 0.6–1.5 m high.

Vegetative spread:

Longevity: ? 20–100 years.

Primary juvenile period:

Flowers: Green or cream, July–September.

Fruit/seed: Succulent fruit (drupe), 3 mm diam., bright or dark red, mature November–December.

Dispersal, establishment & growth: Diaspore: fruit, possibly bird-dispersed. Germination difficult and slow, 3–7 months (A. Bofeldt pers. comm.).

Fire response: Killed by high intensity fire (at Narrabeen Lake 1/1994, P. Kubiak p. c.).

Interaction with other organisms: Fruit eaten by birds (A. Bofeldt pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST; Vic.

Distribution Sydney area: Coast and adjacent plateaus and Blue Mountains.

Select locations: Wattagan Mtns, Mt Wyrabalong, Mona Vale, Epping, Kentlyn, Douglas Park, Helensburgh, Drews Creek, Bowen Creek, Murphys Glen, McMahons Lookout, Blackheath.

Habitat

Habitat: Well-drained slopes and banks, sheltered areas, gullies, creek banks (A. Bofeldt pers. comm.).

Altitude: 0–800 m

Annual rainfall: above 800 mm

Typical local abundance: Rare–occasional.

Vegetation: Moist eucalypt forest e.g. with *Syncarpia glomulifera*, *Allocasuarina torulosa*, low scrub e.g. *Allocasuarina distyla*. Warm temperate rainforest and rainforest/open-forest ecotone (A. Bofeldt pers. comm.).

Substrate: Hawkesbury Sandstone, Narrabeen Series in Illawarra (A. Bofeldt pers. comm.). Poor sandy soils from sandstone, shale, low nutrients. Sometimes rocky areas, moisture intermittent, very well drained (A. Bofeldt pers. comm.).
Exposure: Sheltered, mid–deep shade.

Conservation: Probably adequately conserved.

Conservation***Acrotriche rigida*****EPACRIDACEAE**

Growth form: Robust, densely branched shrub to 1.5 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Green, July–September.

Fruit/seed: Flat-topped succulent fruit (drupe), 3 mm diam., creamy green, mature December.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native.

Botanical subregions: CT NWS CWS.

Distribution Sydney area: Capertee Valley.

Select locations: Genowlan, Capertee–Glen Davis.

Distribution

Habitat: Rocky hillsides.

Altitude: 400–600 m

Annual rainfall: 600–700 mm

Typical local abundance: Rare–occasional.

Vegetation: Dry eucalypt woodland and forest.

Substrate: Sandy soils from sandstone colluvium, low nutrients.

Exposure:

Habitat

Conservation: Conservation status unknown

Conservation***Acrotriche serrulata*****EPACRIDACEAE**

Honeypots

Growth form: Low prostrate shrub to 60 cm high, often forming mats up to 1 m diam.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pale green or whitish, August–September.

Fruit/seed: Flat-topped succulent fruit (drupe), 4.5 mm diam.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native.

Botanical subregions: NC SC NT CT ST CWS; Vic., Tas., S.A.

Distribution Sydney area: Higher Blue Mountains.

Select locations: Hartley Vale, Mt Blaxland, Colong.

Distribution

Habitat: Woodland and grassland.

Altitude: 800–1000 m

Annual rainfall: 800 mm

Typical local abundance: Rare–occasional.

Habitat

Vegetation: Eucalypt woodland e.g. with *Eucalyptus dives*, *E. dalrympleana*, and grassland.

Substrate: Sandy soils, low nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Astroloma humifusum
EPACRIDACEAE

Native Cranberry

Life history

Growth form: Mat-forming shrub with branches to 50 cm high.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Red, often hidden in foliage, at any time of year, peak June.

Fruit/seed: Slightly succulent fruit (drupe), 5–6 mm long, reddish, mature mainly July–October.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST CWS SWS SWP; Vic., Tas., S.A.

Distribution Sydney area: Widespread.

Select locations: Epping, Villawood, Pitt Town, Castlereagh SF, Glenbrook, Wolgan River, Kowmung River, Mt Lambie, Long Swamp (Kodela et al. 1992).

Habitat

Habitat: Dry woodland on sandy clay soils.

Altitude: 0–800 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt grassy open-forest, and woodland e.g. with *Eucalyptus fibrosa*, *E. sideroxylon* and heath with *Kunzea ambigua*, margin of upland mire (Kodela et al. 1992)

Substrate: Often on medium nutrient clay soils e.g. Wianamatta Shale but also on Tertiary alluvium, conglomerates, sandstones. Recorded on saline soils in the Lower Boro area, Southern Tablelands (Kodela & Foster 1990).

Exposure: Full sun to light shade.

Conservation

Conservation: Catherine Hill Bay, Northern geographical limit. Conserved in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.

Astroloma pinifolium
EPACRIDACEAE

Pine Heath

Life history

Growth form: Erect or diffuse shrub 50–100 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Solitary, often appearing clustered at base of branches, March–October, peak August.

Fruit/seed: Slightly succulent fruit (drupe) 10–15 mm long.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST CWS SWS SWP; Tas., S.A., W.A.

Distribution Sydney area: Coast and adjacent plateaus.

Select locations: Wondabyne, West Head (L.McD.), Berowra, Kurnell, Revesby, Kentlyn, Wedderburn, Bundeena.

Habitat

Habitat: Ridges and slopes.

Altitude: 0–200 m

Annual rainfall: above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Heath e.g. with *Allocasuarina distyla*, and eucalypt woodland e.g. with *Eucalyptus sieberi*, *E. globoidea*, *Angophora costata*.

Substrate: Sandy loam over sandstone, possibly with clay influence, infertile, well-drained.

Exposure:

Conservation

Conservation: Conservation status unknown.

Brachyloma daphnoides**EPACRIDACEAE****Life history**

Growth form: Erect, bushy shrub 30–100 cm high.

Vegetative spread: No (McIntyre et al. 1995).

Longevity: Indefinite.

Primary juvenile period:

Flowers: Cream, August–December.

Fruit/seed: Succulent fruit (drupe), 25 mg fresh wt. average (J. Howell pers. comm.), 3–4 mm diameter, green–yellow brown, mature November–December.

Dispersal, establishment & growth: Diaspore: fruit, both vertebrate and ant-adapted dispersal (Rice & Westoby 1981, Westoby et al. 1990).

Fire response: Resprouts from ground level or below (Benson 1981, Fox 1988).

Resprouting plants flowering within 10 months of high intensity fire (at Narrabeen Lake & Lane Cove River 1/1994, P. Kubiak pers. comm.). Seedlings recorded less than 1 year after fire (Purdie 1977).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP; Qld, Vic., Tas., S.A.

Distribution Sydney area: Widespread.

Select locations: Howes Mountain, Calga, Berowra, Frenchs Forest, Mosman, Waterfall, Bomaderry, Agnes Banks, Springwood, Blackheath, Winburndale, Kanangra, Abercrombie Caves, Joadja, Bundanoon.

Habitat

Habitat: Dry forest on poor soils.

Altitude: 0–1200 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt open-forest, woodland, heath. Margin of upland mire (Kodala 1992).

Substrate: Low nutrient sandy soils on sandstone, quartzite, sand deposits e.g. at Agnes Banks, Elderslie.

Exposure: Mid-shade to full sun.

Conservation

Conservation: Reasonably common and adequately conserved across its range.

Conserved in Western Sydney (Benson & McDougall 1991).

Dracophyllum secundum**EPACRIDACEAE****Life history**

Growth form: Erect or procumbent shrub to 1 m high.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: White or pink, 5–8 mm long, July–December, peak September, continuing until December in Blue Mountains.

Fruit/seed: Capsule, 5 mm diam., with very small seeds.

Dispersal, establishment & growth: Diaspore: seed, dispersed by gravity, water, wind (A. Bofeldt pers. comm.).

Fire response: Killed by high intensity fire (at Lane Cove River & Narrabeen Lake 1/1994), seedlings reported after fire (P. Kubiak pers. comm.).

Interaction with other organisms: Root association with *Ascomycete* and *Basidiomycete* micorrhizas, possibly seasonal (Allen et al. 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST.

Distribution Sydney area: Widespread, coast and Blue Mountains.

Select locations: Patonga, Galston, Stanwell Park, Mt Kembla, Macquarie Pass, Springwood, Blackheath, Lithgow, Currant Mountain Gap, Mt Colong, Bullio.

Habitat

Habitat: Lithophyte on sandstone rock ledges and wet cliff faces. Sometimes on clay banks and rarely on tree fern trunks (A. Bofeldt pers. comm.).

Altitude: 0–1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: With sandstone scrub or other moist site species e.g. *Bauera rubioides*, *Leucopogon lanceolatus*, *Epacris longiflora*, *Epacris crassifolia*, *Tristaniopsis collina*, *Banksia serrata*, and often in warm temperate rainforest on poorer soils, M. Robinson, A. Bofeldt pers. comm.).

Substrate: Sandstone rock ledges and wet cliff faces, very low-nutrient sites, moisture supply permanent but well-drained (A. Bofeldt pers. comm.).

Exposure: Sheltered sites, deep to mid shade.

Conservation

Conservation: Probably adequately conserved though habitat vulnerable to changes in stream quality even in conservation reserves. Well-conserved in Illawarra (A. Bofeldt pers. comm.).

Epacris breviflora

EPACRIDACEAE

Life history

Growth form: Erect shrub 50–100 cm, sometimes 200 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, at any time of year but mostly summer.

Fruit/seed: Capsule 1.8 mm long, mature at any time of year but mostly summer.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC NT CT ST SWS; Qld, Vic.

Distribution Sydney area: Bathurst area.

Select locations: Sunny Corner, Rydal.

Habitat

Habitat: Swamps and damp places.

Altitude: 1000 m **Annual rainfall:** 1000 mm

Typical local abundance:

Vegetation: Swamps, creekbanks.

Substrate: Alluvial soil.

Exposure:

Conservation

Conservation: Conservation status unknown.

Epacris calvertiana* var. *calvertiana

EPACRIDACEAE

Life history

Growth form: Erect–diffuse shrub, 20–100 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White–cream–green, at any time of year, mainly August–December (Harden 1992).**Fruit/seed:** Capsule 2.5–3 mm long, with seeds 0.58 x 0.39 mm (Powell & James 1993).**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC CT ST.**Distribution Sydney area:** Blue Mountains and Woronora Plateau.**Select locations:** Bents Basin (1897), Mulgoa (1916), Nepean Dam, Burragorang Lookout, Bullio, Berrima, Stingray Swamp, Long Swamp (Kodala 1992), Bundanoon, Fitzroy Falls, Carrington Falls.

Habitat

Habitat: Cliffs and rocky areas.**Altitude:** 0–800 m**Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Margins of eucalypt forest e.g. with *Eucalyptus radiata*, or rainforest**Substrate:** Skeletal sandy soils from sandstone or shale bands.**Exposure:**

Conservation

Conservation: No recent records for Bents Basin–Mulgoa area and possibly extinct there. Conservation status elsewhere unknown.***Epacris calvertiana* var. *versicolor***

EPACRIDACEAE

Life history

Growth form: Erect–diffuse shrub, 20–100 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Tubes pink–red and lobes white or cream, August–September.**Fruit/seed:** Capsule 2.5–3 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC CT.**Distribution Sydney area:** Southern Highlands.**Select locations:** Belmore Falls, Carrington Falls, Barren Grounds.

Habitat

Habitat:**Altitude:** 600 m**Annual rainfall:** above 1000 mm**Typical local abundance:****Vegetation:** Margins of eucalypt forest.**Substrate:** Gravelly soils over sandstone, low nutrient.**Exposure:**

Conservation

Conservation: Restricted distribution, possibly rare, conservation status unknown.

Epacris coriacea**EPACRIDACEAE****Life history**

Growth form: Slender to erect bushy shrub 0.5–2 m high, sometimes to 4 m.

Vegetative spread: No.

Longevity: More than 50 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White or cream, inconspicuous, September–October.

Fruit/seed: Capsule, 1.4 mm long.

Dispersal, establishment & growth: Diaspore: seed, dispersed by wind or gravity (A. Bofeldt pers. comm.).

Fire response: Probably killed (A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Coricudgy area, Illawarra escarpment, Woronora Plateau.

Select locations: Bare Rock (40 km E of Rylstone), Gaspers Mountain, Helensburgh, O'Hares Creek (Keith 1994), Bulli Pass, Calderwood Trig, Macquarie Pass, Budderoo, West Nattai.

Habitat

Habitat: Sandstone cliffs and rock crevices.

Altitude: 0–1000 m **Annual rainfall:** above 900 mm, mainly above 1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Cliff vegetation e.g. with *Epacris longiflora*, *Dracophyllum secundum*, *Leucopogon amplexicaulis*, or drier shrubs e.g. with *Acacia amoena*, *Banksia ericifolia*, *Banksia serrata*; eucalypt open-forest e.g. *Eucalyptus piperita*, *Angophora costata*, *Eucalyptus gunnifera*, *E. sieberi* (Keith 1994), *Tristaniopsis collina*, *Hakea salicifolia*; and in stunted temperate rainforest on rock ledges e.g. with *Eucryphia moorei*, *Ceratopetalum apetalum* (A. Bofeldt p. c.).

Substrate: Skeletal sandy soils on sandstone, low nutrient. Exceptionally well-drained, moisture permanent/intermittent (A. Bofeldt pers. comm.).

Exposure: Very exposed–sheltered, full sun to full shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Endemic to Sydney region, coded 3RC- on national rare species list (ROTAP 1995). Habitat limited to sandstone cliffs in high rainfall areas; usually secure from human impact except fire — biggest threat is from periodic collapse of cliffline (A. Bofeldt pers. comm.).

Epacris crassifolia**EPACRIDACEAE****Life history**

Growth form: Small trailing or ascending shrub to 20 cm high.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: White–cream, November–January.

Fruit/seed: Capsule, 1.8–2.8 mm long.

Dispersal, establishment & growth: Diaspore seed, soil-stored seedbank

Fire response: Killed, germination within 5 months of high intensity fire (at Bantry Bay 12/1991, L.McD.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Widespread, coast to Blue Mountains.

Select locations: Culoul Range, Mangrove Mountain, Berowra Waters, Bantry Bay, Oakdale, Mt Tomah, Lawson, Blackheath, Clarence, Fitzroy Falls.

Habitat

Habitat: On dry or wet rock ledges in gullies and on cliffs.

Altitude: 0–1100 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Cliff lines associated with *Geichenia rupestris*, *Sprengelia incarnata*, *Leucopogon amplexicaulis*, *Empodisma minus*, *Baeckea linifolia* and heath e.g. with *Eucalyptus apiculata*, *Eucalyptus ligustrina*, *Leptospermum trinervium*, *Hakea propinqua*.

Substrate: Skeletal sandy soils, sandstone, low nutrient, permanent moisture.

Exposure: Sheltered.

Conservation

Conservation: Endemic to Sydney region, habitats restricted, often vulnerable to drainage changes, conservation status unknown.

Epacris hamiltonii**EPACRIDACEAE****Life history**

Growth form: Flattened or matted shrub 1 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, July–October.

Fruit/seed: Capsule, 2 mm long.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT.

Distribution Sydney area: Blackheath.

Select locations: Blackheath.

Habitat

Habitat: Rock ledges, moist gullies.

Altitude: 1000 m **Annual rainfall:** 1100 mm

Typical local abundance: Rare.

Vegetation: Rainforest e.g. with *Ceratopetalum apetalum*, *Doryphora sassafras*; scrub with *Epacris obtusifolia*, *Xanthorrhoea*, *Blechnum*, *Todea barbara*.

Substrate: Low nutrient, skeletal sandy soils from sandstone, among sheltered damp rocks.

Exposure: Sheltered sites, mid to deep shade.

Conservation

Conservation: Recorded from Blackheath only. Very rare, local endemic species. Coded 2ECit on national rare species list (ROTAP 1995).

Epacris longiflora**EPACRIDACEAE**

Fuchsia Heath

Life history

Growth form: Straggling shrub 50–200 cm high. A more robust form with larger leaves and white flowers is found on coastal cliffs from Port Jackson to Botany Bay (Harden 1992).

Vegetative spread: No.

Longevity: 5–20 years.

Primary juvenile period:

Flowers: Red with white lobes, or white, August–April, peak September, March.

Fruit/seed: Capsule 3–4 mm long, seed size 0.74 × 0.5 mm (Powell & James 1993), average seed weight 0.10–0.15 mg (J. Howell pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990). Soil-stored seedbank.

Fire response: Killed, regenerates from soil-stored seed. Seedlings reported after a low intensity burn (Bradley 1972) and after high intensity fire 1/94 (at Lane Cove, P. Kubiak p. c.).

Interaction with other organisms: Weed growth at base of plant in cultivation can cause sweating resulting in death of plant (Jones & Elliot 1986).

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT; Qld.

Distribution Sydney area: Coast and adjacent plateaus.

Select locations: Gosford, Terrey Hills, Lane Cove, North Head, Cape Solander, Bundeena, Robertson.

Habitat

Habitat: Sheltered seepage areas on sandstone.

Altitude: 0–600 m **Annual rainfall:** > 1000 mm pa, supplemented by local seepage.

Typical local abundance: Frequent–occasional.

Vegetation: In wet heath and eucalypt forest and woodland e.g. with *Eucalyptus gummifera*, *E. piperita*, *Angophora costata*.

Substrate: Sandy soil, often on sandstone outcrops along seepage lines.

Exposure: Sheltered, mid-shade.

Conservation

Conservation: Once a conspicuous species around the immediate Sydney area and used as a popular decorative motif in nineteenth and early twentieth century, now less common due to loss of habitat though conserved in major national parks.

Epacris microphylla* var. *microphylla
EPACRIDACEAE

Life history

Growth form: Erect, wiry shrub to 1 m high.

Vegetative spread: No.

Longevity: 5–20 years (D. Keith pers. comm.).

Primary juvenile period: 2–4 years.

Flowers: White, at any time of year.

Fruit/seed: Capsule, 2 mm long, average seed weight 0.03 mg (J. Howell pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990). Soil-stored seedbank, recruitment mainly after fire (D. Keith p. c.).

Fire response: Killed by fire, seedlings noted after high intensity fire (at Lane Cove & Narrabeen Lake 1/1994), flowering within 2 years (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST SWS; Qld, Vic.

Distribution Sydney area: Widespread.

Select locations: Terrey Hills, Ryde, Kurnell, Helensburgh, Bargo, Woodford, Blackheath, Mt Werong, Hilltop, Carrington Falls.

Habitat

Habitat: Heath–woodland on poor soils.

Altitude: 0–1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent.

Vegetation: Drier coastal heath, dry eucalypt forest, swampy heath (Harden 1992), margin of upland mire (Kodala 1992).

Substrate: Low-nutrient sandy soils on sandstone with clay influence? periodically wet.

Exposure: Light shade to full sun.

Conservation

Conservation: Probably adequate.

Epacris microphylla* var. *rhubifolia

EPACRIDACEAE

Life history

Growth form: Erect, wiry shrub to 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, October–March.**Fruit/seed:** Capsule, 2 mm long, March–June.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NT CT.**Distribution Sydney area:** Mainly higher elevations.**Select locations:** Kekeelbon Mountains, Boyd Plateau, Jamberoo Pass.

Habitat

Habitat: Moist sites, high elevations.**Altitude:** 600–1200 m **Annual rainfall:** above 900 mm**Typical local abundance:** Frequent.**Vegetation:** Sphagnum bog, shrub swamp.**Substrate:** Rocky creek banks and sandstone crevices, peaty bog on granite.

Permanent moisture, low nutrients.

Exposure: ? Full sun.

Conservation

Conservation: Conservation status unknown.***Epacris muelleri***

EPACRIDACEAE

Life history

Growth form: Small shrub with branches 5–30 cm long, often weak and spreading but sometimes (even on nearby plants) erect and firm. The distinction between this species and *Epacris rigida* is not very clear in respect of the forms found in the Blue Mountains.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White or cream, October–December.**Fruit/seed:** Capsule, 2 mm long, mature March–May.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CT.**Distribution Sydney area:** Upper Blue Mountains.**Select locations:** Coricudgy, Kekeelbon Mtns, Galah Mtn, Newnes SF, Mt Wilson, Mt Hay, Blackheath, Bonnum Pic.

Habitat

Habitat: Damp rock faces, rock crevices, cliffs at higher elevations.**Altitude:** 800–1100 m **Annual rainfall:** above 900 mm**Typical local abundance:** Frequent.**Vegetation:** Cliffline vegetation e.g. with *Dracophyllum secundum*, and shrub/heath vegetation e.g. with *Leptospermum arachnoides*, *Allocasuarina nana*, *Leptospermum macrocarpum*.**Substrate:** On damp sandstone rocks, skeletal soils.**Exposure:** Sheltered places.

Conservation

Conservation: Endemic to Sydney area, coded 3RC- on national rare species list (ROTAP 1995).

Epacris obtusifolia

EPACRIDACEAE

Life history

Growth form: Shrub 0.5-1.5 m high.

Vegetative spread: No.

Longevity: 10-20 years.

Primary juvenile period: May attain flowering maturity in less than 4 years.

Flowers: Cream-white, July-December, peak September.

Fruit/seed: Capsule 3.5 mm long, average seed weight 0.03 mg (J. Howell pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990), soil-stored seedbank. Non-dormant fraction of total seed crop 15%, minimum temperature for maximum germination $\leq 60^{\circ}\text{C}$, recruitment mainly after fire (D. Keith pers. comm.).

Fire response: Killed by fire; seedling noted within 10 months of high intensity fire (at Lane Cove River 1/1994, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST; Qld, Vic., Tas.

Distribution Sydney area: Widespread, coast and mountains.

Select locations: Doyalson, Belrose, Kurnell, Royal NP, Bargo River, Lawson, Flat Top.

Habitat

Habitat: Sedgeswamp.

Altitude: 0-1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent-occasional.

Vegetation: Wet heath and sedgeland e.g. with *Gleichenia dicarpa*, *Banksia robur*, *Lepidosperma limicola*.

Substrate: Sandy soil on sandstone, poorly-drained sites, low nutrients.

Exposure: Full sun to light shade.

Conservation

Conservation: Probably adequately conserved.

Epacris paludosa

EPACRIDACEAE

Swamp Heath

Life history

Growth form: Erect shrub 1-2 m high.

Vegetative spread: No.

Longevity: More than 60 years (D. Keith pers. comm.).

Primary juvenile period: Primary juvenile period 4-? years (D. Keith pers. comm.).

Flowers: White, June-October.

Fruit/seed: Capsule 3 mm long.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Resprouts, secondary juvenile period 1 year (D. Keith pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT ST; Vic., Tas.

Distribution Sydney area: Blue Mountains and Woronora Plateau.

Select locations: Wolgan Gap, Maddens Plains, Wingecarribee Swamp, Budderoo NP.

Habitat

Habitat: Swamps, bogs and wet heath.

Altitude: 0-1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent.

Vegetation: Shrub swamps e.g. with *Viminaria juncea*, *Gleichenia dicarpa*, *Empodisma minus*, *Banksia paludosa*, *Leptospermum lanigerum*, *Baeckea utilis*, also eucalypt forest (Wolgan Gap).

Substrate: Swamps, grey clay on sandstone or fibrous peat. Watertable permanently high, low nutrient soil.

Exposure: Full sun.

Conservation

Conservation: Conservation status unknown.

Epacris pulchella**EPACRIDACEAE****Life history****Growth form:** Slender, erect shrub 40–150 cm high.**Vegetative spread:** No.**Longevity:** 10–20 years.**Primary juvenile period:** 3–6 years.**Flowers:** White–pink, January–May, peak March.**Fruit/seed:** Capsule 2 mm long, average seed weight 0.07 mg (J. Howell pers. comm.).**Dispersal, establishment & growth:** Diaspore: seed, no special dispersal morphology (Westoby et al. 1990).**Fire response:** Killed by high intensity fire (at Lane Cove River & Narrabeen Lake 1/1994), some plants flowering within 2 years 8 months and fruiting within 3 years of moderate intensity September fire (at Lane Cove River, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST; Qld.**Distribution Sydney area:** Coast and Blue Mountains.**Select locations:** Peats Ridge, Berowra, Cheltenham, Ashton Park, Flat Rock Creek, Colo Heights, Kurrajong Heights, Wentworth Falls, Blackheath.**Habitat****Habitat:** Ridgetops and hillsides.**Altitude:** 0–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Woodland and heath e.g. with mallee eucalypts *Eucalyptus stricta*, *E. apiculata*, *E. haemastoma* and shrubs e.g. *Leptospermum trinervium*, *Angophora hispida*, *Allocasuarina littoralis*, *Banksia ericifolia*.**Substrate:** Sandy skeletal soils from sandstone, low nutrient soils, cracks in rocks.**Exposure:****Conservation****Conservation:** Probably adequate.***Epacris purpurascens* var. *onosmiflora*****EPACRIDACEAE****Life history****Growth form:** Erect shrub 50–150 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pink–white, October–November, peak October.**Fruit/seed:** Capsule 2.5 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT ST.**Distribution Sydney area:** Upper Blue Mountains.**Select locations:** Newnes SF, Blackheath, Little Hartley, Mt Werong, Hilltop.**Habitat****Habitat:** Moist open-forest.**Altitude:** 800–1200 m**Annual rainfall:** above 900 mm**Typical local abundance:** Occasional.**Vegetation:** Moist eucalypt open-forest e.g. with *Acacia longifolia*, *Banksia ericifolia*, *Leptospermum polygalifolium*, *Hakea dactyloides*.**Substrate:** Deep alluvial sand or sandy soil over sandstone, low nutrients.**Exposure:****Conservation****Conservation:** Endemic to Sydney area., poorly known.

Epacris purpurascens* var. *purpurascens**EPACRIDACEAE****Life history****Growth form:** Erect shrub 50–150 cm high.**Vegetative spread:** No.**Longevity:** 5–20 years.**Primary juvenile period:****Flowers:** Pink–white, February–October.**Fruit/seed:** Capsule 2 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Probably killed, possibly grows quickly after fire if light is available. Killed by high intensity fire (at Lane Cove River 1/1994, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC .**Distribution Sydney area:** Northern Sydney.**Select locations:** Dural, Excelsior Park (L. McD.), Epping, Field of Mars, Condell Park.**Habitat****Habitat:****Altitude:** 0–200 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Rare.**Vegetation:** Scrub e.g. with *Melaleuca thymifolia*, *Melaleuca decora*.**Substrate:** Periodically poorly-drained clay soil of moderate nutrient on sandstone or shale.**Exposure:** Light shade to full sun.**Conservation****Conservation:** Endemic to Sydney area, coded 2KC- on national rare species list (ROTAP 1995), poorly conserved, only western Sydney population known is at Deveral Park (Condell Pk) (about 20 plants, 8/89). Vulnerable in Western Sydney (Benson & McDougall 1991).***Epacris reclinata*****EPACRIDACEAE****Life history****Growth form:** Decumbent or spreading shrub to 60 cm high, with prominent leaf scars on stem.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pink–red, June–December, peak October.**Fruit/seed:** Capsule 2 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT CWS.**Distribution Sydney area:** Upper and northern Blue Mountains, Southern Highlands.**Select locations:** Kelgoola, Kandos, Newnes Plateau, Lithgow, Blackheath, Mt Tomah, Lawson, Budderoo NP.**Habitat****Habitat:** Damp sandstone cliff faces and rock ledges.**Altitude:** 600–1200 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Damp ledges e.g. with *Callicoma serratifolia*, *Gleichenia rupestris*, *Todea barbara*, or moist forest / rainforest e.g. with *Eucalyptus oreades*.**Substrate:** Skeletal sandy soil among sandstone rocks, low nutrients, permanent moisture.**Exposure:** Mid shade.**Conservation****Conservation:** Conservation status unknown.

Epacris rigida**EPACRIDACEAE****Life history**

Growth form: Erect rigid bushy shrub 30–60 cm high, with prominent leaf scars on stem.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White or cream, mostly August–September.

Fruit/seed: Capsule 1.5 mm long.

Dispersal, establishment & growth:

Fire response: Probably resprouts from basal lignotuber (Harden 1992).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT

Distribution Sydney area: Blue Mountains.

Select locations: Lawson, Wentworth Falls, Mt Hay.

Habitat

Habitat: Heath on sandstone.

Altitude: 800–1000 m

Annual rainfall: above 1100 mm

Typical local abundance: Frequent.

Vegetation: Exposed open-heath e.g. with *Eucalyptus stricta*, *E. ligustrina*.

Substrate: Skeletal sandy soils from sandstone, low nutrients.

Exposure: Full sun.

Conservation

Conservation: Endemic to Sydney area, restricted but probably adequately conserved.

Epacris robusta**EPACRIDACEAE****Life history**

Growth form: Erect to spreading shrub 50–100 cm, rarely 200 cm high, with conspicuous leaf scars on the stem.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Cream, sweet-scented, August–December.

Fruit/seed: Capsule 2.5 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ST; Vic.

Distribution Sydney area: Jenolan Caves.

Select locations: Jenolan Caves (1900) only Sydney record.

Habitat

Habitat:

Altitude: 800 m

Annual rainfall: 950 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Only one record for Sydney area and now possibly extinct. Other occurrences mainly south from the Tinderry Mountains in ACT.

Epacris sparsa**EPACRIDACEAE****Life history**

Growth form: Erect shrub 60–90 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Cream, May–June.

Fruit/seed: Capsule, 1.4–1.8 mm high, seeds 0.8 mm long (Powell & James 1993), mature September.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Young plants growing from woody rootstock reported, suggesting capacity to resprout after fire or flooding.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC.

Distribution Sydney area: Grose River.

Select locations: Linden Creek, Burrellow Creek/lower Grose River.

Habitat

Habitat: Base of rock faces or on rock platforms in the riparian flood zone.

Altitude: 0–1000 m **Annual rainfall:** 800–900 mm

Typical local abundance: Occasional–rare.

Vegetation: Shady ground cover e.g. with *Sticherus*, *Lomandra montana*, *Lomandra fluviatilis* with canopy of *Tristaniopsis laurina*, *Backhousia myrtifolia*, *Ceratopetalum apetalum*.

Substrate: Damp low nutrient, sandy clay soil derived from exposed shale lenses between Hawkesbury Sandstone beds. Sites frequently subject to high moisture from wind-driven spray and would be inundated during periods of high rainfall (Powell & James 1993).

Exposure: Mid–deep shade.

Conservation

Conservation: Rare, endemic to Sydney area, coded 2VCi on national rare species list (ROTAP 1995). This species collected in 1803–5 and 1855 remained unknown until re-discovered in 1991 at Avoca Vale Reserve (Powell & James 1993).

Leucopogon amplexicaulis**EPACRIDACEAE****Life history**

Growth form: Scrambling shrub with branches to 1 m long.

Vegetative spread: No.

Longevity: 20–30 years. Abundant in some areas remaining unburnt for long periods.

Primary juvenile period:

Flowers: White, July–November, peak August–September.

Fruit/seed: Succulent fruit (drupe), average fresh weight 5–6 mg (J. Howell pers. comm.), 3.5 mm long, mature September–December.

Dispersal, establishment & growth: Diaspore: fruit with semi-fleshy layer plus tiny ‘skirt’ (J. Howell pers. comm.). Possibly a myrmecochore (Rice & Westoby 1981), soil-stored seed.

Fire response: Killed by high intensity fire (at Narrabeen Lake 1/1994), a few seedlings seen 10–12 cm high within 16 months of high intensity fire (at Lane Cove River 1/1994, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC.

Distribution Sydney area: Coast and adjacent plateaus.

Select locations: Kariong, Woy Woy, Berowra, Bantry Bay, Willoughby, Rose Bay, Royal NP, Waterfall, Springwood, Bargo.

Habitat

Habitat: Sheltered sites on sandstone outcrops and lower hillslopes.

Altitude: 0–300 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt woodland and open-scrub e.g. with *Angophora costata*, *Eucalyptus gummifera*, *Eucalyptus piperita*, *Bauera rubioides*, *Banksia ericifolia*, *Gleichenia*.

Substrate: Hawkesbury Sandstone, shady wet sandstone rock faces, low nutrients, permanent seepage.

Exposure: Sheltered aspects, mid to light shade.

Conservation

Conservation: Previously on national rare species list (ROTAP) but now regarded as well-conserved. Common in Heathcote NP, parts of Ku-ring-gai Chase NP and Garigal NP.

Leucopogon appressus**EPACRIDACEAE****Life history**

Growth form: Straggling shrub with rigid wiry branches.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, inconspicuous, December–February, peak February.

Fruit/seed: Dry seed with elaiosome, 1.6 mm long, average seed weight 0.65 mg (J. Howell pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, ant-adapted food body for dispersal (Westoby et al. 1990, Rice & Westoby 1981)

Fire response: Killed by high intensity fire (at Lane Cove River & Narrabeen Lake 1/1994), a few seedlings seen within 19 months (at Lane Cove, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT

Distribution Sydney area: Coast and adjacent plateau and lower Blue Mountains.

Select locations: Boorai Ridge, Cowan, Pennant Hills Park, Belrose (L.McD.), Mountain Lagoon, Murphys Glen, Lawson, Newnes Plateau.

Habitat

Habitat: Shrubby forest on sandstone.

Altitude: 0–1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Heath; eucalypt forest with heathy understorey e.g. with *Leptospermum trinervium*, *Hakea propinqua*, *Banksia ericifolia*.

Substrate: Skeletal sandy soil between sandstone rocks, well-drained, low nutrient.

Exposure:

Conservation

Conservation: Endemic to Sydney area, reasonably common and adequately conserved.

Leucopogon deformis**EPACRIDACEAE****Life history**

Growth form: Bushy shrub usually less than 1 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, March–May.

Fruit/seed: Succulent fruit (drupe), 2–2.3 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC CC; Qld.
Distribution Sydney area: Centennial Park.
Select locations: Centennial Park (1901).

Habitat

Habitat:
Altitude: 0–100 m **Annual rainfall:** 1200 mm
Typical local abundance:
Vegetation: Coastal dry sandplain heath.
Substrate: Deep sand.
Exposure:

Conservation

Conservation: Now extinct in the Sydney area. Early record from Centennial Park is southern limit, now only occurring north from Hawks Nest.

Leucopogon ericoides**EPACRIDACEAE****Life history**

Growth form: Slender shrub to 0.9 m high with finely pubescent branches.
Vegetative spread: No.
Longevity: 5–20 years.
Primary juvenile period:
Flowers: White–pinkish, July–October, peak September.
Fruit/seed: Succulent fruit (drupe), 5.7 mm long with prominent ridges, turning brown.
Dispersal, establishment & growth:
Fire response: Killed, re-established from soil-stored seed (at Agnes Banks, Benson 1981). One plant flowering less than 3 years after moderate intensity September fire (at Lane Cove River, P. Kubiak pers. comm.). Resprouts at ground level or below (at Myall Lakes, Fox 1988).
Interaction with other organisms: Source of nectar for bees (Clemenson 1985).

Distribution

Status/origin: Native.
Botanical subregions: NC CC SC CT ST CWS; Vic., Tas.
Distribution Sydney area: Widespread.
Select locations: Cheltenham, Villawood, Helensburgh, Bass Point, Marsden Park, Agnes Banks, Wedderburn, Wentworth Falls, Lithgow.

Habitat

Habitat: Ridges, plateaus, hillsides.
Altitude: 0–1000 m **Annual rainfall:** above 700 mm
Typical local abundance: Frequent–occasional.
Vegetation: Heath and woodland e.g. with *Eucalyptus sclerophylla*, *Angophora bakeri*, *Eucalyptus piperita*.
Substrate: Deep sand and sandy clay soils from sandstone and Tertiary alluvium. Indurated beach and marine sand near shore (at Bass Point, M. Robinson pers. comm.).
Exposure: Full sun.

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991), rare in Illawarra (M. Robinson pers. comm.), status elsewhere unknown.

Leucopogon esquamatus**EPACRIDACEAE****Life history**

Growth form: Slender shrub to 1 m high, with erect branches.
Vegetative spread: No.
Longevity: 5–20 years (D. Keith pers. comm.).
Primary juvenile period: May attain flowering maturity in less than 4 years.

Flowers: White, August–September, peak September.

Fruit/seed: Cylindrical, dry fruit, 4.5 mm long, brown, November–December, average seed weight 8 mg, seed with elaiosome (J. Howell pers. comm.).

Dispersal, establishment & growth: Diaspore: fruit, ant-adapted food body for dispersal (Westoby et al. 1990, Rice & Westoby 1981).

Fire response: Killed by fire, recruitment mainly after fire (D. Keith pers. comm.)

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST; Vic., Tas.

Distribution Sydney area: Coastal and upper Blue Mountains.

Select locations: Kariong, Berowra, Frenchs Forest, Lane Cove, Helensburgh, Bulli, Berry Mtn, Woodford, Wentworth Falls, Bell.

Habitat

Habitat: Swamp, heath and woodland.

Altitude: 0–1200 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Shrubswamp and damp heath e.g. with *Banksia oblongifolia*, *B. paludosa*, *B. ericifolia*, woodland e.g. with *Eucalyptus haemastoma*, *E. gummifera*.

Substrate: Skeletal sandy soils on sandstone, low nutrient soils.

Exposure:

Conservation

Conservation: Probably adequately conserved.

Leucopogon exolasius

EPACRIDACEAE

Life history

Growth form: Erect shrub to 1 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, August–October, peak August.

Fruit/seed: Fruit (drupe) 4.5 mm long, mature October.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC.

Distribution Sydney area: Upper Georges River, Woronora River, Grose River.

Select locations: Leumeah, The Woolwash, O'Hares Creek, Stokes Creek, Woronora River, Grose River (1894).

Habitat

Habitat: Hillsides near creeks.

Altitude: 0–100 m

Annual rainfall: above 1000 mm

Typical local abundance: Rare.

Vegetation: Woodland e.g. with *Eucalyptus piperita*, *E. sieberi* and shrubs *Pultenaea flexilis*, *Leptospermum trinervium*, *Dillwynia retorta*.

Substrate: Sandy alluvium and rocky sandstone hillsides near creeks, low nutrient soils.

Exposure:

Conservation

Conservation: Endemic to Sydney area, rare, coded 2VC- on national rare species list (ROTAP 1995). Grose River populations not reported since 1894. Reported as fairly common in alluvial deposits along Georges River from Macquarie Fields to Campbelltown in 1914. Current status not known — vulnerable to changes in creek conditions and increased weed invasion.

Leucopogon fletcheri* subsp. *brevisepalus

EPACRIDACEAE

Life history**Growth form:** Densely branched shrub 0.3–1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, cream or pink-tinged, pendent, September–November (Powell & Robertson 1993).**Fruit/seed:** Succulent fruit (drupe) 3 mm long, December–February (Powell & Robertson 1993).**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT ST SWS; Vic.**Distribution Sydney area:** Mt Werong.**Select locations:** Mt Werong (1909) only record for area.**Habitat****Habitat:****Altitude:** 1000 m**Annual rainfall:** 1000 m**Typical local abundance:** Frequent.**Vegetation:** Eucalypt open-forest and woodland.**Substrate:** Stony and sandy yellow-brown or orange-brown soils on various substrates (Powell & Robertson 1993).**Exposure:****Conservation****Conservation:** Mt Werong is northern geographical limit. Relatively widespread, and not considered endangered elsewhere (Powell & Robertson 1993).***Leucopogon fletcheri* subsp. *fletcheri***

EPACRIDACEAE

Life history**Growth form:** Densely branched shrub to 1.8 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, pendent, August–October.**Fruit/seed:** Succulent fruit (drupe) 5 mm long, October.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC.**Distribution Sydney area:** Northwestern Sydney.**Select locations:** St Albans, Blaxlands Ridge, Annangrove, Springwood.**Habitat****Habitat:****Altitude:** 0–600 m**Annual rainfall:** 800–1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Local Sydney endemic species coded 3RC- on national rare species list (ROTAP 1995). Not collected in recent years and considered rare and endangered (Powell & Robertson 1993).

Leucopogon fraseri

EPACRIDACEAE

Life history

Growth form: Prostrate shrub with ascending branches to 0.2 m high.

Vegetative spread: No (McIntyre et al. 1995).

Longevity:

Primary juvenile period:

Flowers: White, September–November, sometimes March–May.

Fruit/seed: Succulent fruit (drupe), yellow, 5 mm long.

Dispersal, establishment & growth: Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC SC NT CT ST ; Vic., Tas., N.Z.

Distribution Sydney area: Western Blue Mountains. South from Rylstone.

Select locations: Cudgegong River, Glen Alice–Rylstone, Capertee, Winburndale, Jenolan Caves, Barbers Creek (1899).

Habitat

Habitat:

Altitude: 500–1000 m **Annual rainfall:** 600–1000 mm

Typical local abundance: Occasional.

Vegetation: Eucalypt woodland, shrubland and heath.

Substrate: Shallow sandy soils, often poorly-drained, on sandstone or granite.

Exposure:

Conservation

Conservation: Cudgegong River is northern geographical limit, conservation status unknown.

Leucopogon juniperinus

EPACRIDACEAE

Life history

Growth form: Rigid, divaricate shrub to 1 m high.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: White, May–October.

Fruit/seed: Succulent fruit (drupe), average fresh weight 22 mg (J. Howell pers. comm.), ovoid–ellipsoid, 4 mm long, yellow at maturity August–January,

Dispersal, establishment & growth: Diaspore: fruit, both vertebrate and ant-adapted dispersal (Westoby et al. 1990). Coloniser of disturbed sites. Mycorrhizas possibly assist breakdown of woody seed coat and establishment of seedling, but presence not related to nitrogen status of plant (Reed 1989).

Fire response: Killed by high intensity fire (at Lane Cove River 1/1994, P. Kubiak p. c.).

Interaction with other organisms: Can tolerate *Casuarina* allelopathy, possibly assisted by mycorrhizal association (Reed 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld, Vic.

Distribution Sydney area: Coast, widespread.

Select locations: Wyong, Eastwood, Kogarah, Silverwater, Liverpool, Appin, Kurrajong, Mulgoa, Mt Ousley, Yallah, Shellharbour, Cambewarra.

Habitat

Habitat: Forest and open areas.

Altitude: 0–300 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Dry and wet eucalypt forest e.g. with *Eucalyptus saligna*, *E. pilularis*, *E. tereticornis*, *E. maculata*, *Bursaria spinosa*, and woodland with *Eucalyptus eugenioides*, *E. longifolia*; open shrubland of *Melaleuca armillaris* on ridgetop (M. Robinson pers. comm.).

Substrate: Clay soils particularly from Wianamatta Shale, medium nutrient, well-drained. Watertable mostly low. On Berry siltstone/Budgong Sandstone/Bombo Latite Member in Illawarra (M. Robinson pers. comm.).

Exposure: Light shade–full sun.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), widespread in suitable habitat but inadequately conserved in Illawarra (A. Bofeldt, M. Robinson pers. comm.), status elsewhere unknown.

Leucopogon lanceolatus var. *lanceolatus*

EPACRIDACEAE

Life history

Growth form: Erect or bushy shrub 0.7–3 m, rarely to 7 m high.

Vegetative spread: No.

Longevity: More than 25 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White, May–October, peak September, fragrant.

Fruit/seed: Succulent red or yellowish fruit (drupe) 3mm long, average fresh weight 32 mg (J. Howell pers. comm.), red at maturity, August–March.

Dispersal, establishment & growth: Diaspore: fruit, both vertebrate (probably bird) and ant-adapted dispersal (Westoby et al. 1990). Germination slow 6–18 months, slow-growing (A. Bofeldt pers. comm.).

Fire response: Resprouts from ground level, after high intensity fire (at Katandra 1/1994, L.McD.), resprouting plants flowering within 20 months (at Lane Cove, P. Kubiak p. c.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS; Qld, Vic, Tas, SA.

Distribution Sydney area: Widespread.

Select locations: Wahroonga, Narrabeen, Helensburgh, Mt Kembla, Berry, Long Swamp (Kodala 1992), Thirlmere, Belanglo, Springwood, Lawson, Blackheath, Winburndale, Mt Coricudgy.

Habitat

Habitat: Open-forest, rainforest on poor sandy soil.

Altitude: 0–1200 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Moist to dry eucalypt forests e.g. with *Eucalyptus saligna*, *E. pilularis*, *E. sieberi*, *Syncarpia glomulifera*, *Angophora floribunda*, tall open-forest/rainforest ecotone. Warm temperate rainforest on poorer sandy soils (A. Bofeldt pers. comm.). Margin of upland mire (Kodala 1992).

Substrate: Most types of soil, often with some clay; sandstone, Wianamatta Shale, basalt; low–high nutrient, well-drained; Beach sands in Illawarra (A. Bofeldt, M. Robinson p. c.).

Exposure: Mid-shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Probably adequately conserved.

Leucopogon margarodes

EPACRIDACEAE

Life history**Growth form:** Erect shrub to 70 cm high.**Vegetative spread:** No.**Longevity:****Primary juvenile period:****Flowers:** September–February.**Fruit/seed:** Fruit (drupe) 3–4 mm long, green with a white fleshy base.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC.**Distribution Sydney area:** North of Broken Bay.**Select locations:** North Entrance, Kincumber, Wondabyne.

Habitat**Habitat:** Swamp margins.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Coastal heath, swamp forest e.g. with *Eucalyptus robusta*, *Banksia collina*.**Substrate:** Sandy soil, low nutrients.**Exposure:**

Conservation**Conservation:** Wondabyne is southern geographical limit. Conservation status unknown.***Leucopogon microphyllus* var. *microphyllus***

EPACRIDACEAE

Life history**Growth form:** Bushy or spreading shrub to 1 m high.**Vegetative spread:** No.**Longevity:** 5–20 years (D. Keith pers. comm.).**Primary juvenile period:** May attain flowering maturity in 4–5 years (Benson 1985).**Flowers:** White, at any time of year, but mainly July–October.**Fruit/seed:** Dry fruit 1.2–1.5 mm long, with flaky coat attractive to ants, 1–2 embryos per fruit, average weight 0.7 mg (J. Howell pers. comm.), mainly August–October.**Dispersal, establishment & growth:** Dispersal: ant-adapted food body (Westoby et al. 1990).**Fire response:** Killed by high intensity fire, regenerates from soil-stored seed seedlings flowering within 2 years (at Lane Cove River & Narrabeen Lake 1/1994, P. Kubiak pers. comm.). Regrowth from rootstock reported by B. Wiecek at Kenthurst (5/1993).**Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST CWS; Qld.**Distribution Sydney area:** Widespread**Select locations:** Kenthurst, Cheltenham, Middle Harbour, Royal NP, Bulli, Dapto, Barren Grounds, Woodford, Clarence, Kanangra, Winburndale, Coricudgy.

Habitat**Habitat:** Ridges and hillsides.**Altitude:** 0–1200 m**Annual rainfall:** above 900 mm**Typical local abundance:** Frequent.**Vegetation:** Heath e.g. with *Banksia ericifolia*, *Allocasuarina nana*, *Allocasuarina distyla* and dry sclerophyll forest e.g. *Eucalyptus gummifera*, *E. piperita*, *E. eximia*.**Substrate:** Sandy soil on sandstone, quartzite, low nutrient.**Exposure:** Full sun.

Conservation**Conservation:** Probably adequately conserved.

Leucopogon microphyllus* var. *pilibundus

EPACRIDACEAE

Life history**Growth form:** Bushy or spreading shrub to 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, August–October.**Fruit/seed:** Succulent fruit (drupe) 1.2–1.5 mm long.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST CWS SWS; Vic.**Distribution Sydney area:** Tablelands, higher altitudes.**Select locations:** Coricudgy, Winburndale NR, Mullion Creek State Forest, Taralga.

Habitat**Habitat:** Upper slopes, ridges, rocky creek banks.**Altitude:** 800–1200 m **Annual rainfall:** 800–1000 mm**Typical local abundance:** Frequent.**Vegetation:** Open-forest and woodland e.g. with *Eucalyptus rossii*, *E. dives*, *E. goniocalyx*, *E. piperita*.**Substrate:** Clayey to sandy soil on conglomerate, sandstones, shales.**Exposure:**

Conservation**Conservation:** Conservation status unknown.***Leucopogon muticus***

EPACRIDACEAE

Life history**Growth form:** Erect straggly shrub to 1.5 m high.**Vegetative spread:****Longevity:** Medium.**Primary juvenile period:****Flowers:** White, scented, July–October, peak September.**Fruit/seed:** Black, succulent fruit (drupe) 3.0–4.5 mm long, black, October–January, peak December.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:** May resprout after low or medium intensity fires, flowering in winter following such fires (R. Lembit pers. comm.).**Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS; Qld.**Distribution Sydney area:** Blue Mountains and Hornsby Plateau.**Select locations:** Howes Valley, Wisemans Ferry, Dural, Springwood, Glenbrook, Nortons Basin, Olinda, Mt Coricudgy, Glen Davis, Mt Victoria.

Habitat**Habitat:** Upper slopes and ridges.**Altitude:** 0–1000 m **Annual rainfall:** 700–1000 mm**Typical local abundance:** Frequent–dominant.**Vegetation:** Heath and dry sclerophyll forest e.g. with *Eucalyptus eximia*, *Eucalyptus punctata*, *Angophora bakeri*.**Substrate:** Skeletal sandy soil on sandstone. Could be indicator of clay influence?**Exposure:** Frequent species, and widespread on drier parts of sandstone plateau.

Conservation**Conservation:** Conservation status unknown.

Leucopogon neo-anglicus**EPACRIDACEAE****Life history****Growth form:** Erect shrub to 0.8 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, March–October.**Fruit/seed:** Succulent fruit (drupe) 3 mm long, reddish brown to grey brown.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS; Qld.**Distribution Sydney area:** Southern part of area.**Select locations:** West Cambewarra, Wingello.**Habitat****Habitat:****Altitude:** 0–600 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:****Substrate:** Peaty soil, low nutrients.**Exposure:****Conservation****Conservation:** Appears to be rare, conservation status unknown.***Leucopogon parviflorus*****EPACRIDACEAE**

Coastal Bearded-Heath

Life history**Growth form:** Erect shrub or small tree 1–5 m high.**Vegetative spread:** No.**Longevity:** 20–100 years (A. Bofeldt pers. comm.).**Primary juvenile period:****Flowers:** White, July–October. Fragrant (A. Bofeldt pers. comm.).**Fruit/seed:** Succulent fruit 5 mm long, white/pale green, edible, sweet (A. Bofeldt p. c.).**Dispersal, establishment & growth:** Diaspore: fruit, bird-dispersed, slow to germinate 6–18 months, slow-growing, coloniser of sand dunes (A. Bofeldt, M. Robinson pers. comm.).**Fire response:****Interaction with other organisms:** Mycorrhizal association with roots, likely to assist nutrition (Logan et al. 1989). Foodplant of Silver Gull *Larus novaehollandiae* (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; LHL, Qld, Vic., Tas., S.A., W.A., N.Z.**Distribution Sydney area:** Coast, near the sea.**Select locations:** North Entrance, Ettalong, Avalon, Manly, Maroubra, Cronulla, Austinmer, Lake Illawarra, Bass Point, Shellharbour.**Habitat****Habitat:** Coastal sand dunes.**Altitude:** 0–50 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional–frequent.**Vegetation:** Dune scrub e.g. with *Acacia sophorae*, and low open-forest behind beach e.g. with *Eucalyptus pilularis*, *E. gunnifera*, *Angophora costata*.**Substrate:** Dune sand or less commonly on sandstone, low nutrient, well-drained. Moisture intermittent (A. Bofeldt pers. comm.).**Exposure:** Very exposed to sheltered, full sun–mid shade (A. Bofeldt pers. comm.).**Conservation****Conservation:** Conservation status unknown.

Leucopogon setiger

EPACRIDACEAE

Life history

Growth form: Erect to spreading shrub 0.3–1.5 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, pendent, July–October, peak August–September.

Fruit/seed: Succulent fruit (drupe) 4.2 mm long, yellow–green at maturity, October–December.

Dispersal, establishment & growth: Diaspore: fruit, adapted for ant-dispersal (Rice & Westoby 1981)

Fire response: Killed by high intensity fire, no seedlings seen (at Lane Cove River & Narrabeen Lake 1/1994, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT CWS.

Distribution Sydney area: Widespread

Select locations: Cowan, Roseville, Heathcote, Tahmoor, Springwood, Clarence, Blackheath, Mt Coricudgy, Hilltop, Bundanoon.

Habitat

Habitat: Shrubby woodland on sandstone.

Altitude: 0–1200 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Shrubby woodland and forest e.g with *Eucalyptus gummifera*, *E. eximia*, *E. piperita*, *Angophora costata*.

Substrate: Sandy loam or shallow peaty soil, sandstone, low nutrient soils.

Exposure: Light shade.

Conservation

Conservation: Conservaton status unknown.

Leucopogon virgatus

EPACRIDACEAE

Life history

Growth form: Slender shrub 35–45 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, July–December, peak September–October.

Fruit/seed: Succulent fruit (drupe) 2.3 mm long, mature October–November.

Dispersal, establishment & growth:

Fire response: Resprouts from ground level or below (Benson 1981, Fox 1988).

No seedlings recorded within 1 year after fire (Purdie 1977).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS; Qld, Vic., S.A.

Distribution Sydney area: Widespread, coast and south of area.

Select locations: Howes swamp, Long Bay, Kogarah, Wedderburn, St Marys, Richmond, Barrengarry, Hilltop, Mt Jellore, Berrima.

Habitat

Habitat:

Altitude: 0–600 m **Annual rainfall:** above 700 m

Typical local abundance: Frequent–occasional.

Vegetation: Heath and woodland e.g. with *Angophora floribunda*, *Eucalyptus sclerophylla*, *E. parramattensis*, *Banksia serrata*.

Substrate: Sandy soil from sandstone substrate, slates, Devonian metasediments, very low nutrients.

Exposure:

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991), status elsewhere unknown

Lissanthe sapida

EPACRIDACEAE

Native Cranberry

Life history

Growth form: Bushy shrub to 1m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Creamy white, March–December, peak July–September.

Fruit/seed: Succulent fruit (drupe) 6.0 mm long, red, mature June–February.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Lower Blue Mountains.

Select locations: Culoul Range, Wheeny Creek, Vale of Avoca, Glenbrook, Woodford, Lawson.

Habitat

Habitat: Ridges and hillsides, sometimes along creeks.

Altitude: 0–800 m

Annual rainfall: 900–1200 mm

Typical local abundance: Rare–occasional.

Vegetation: Eucalypt open-forest e.g. with *Eucalyptus gummifera*, *E. eximia*, *Angophora costata*, *Syncarpia glomulifera*, *Allocasuarina torulosa*.

Substrate: Rocky ledges, sandy soil on sandstone, low nutrients.

Exposure:

Conservation

Conservation: Endemic to Sydney area, coded 3RCa on national rare species list (ROTAP 1995), probably adequately conserved e.g. in Blue Mountains/Wollemi NP.

Lissanthe strigosa* subsp. *strigosa

EPACRIDACEAE

Peach Heath

Life history

Growth form: Erect shrub 30–100 cm high, leaves dense on branches, 3.4–5.8 mm long usually with a single thick midrib grooved on each side, on under surface (Powell & Wiecek 1994).

Vegetative spread: No.

Longevity: Long.

Primary juvenile period:

Flowers: White–pink, July–September, peak September.

Fruit/seed: Succulent fruit (drupe), 3 mm long, sweet tasting when ripe Cribb (1975), matures September–November and drops.

Dispersal, establishment & growth: Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995).

Fire response: Resprouts from base after high intensity fire (Narrabeen Lake 1/1994), one plant flowering within 9 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC.

Distribution Sydney area: Mainly western Sydney.

Select locations: Howes Mountain, Sackville, Castlereagh State Forest, Vineyard, Agnes Banks, St Marys, Bankstown, Kentlyn, Mulgoa, Douglas Park.

Habitat

Habitat: Low-lying, flatter sites.

Altitude: 0–300 m

Annual rainfall: 700–1000

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest and woodland e.g. with *Eucalyptus fibrosa*, *Angophora bakeri*, *Melaleuca decora*, *Eucalyptus longifolia*, *E. sideroxylon*, *E. parramattensis*.

Substrate: Tertiary alluvium, Wianamatta Shale, and less commonly on sandstone. Fine light yellow-grey or orange-brown clayey soils that are probably subjected to periodic inundation, poorly-drained (Powell 1994). Where growing together, *L. strigosa* subsp. *strigosa* occupies fine claysoils on ridgetops, while *L. strigosa* subsp. *subulata* is on rocky slopes.

Exposure: Full sun to mid-shade.

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991). Status elsewhere unknown.

Lissanthe strigosa* subsp. *subulata**EPACRIDACEAE**

Peach Heath

Life history

Growth form: Erect shrub 30–100 cm high, leaves 6.1–16.5 mm long with veins strongly 3–5-ribbed and grooved on undersurface (Powell 1994).

Vegetative spread: No.

Longevity: long.

Primary juvenile period:

Flowers: White–pink, July–October, peak August–September.

Fruit/seed: Succulent fruit (drupe), 3 mm long, edible, sweet tasting when ripe Cribb (1975), matures October–December and drops.

Dispersal, establishment & growth: Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995).

Fire response: Resprouts from base.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC NT CT ST NWS CWS NWP; Qld, Vic., Tas., S.A.

Distribution Sydney area: Coast and adjacent plateaus and lower Blue Mountains.

Select locations: Colo Heights, Glenorie, Willoughby, Cronulla, Loftus, Hill Top, Maldon, Macquarie Pass, Springwood, Lawson, Lithgow, Capertee, Abercrombie Caves.

Habitat

Habitat: Rocky ridges, stony slopes (Powell 1994)

Altitude: 0–1000 m

Annual rainfall: above 600 mm

Typical local abundance: Occasional–frequent.

Vegetation: Open-forest, woodland, shrublands e.g. with *Eucalyptus eximia*, *E. gummifera*, *E. punctata*.

Substrate: Skeletal sandy loam over sandstone, well-drained low nutrients, also loamy and clayey soils over sedimentary and igneous rocks (Powell & Wiecek 1994).

Exposure:

Conservation

Conservation: Widespread and probably adequately conserved except in Sydney suburban area.

Melichrus erubescens

EPACRIDACEAE

Ruby Urn Heath

Life history**Growth form:** Bushy shrub 30–120 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pink–deep red, February–October.**Fruit/seed:** Succulent, ribbed fruit (drupe) 5 mm long.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:****Botanical subregions:** CT NWS CWS SWS.**Distribution Sydney area:** Lithgow area.**Select locations:** Newnes Plateau, Pantoneys Crown.**Habitat****Habitat:** Sandstone pagodas and slopes.**Altitude:** 800–1000 m **Annual rainfall:** 900–1000 mm**Typical local abundance:** Rare.**Vegetation:** Scrub e.g. with *Hakea*, *Banksia*, or eucalypt woodland.**Substrate:** Shallow, alluvial sand over sandstone.**Exposure:****Conservation****Conservation:** Rare in Sydney area, mainly western slopes. Conservation status unknown.**Melichrus procumbens**

EPACRIDACEAE

Jam Tarts

Life history**Growth form:** Procumbent shrub to 20 cm high. Vernacular name comes from the peculiar shape of the open flowers and the large amount of nectar present.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Cream or pale green with pink-tinged lobes, May–October.**Fruit/seed:** Succulent fruit (drupe), mature August–November.**Dispersal, establishment & growth:****Fire response:** Resprouts from ground level or below (Fox 1988).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT CT; Qld.**Distribution Sydney area:** Coast and Hornsby plateau.**Select locations:** Coricudgy, Howes Swamp, Morrisset, Bucketty, South Maroota, Pennant Hills, Narrabeen, Lane Cove NP, Kogarah, East Hills.**Habitat****Habitat:** Dry forest.**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm**Typical local abundance:** Rare–frequent.**Vegetation:** Eucalypt forest e.g. with *Eucalyptus gummifera*, *E. punctata*, *Angophora bakeri*, heath e.g. with *Angophora hispida*, *Banksia ericifolia*.**Substrate:** Low-nutrient sandstone soils, deep sandy loam, well-drained.**Exposure:****Conservation****Conservation:** Southern geographical limit East Hills. Vulnerable in Western Sydney (Benson & McDougall 1991). Conservation status elsewhere unknown.

Melichrus urceolatus

EPACRIDACEAE

Urn Heath

Life history**Growth form:** Erect, stiffly branched shrub 20–150 cm high.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:****Primary juvenile period:****Flowers:** White, cream or yellow-green, March–November.**Fruit/seed:** Succulent fruit (drupe) 4 mm long, greenish white or purple-brown, July–November.**Dispersal, establishment & growth:** Diaspore: fruit, adaptation for dispersal by ingestion (McIntyre et al. 1995).**Fire response:** Regrowth from surviving rootstocks, no seedlings recorded less than 1 year after fire (Purdie 1977).**Interaction with other organisms:** Flowers eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic.**Distribution Sydney area:** Mainly higher parts of Blue Mountains.**Select locations:** Boorai Creek, Kenthurst, Wedderburn, Nullo Mountain, Capertee, Mullion Range, Winburndale NR, Blackheath, Abercrombie Road, Tallong.**Habitat****Habitat:** Steep slopes, hillsides.**Altitude:** 0–1200 m **Annual rainfall:** above 700 mm**Typical local abundance:** Occasional–frequent.**Vegetation:** Eucalypt woodland e.g. with *Eucalyptus eximia*, *E. gummifera*, *E. sclerophylla*, *E. sparsifolia*, *E. rossii*, *E. macrorhyncha*, *Callitris* woodland and *Acacia* scrub.**Substrate:** Sandy or loamy soils on sandstone, acid volcanics, shaley soils, sometimes on disturbed sites.**Exposure:****Conservation****Conservation:** Widespread species, conservation status unknown.**Monotoca elliptica**

EPACRIDACEAE

Life history**Growth form:** Bushy shrub or small tree to 4 m, sometimes to 8 m high.**Vegetative spread:** No.**Longevity:** Long-lived, more than 100 years. Some near Moore Park pre-date Centennial Park (M. Reed pers. comm.).**Primary juvenile period:****Flowers:** White–cream, July–September.**Fruit/seed:** Fleshy fruit (drupe) 3–4 mm long, orange or red, August–November.**Dispersal, establishment & growth:** Diaspore: fruit, probably bird-dispersed. Germination slow and difficult, slow-growing (A. Bofeldt pers. comm.). Seedlings appear to establish in areas long unburnt.**Fire response:** Resprouts from epicormic shoots (at La Perouse), though survival may be patchy. Most of population killed by high intensity fire (at Lane Cove River 1/1994), a few resprouting, no seedlings seen (P. Kubiak pers. comm.).**Interaction with other organisms:** Fruit eaten by Noisy Miners. Foodplant of butterfly larva *Neolucia mathewi* (Common & Waterhouse 1982).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT ST; Qld, Vic., Tas.**Distribution Sydney area:** Widespread, but frequently near the sea.**Select locations:** Norah Head, Narrabeen, Neilsen Park, Abbotsford, La Perouse, Cronulla, Corrimal, Bass Point, Seven Mile Beach, Vale of Avoca, Leura Falls, Blackheath, Newnes Plateau.

Habitat**Habitat:****Altitude:** 0–1000 m**Annual rainfall:** above 1100 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Eucalypt open-forest e.g. with *Eucalyptus robusta*, *Angophora costata*, *Eucalyptus botryoides*; low-forest and cliff-top scrub e.g. with *Acmena smithii*, *Banksia integrifolia*, *Elaeocarpus reticulatus*.**Substrate:** Coastal sand dunes, sandy soil over sandstone. Low nutrient soil, very well-drained (A. Bofeldt pers. comm.).**Exposure:** Light shade (M. Robinson pers. comm.).**Conservation****Conservation:** Not necessarily well conserved, coastal populations often include many senescent plants with little juvenile recruitment.***Monotoca ledifolia*****EPACRIDACEAE****Life history****Growth form:** Compact shrub 30–50 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, May (1 record).**Fruit/seed:** Fleshy, ribbed fruit (drupe), 2.8 mm long, mature July–November.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC CT.**Distribution Sydney area:** Woronora Plateau, Leura (1 record).**Select locations:** Waterfall, Heathcote NP, Woronora River, Darkes Forest, Budderoo, Hilltop, Leura.**Habitat****Habitat:** Rocky areas.**Altitude:** 0–1000 m**Annual rainfall:** above 900 mm**Typical local abundance:** Rare–frequent.**Vegetation:** Scrub or shrubland with mallees e.g. *Eucalyptus stricta*, *E. obtusifolia*; riparian scrub with *Tristaniopsis laurina*, *Hakea salicifolia*, woodland.**Substrate:** Rocky sites on cliff edges, along creeks on sandstone. Very low nutrient soil. Watertable mostly low, intermittent, fresh.**Exposure:** Exposed sites.**Conservation****Conservation:** Endemic to Sydney region, coded 3 RC- on national rare species list (ROTAP 1995).***Monotoca scoparia*****EPACRIDACEAE****Life history****Growth form:** Compact to spreading shrub 30–120 cm high.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** Medium–long.**Primary juvenile period:****Flowers:** White, March–July, peak April–May. Large-flowered plants visited by introduced bee, small-flowered plants by little black native bee (I. Bowden Herbarium note).**Fruit/seed:** Fleshy fruit (drupe) 3 mm long, average fresh weight 7 mg (J. Howell pers. comm.), yellow–orange, mature December–June.

Dispersal, establishment & growth: Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995), both vertebrate and ant-adapted dispersal (Westoby et al. 1990, Rice & Westoby 1981).

Fire response: Stems killed, regenerates from basal sprouts (e.g. at Agnes Banks, Benson 1981), after high-intensity fire at Katandra 1/1994, L.McD.). No seedlings recorded less than 1 year after fire (Purdie 1977). A few resprouting plants flowering within 17 months of high intensity fire (at Lane Cove River & Narrabeen Lake 1/1994, P. Kubiak pers. comm.).

Interaction with other organisms: Foodplant of butterfly larva *Neolucia mathewi* (Common & Waterhouse 1982). Low palatability, mortality unaffected by grazing after fire (Leigh & Holgate 1979).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS; Qld, Vic., Tas., S.A.

Distribution Sydney area: Widespread.

Select locations: Central Mangrove, Narrabeen, Botany Bay, Darkes Forest, Bulli, Bents Basin, Bargo, Cullen Bullen, Winburndale NR, Limekilns, Mt Wilson, Blackheath, Jellore Creek.

Habitat

Habitat: Dry forest and heath.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt forest, woodland e.g. with *Eucalyptus piperita*, *E. sieberi*, *E. blaxlandii*, *E. oreades*, *E. dalrympleana*, *E. pauciflora*, *E. rossii*, and heath.

Substrate: Sandy loam soil, over sandstone, conglomerate, low nutrient.

Exposure:

Conservation

Conservation: Widespread and common species that is generally well conserved. Conserved in Western Sydney (Benson & McDougall 1991).

Rupicola apiculata
EPACRIDACEAE

Life history

Growth form: Slender, erect shrub to 45 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, October–January, peak October–November, sometimes with an autumn flowering in April.

Fruit/seed: Capsule 1.5 mm long, with many seeds, mature December.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT.

Distribution Sydney area: Upper Blue Mountains, Blackheath–Leura.

Select locations: Wentworth Falls, Leura, Centennial Glen at Blackheath.

Habitat

Habitat: Rock ledges.

Altitude: 850–1000 m **Annual rainfall:** above 1100 mm

Typical local abundance: Frequent.

Vegetation: Rock ledge vegetation e.g. with *Geichenia rupestris*, *Epacris reclinata*, *E. crassifolia*, *Sprengelia monticola*.

Substrate: On rock ledges, low nutrient sandstone, permanently wet, receiving drips from steep cliffs above and seepage.

Exposure: Mid shade.

Conservation

Conservation: Endemic to Sydney region, coded 2RCa on national rare species list (ROTAP 1995), adequately conserved, several populations lie within Blue Mountains NP (Telford 1992)

Rupicola ciliata

EPACRIDACEAE

Life history**Growth form:** Decumbent shrub with branches to 50 cm long.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White or cream, October–December, peak November.**Fruit/seed:** Capsule 2.5 mm long, with many seeds, mature December–January.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC CT.**Distribution Sydney area:** Kurrajong area.**Select locations:** Bungleboori Creek, Yarramun Creek, Kurrajong Heights, Wheeny Creek, Bilpin.**Habitat****Habitat:** Rock crevices, rock ledges and beneath cliff overhangs.**Altitude:** 600–900 m **Annual rainfall:** 900–1200 mm**Typical local abundance:** Frequent.**Vegetation:** Rock ledge vegetation with e.g. *Acrophyllum australe*, *Gleichenia rupestris*, in open-forest with *Eucalyptus piperita*, *E. gummifera*, *E. agglomerata*.**Substrate:** Crevices and shallow benches on sandstone cliffs, low nutrient.**Exposure:** Sheltered.**Conservation****Conservation:** Endemic to Sydney region, coded 2RC-t on national rare species list (ROTAP 1995), well-conserved, all known populations are within Blue Mountains and Wollemi NP (Telford 1992).***Rupicola decumbens***

EPACRIDACEAE

Life history**Growth form:** Straggling, decumbent shrub with branches to 80 cm long.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White or cream, July–December.**Fruit/seed:** Hairy capsule 2 mm long, with many seeds, mature July.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT.**Distribution Sydney area:** Wollemi area.**Select locations:** Kelgoola, Coricudgy, Glen Davis.**Habitat****Habitat:** Cliff faces and at base of sandstone cliffs.**Altitude:** 550–950 m **Annual rainfall:** 600–1000 mm**Typical local abundance:** Rare.**Vegetation:** Cliff line vegetation e.g. with *Gleichenia rupestris*, *Epacris reclinata*.**Substrate:** Skeletal soil in rock crevices and base of sandstone cliffs, low nutrient, moist.**Exposure:** South to north-west aspects, sheltered.**Conservation****Conservation:** Endemic to Sydney region, coded 2RC- on national rare species list (ROTAP 1995). Several populations lie within Wollemi NP (Telford 1992).

Rupicola sprengelioides

EPACRIDACEAE

Life history

Growth form: Erect shrub 1-2 m high with white flowers.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, September–April, peak December, sometimes with autumn flowering in April.

Fruit/seed: Capsule 2 mm long, with many seeds.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT.

Distribution Sydney area: Blue Mountains.

Select locations: Kings Tableland, McMahons Lookout, Burragorang Lookout.

Habitat

Habitat: Sandstone ledges, cliff faces, rocky ground.

Altitude: 450–650 m **Annual rainfall:** above 1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest e.g. with *Eucalyptus punctata*, *Angophora costata*.

Substrate: Low nutrient skeletal sandy soils on sandstone, cracks in vertical cliff faces.

Exposure:

Conservation

Conservation: Endemic to Sydney region, rare, coded 2RC-t on national rare species list (ROTAP 1995), known from only three populations, two of which lie in Blue Mountains NP (Telford 1992).

Sprengelia incarnata

EPACRIDACEAE

Life history

Growth form: Shrub 50-200 cm high.

Vegetative spread:

Longevity: 5–20 years.

Primary juvenile period: May attain flowering maturity at 50 cm high in less than 4 years.

Flowers: Pink, June–October, peak August–September.

Fruit/seed: Capsule 1.8 mm long, mature September–December.

Dispersal, establishment & growth: Diaspore: seed. Recruitment mainly after fire, fire temperature more than 60° C for maximum germination, non-dormant fraction of total seed crop 33% (D. Keith pers. comm.).

Fire response: Killed by high intensity fire (at Lane Cove River, P. Kubiak pers. comm.), re-establishes from soil-stored seed.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST; Vic., Tas., S.A.

Distribution Sydney area: Widespread

Select locations: Mt White, Woy Woy, Frenchs Forest, Rose Bay, Royal NP, Bulli Pass, Woodford, Leura, Blackheath, Clarence, Robertson, Bundanoon.

Habitat

Habitat: Wet heath on sandstone.

Altitude: 0–1200 m **Annual rainfall:** above 1200 mm

Typical local abundance: Frequent.

Vegetation: Perennially wet heath or sedgeland e.g. with *Gleichenia*, *Banksia robur*, *Banksia ericifolia*.

Substrate: Sandy loam on sandstone, poorly-drained and permanently moist. Low nutrient.

Exposure: Full sun.

Conservation

Conservation: Probably adequately conserved.

Sprengelia monticola

EPACRIDACEAE

Life history**Growth form:** Diffuse or procumbent shrub 20–50 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, solitary, September–December, peak October.**Fruit/seed:** Capsule 2 mm diam.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT.**Distribution Sydney area:** Upper Blue Mountains.**Select locations:** Wentworth Falls, Katoomba, Medlow Bath, Blackheath, Mt Victoria.**Habitat****Habitat:** Wet rock faces and ledges or cliff bases.**Altitude:** above 900 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Frequent.**Vegetation:** Cliff ledge vegetation e.g. with *Todea barbara*, *Dracophyllum secundum*, *Gleichenia rupestris*, *Sticherus tener*.**Substrate:** Lower-nutrient sandstone, wet rock ledges, crevices with permanent moisture.**Exposure:** Sheltered sites.**Conservation****Conservation:** Endemic to the Sydney region, coded 3RC-t on national rare species list (ROTAP 1995).***Sprengelia sprengelioides***

EPACRIDACEAE

Life history**Growth form:** Slender erect wiry shrub 30–100cm high with white flowers.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, August–September.**Fruit/seed:** Capsule 2.5 mm diam., mature November.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC; Qld.**Distribution Sydney area:** Ku-ring-gai Chase, Bondi–Waterloo.**Select locations:** Salvation Creek, Bondi Swamps (1893), Waterloo swamps (1889).**Habitat****Habitat:** Swamp**Altitude:** 0–100 m**Annual rainfall:** above 1100 mm**Typical local abundance:** Frequent.**Vegetation:** Swampy heath e.g. with *Banksia robur*, *Xyris*.**Substrate:** Sandy soil in swamps, poorly-drained, low nutrient.**Exposure:** Full sun.**Conservation****Conservation:** Southern limit Waterloo–Bondi, though now extinct there. Rare in the Sydney region.

Styphelia angustifolia

EPACRIDACEAE

Life history**Growth form:** Erect shrub to 1.8 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pale green, December–February.**Fruit/seed:** Succulent ridged fruit (drupe) 6–7 mm long.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC CT ST NWS.**Distribution Sydney area:** Woronora Plateau, lower Blue Mountains.**Select locations:** Loftus (1897), Faulconbridge (1886), Linden (1915), Hilltop (1923).**Habitat****Habitat:** Rocky outcrop.**Altitude:** 0–600 m**Annual rainfall:** above 900 mm**Typical local abundance:** Rare.**Vegetation:** Open-forest.**Substrate:** Sandstone.**Exposure:****Conservation****Conservation:** Rare in Sydney area, only old records, last collection Hilltop (1923). Conservation status unknown, possibly endangered.***Styphelia laeta* subsp. *laeta***

EPACRIDACEAE

Life history**Growth form:** Slender, erect shrub 1–2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pale yellow-green or red, February–August.**Fruit/seed:** Succulent fruit (drupe) to 6–8 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC CT.**Distribution Sydney area:** Widespread.**Select locations:** Bucketty, Pearl Beach, Galston, Hurstville, East Hills, Appin, Yerrinbool, Londonderry, Lawson, Bungleboori Creek.**Habitat****Habitat:** Woodland on poor soils.**Altitude:** 0–700 m**Annual rainfall:** above 700 mm**Typical local abundance:** Rare–occasional.**Vegetation:** Eucalypt open-forest e.g. with *Eucalyptus sideroxylon*, *E. punctata*, *E. gummifera*, *E. eximia*, or heath e.g. with *Angophora hispida*.**Substrate:** Low-nutrient sandy or sandy-clay soils on Tertiary alluvium or Hawkesbury Sandstone, low nutrients.**Exposure:****Conservation****Conservation:** Endemic to Sydney region, not well conserved. Conserved in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.

Styphelia laeta* subsp. *latifolia

EPACRIDACEAE

Life history

Growth form: Slender, erect shrub 1-2 m high.
Vegetative spread: No.
Longevity:
Primary juvenile period:
Flowers: Pale yellow-green or red, March–July.
Fruit/seed: Succulent fruit (drupe) to 8 mm long.
Dispersal, establishment & growth: Diaspore: fruit.
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC CC CT NWS.
Distribution Sydney area: Hawkesbury River to Gosford.
Select locations: Kulnura, Peats Ridge, Somersby, Piles Creek, Calga, Point Clare.

Habitat

Habitat: Mainly ridgetop.
Altitude: 0–300 m **Annual rainfall:** above 1200 mm
Typical local abundance: Frequent.
Vegetation: Eucalypt woodland e.g. with *Eucalyptus haemastoma*, with shrubby understorey including Proteaceae species, *Acacia myrtifolia*.
Substrate: Deep yellow earth or ironstone 'lateritic' soils, or gravelly sandy soils, on sandstone plateaus, low nutrient.
Exposure:

Conservation

Conservation: Conservation status unknown.

Styphelia longifolia

EPACRIDACEAE

Life history

Growth form: Erect shrub 0.6–2 m high.
Vegetative spread: No.
Longevity:
Primary juvenile period: Less than 4 years (at Bantry Bay, L.McD.)
Flowers: Pale green–yellow, March–September, peak June.
Fruit/seed: Succulent fruit (drupe) 7–8 mm long, mature ? October.
Dispersal, establishment & growth: Present in area unburnt for 20 years (Bradley 1972).
Fire response: Killed by high-intensity fire (at Bantry Bay 12/1991, Katandra 1/1994 L.McD.).
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC CC.
Distribution Sydney area: Coast, Woy Woy to Waterfall.
Select locations: Bouddi NP, Wobby Beach, West Head, Mona Vale, The Spit, Ashton Park, Lane Cove, Waterfall.

Habitat

Habitat:
Altitude: 0–100 m **Annual rainfall:**
Typical local abundance: Rare–occasional.
Vegetation: Eucalypt open-forest e.g. with *Angophora costata*, *Eucalyptus haemastoma*.
Substrate: Sandy or gravelly soils on sandstone, sandstone–shale transition.
Exposure: Light shade.

Conservation

Conservation: Rare, occurring infrequently in low numbers and possibly endangered by frequent fire. 22/30 specimens collected pre 1950. Southern geographical limit is Waterfall.

Styphelia triflora

EPACRIDACEAE

Life history**Growth form:** Erect shrub 0.4-2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pink-red or cream or pale yellow-green, mainly April-October, peak September-October.**Fruit/seed:** Succulent fruit (drupe) 6.5-8 mm long, mature ? September.**Dispersal, establishment & growth:****Fire response:** Killed (Bantry Bay 1991, L.McD.), a few seedlings seen within 15 months of high intensity fire (at Lane Cove River & Narrabeen Lake 1/1994, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS NWP; Qld.**Distribution Sydney area:** Coast and west of Blue Mountains.**Select locations:** Yengo NP, Roseville, La Perouse, Audley, Appin, Nullo Mountain, Lithgow, Mullions Range, Winburndale NR, Hill End, Tarana, Trunkey.**Habitat****Habitat:** Sandstone ridge, moist gully.**Altitude:** 0-1200 mm **Annual rainfall:** above 700 mm**Typical local abundance:** Rare-occasional.**Vegetation:** Eucalypt forest and woodland e.g. with *Angophora costata*, *Eucalyptus piperita*, *E. rossii*, *E. mannifera*, *E. macrorhyncha*, *E. dives*. Sea cliff-top scrub e.g. with *Melaleuca nodosa*, *Leptospermum laevigatum*, *Calythrix tetragona*.**Substrate:** Low-nutrient sandy-clayey soils on sandstone, conglomerate.**Exposure:** Light shade to full sun.**Conservation****Conservation:** Conservation status unknown.***Styphelia tubiflora***

EPACRIDACEAE

Life history**Growth form:** Spreading shrub 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Red or cream or pale yellow-green, April-August.**Fruit/seed:** Dry capsule 5 mm long, with tiny 'skirt' around one end, average fresh weight 19 mg (J. Howell pers. comm.), mature August-December.**Dispersal, establishment & growth:** Ant adapted for dispersal (Westoby et al. 1990). Many fruits infertile; germination takes more than 2 years; mycorrhizas possibly assist breakdown of seed coat and establishment of seedling (Reed 1989).**Fire response:** Killed by high and medium intensity fire (at Lane Cove River), localised seedlings reported after fire (P. Kubiak pers. comm.).**Interaction with other organisms:** Can tolerate *Casuarina* allelopathy, possibly assisted by mycorrhizal association (Reed 1989).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT ST.**Distribution Sydney area:** Widespread.**Select locations:** Wattagan Forest, Cheltenham, Narrabeen, Manly, Cronulla, Lucas Heights, Kurrajong Heights, Springwood, Wentworth Falls, Blackheath, Bell, Wingello.

Habitat**Habitat:** Ridges and hillsides.**Altitude:** 0–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Occasional–frequent.**Vegetation:** Woodland e.g. with *Eucalyptus piperita*, *E. haemastoma*, *E. gummifera*, and heath e.g. with *Angophora hispida*.**Substrate:** Low nutrient sandy soils on sandstone.**Exposure:****Conservation****Conservation:** Probably adequately conserved though may be endangered by frequent fire regimes.***Styphelia viridis* subsp. *viridis*****EPACRIDACEAE****Life history****Growth form:** Erect shrub 1–2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Translucent green, April–August.**Fruit/seed:** Succulent fruit (drupe) 7–10 mm long, mature ? August.**Dispersal, establishment & growth:** Diaspore: fruit. Soil-stored seedbank (Fox 1988).**Fire response:** Killed by fire (Fox 1988).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC.**Distribution Sydney area:** Coast, Port Jackson to Royal NP.**Select locations:** Rose Bay, Vaucluse–Bondi, La Perouse, Lady Robinsons Beach, Kurnell, Bundeena, Waterfall.**Habitat****Habitat:****Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Coastal heath e.g. with *Banksia serrata*, *Lambertia formosa*, *Ricinocarpus pinifolius*.**Substrate:** Old dunes not far from the sea and sandy soil from sandstone, low nutrient soils.**Exposure:****Conservation****Conservation:** Sydney populations at southern geographical limit, probably not adequately conserved. Possibly threatened by frequent fire.***Trochocarpa laurina*****EPACRIDACEAE**

Tree Heath

Life history**Growth form:** Compact shrub or crooked tree to 15 m high, with 5–7 veined leaves.**Vegetative spread:** No.**Longevity:** Probably long, more than 10 years (A. Bofeldt pers. comm.).**Primary juvenile period:****Flowers:** White, December–January.**Fruit/seed:** Succulent fruit (drupe) 6–8 mm diam., average fresh weight 180 mg, with multiple embryos per fruit (J. Howell pers. comm.), purple to black, ripening June–September. 40,600 seeds per kg (Floyd 1989).**Dispersal, establishment & growth:** Diaspore: fruit. Dispersal: vertebrate-adapted fleshy fruit (Westoby et al. 1990), bird-dispersed, water-dispersed, germination 6–14 months, low germination rate, very slow-growing especially when young (A. Bofeldt pers. comm.). Germination is difficult, may take up to 2 years (Floyd 1989).

Fire response: Resprouts from base after high intensity fire (at Narrabeen Lake 1/1994, P. Kubiak pers. comm.), resprouts from stem/branches after low intensity fires (A. Bofeldt pers. comm.).

Interaction with other organisms: Host tree for epiphytes e.g. ferns, orchids (A. Bofeldt pers. comm.). Used by Aboriginal people for waddies (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT; Qld.

Distribution Sydney area: Coast and adjacent plateaus.

Select locations: Mt Kindarun, Yarramalong, Mooney Mooney Creek, Calna Creek, Marramarra Creek, Warrawee, Brush Farm, Burralow Creek, Royal NP, Mt Keira, Cataract Creek, Saddleback.

Habitat

Habitat: Gullies, amongst rocks. Creekbanks, escarpment slopes (A. Bofeldt pers. comm.).

Altitude: 0–700 m **Annual rainfall:** above 1200 mm

Typical local abundance: Frequent–rare.

Vegetation: Warm temperate, sub-tropical, riverine, and sometimes dry rainforest (A. Bofeldt pers. comm.), moist eucalypt forest e.g. with *Eucalyptus saligna*, *E. pilularis*, *Ceratopetalum apetalum*, *Acmena smithii*, *Syncarpia glomulifera*, *Backhousia myrtifolia*.

Substrate: Sandy loam to yellow sandy clays from sandstone, shales, possibly on basalt. Low–moderate nutrient soils, well-drained. Illawarra Coal Measures, Hawkesbury Sandstone, Narrabeen Series in Illawarra (A. Bofeldt pers. comm.).

Exposure: Sheltered. Mid-shade, young plants not able to tolerate full sun (A. Bofeldt pers. comm.).

Conservation

Conservation: Probably adequately conserved.

Woolisia pungens
EPACRIDACEAE

Life history

Growth form: Erect shrub 0.2–2 m high.

Vegetative spread: No.

Longevity: 10–20 years. Plants recorded in unburnt bush after 13 years (at Field of Mars).

Primary juvenile period: 3–5 years (Benson 1985).

Flowers: White–pink, at any time of year, sweetly scented. (Dark red form at northern coast of Jervis Bay only.)

Fruit/seed: Capsule 2.5 mm diam., with many small seeds, average seed weight 0.2–0.25 mg (J. Howell pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, no special dispersal morphology (Westoby et al. 1990).

Fire response: Killed and re-established from soil-stored seed (at Brisbane Water). Resprouted from stem base after medium intensity fire (at Myall Lakes, Fox 1988).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST; Qld.

Distribution Sydney area: Coast and upper Blue Mountains.

Select locations: Calga, Hornsby, Narrabeen, Bondi, La Perouse, Waterfall, Minto, Springwood, Lawson, Leura.

Habitat

Habitat: Sandstone plateaus and coastal dunes.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–abundant.

Vegetation: Heath e.g. with *Banksia serrata*, *Lambertia formosa*, *Xanthorrhoea resinifera*, and dry eucalypt open-forest e.g. with *Eucalyptus piperita*, *E. haemastoma*, *E. gummiifera*.

Substrate: Sandstone and dunes, fine silty sand–gravelly soil.

Exposure: Full sun to light shade.

Conservation

Conservation: Probably adequately conserved.

***Erica lusitanica* ***

ERICACEAE

Heath

Life history

Growth form: Erect shrub 0.5–3.3 m high, with hairy branches.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, autumn–spring, peak August.**Fruit/seed:** Capsule with many seeds.**Dispersal, establishment & growth:** Diaspore: seed, dispersed by water along roadsides, stormwater drains and creeks (R. Buchanan pers. comm.).**Fire response:****Interaction with other organisms:** Micorrhizal roots (Zomlefer 1994), wood-boring larvae reported at Kurrajong 1945 (Herbarium note).

Distribution

Status/origin: Naturalised exotic, native to S Europe, introduced as ornamental.**Botanical subregions:** NC CC CT; Vic., Tas., S.A.**Distribution Sydney area:** Blue Mountains, Southern Highlands.**Select locations:** Kurrajong (1945), Bilpin, Lawson, Blackheath, Braemar, Exeter.

Habitat

Habitat: Roadsides, creeks, grassland.**Altitude:** 300–1000 m **Annual rainfall:** above 900 mm**Typical local abundance:** Frequent.**Vegetation:** Grassland, margins of eucalypt woodland, heath.**Substrate:** Sandy soil from sandstone, low nutrient.**Exposure:** Full sun to light shade.

Conservation

Conservation: Naturalised commonly in the upper Blue Mountains, invading woodland, heath and creeksides e.g. Govetts Creek, at Junction Rock in the Grose Valley and Darwins Walk (Jamieson Creek), Wentworth Falls (R. Buchanan pers. comm.).***Gaultheria appressa***

ERICACEAE

White Wax Berry

Life history

Growth form: Erect shrub 0.5–2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, late spring–summer.**Fruit/seed:** Capsule enclosed in fleshy calyx 7–10 mm diam., fruit weight 310 mg, 330 seeds per fruit (extra data on seed & pulp characteristics in French 1991).**Dispersal, establishment & growth:** Diaspore: seed, probably wind-dispersed.**Fire response:****Interaction with other organisms:** Micorrhizal roots (Zomlefer 1994).

Distribution

Status/origin: Native.**Botanical subregions:** NC NT CT ST SWS; Vic.**Distribution Sydney area:** Mt Werong.**Select locations:** Mt Werong (only Sydney record).

Habitat

Habitat: Creek edge.**Altitude:** 1000 m **Annual rainfall:** 1000 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:** Gravelly clay.**Exposure:**

Conservation

Conservation: Rare in Sydney area, Mt Werong is only record, conservation status unknown.

Abrophyllum ornans

ESCALLONIACEAE

Native Hydrangea

Life history**Growth form:** Spreading shrub or tree to 8 m high.**Vegetative spread:** No.**Longevity:** More than 50 years (A. Bofeldt pers. comm.).**Primary juvenile period:** 3–5 years (A. Bofeldt pers. comm.).**Flowers:** Yellowish, October–December.**Fruit/seed:** Shiny blackish berry 8–12 mm diam., with numerous seeds, mature

May–September (A. Bofeldt pers. comm.). 36,000 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fruit, bird-dispersed. Germination from

fresh seed (Floyd 1989). Seedlings often grow on mossy rocks and on tree fern trunks

(A. Bofeldt pers. comm.).

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; Qld.**Distribution Sydney area:** Widespread, but rare (A. Bofeldt pers. comm.).**Select locations:** Colo River, Wattagan Mountains, Wondabyne, Collaroy, Lane

Cove, Springwood, Stanwell Park, Bulli Pass, Minnamurra Falls.

Habitat**Habitat:** Along watercourses or in sheltered gullies.**Altitude:** 0–600 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Rare–occasional.**Vegetation:** Subtropical and warm temperate rainforest e.g. with *Ceratopetalum apetalum*,*Doryphora sassafras*, *Cryptocarya glaucescens*, *Acmena smithii*, *Callicoma serratifolia*,*Tristaniopsis laurina*. Moist open-forest (M. Robinson pers. comm.).**Substrate:** Poor sandy soils and clays from quartz-rich sandstone, alluvium–tallus, also soil

from volcanic rocks like latite, medium nutrients (A. Bofeldt pers. comm.).

Exposure: Sheltered sites, full shade.**Conservation****Conservation:** Widespread but rare, conservation status unknown.***Polyosma cunninghamii***

ESCALLONIACEAE

Featherwood

Life history**Growth form:** Tree to 15 m high, pyramidal shape, with shiny elegant leaves, new growth hairy.**Vegetative spread:** No.**Longevity:** More than 50 years.**Primary juvenile period:****Flowers:** Greenish-yellow–white, perfumed, March–November.**Fruit/seed:** Egg-shaped, ribbed, purplish berry 12–18 mm long with 1 seed.

Mature March–October (A. Bofeldt pers. comm.).

Dispersal, establishment & growth: Diaspore: fleshy fruit, vertebrate-adapted

dispersal (Westoby et al. 1990), bird-dispersed, slow germination 2–12 months

(A. Bofeldt pers. comm.).

Fire response: Killed (A. Bofeldt pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT; Qld.**Distribution Sydney area:** Gosford, Illawarra.**Select locations:** Gosford, Otford, Mt Keira, Albion Park, Avon River,

Minnamurra Falls, Robertson.

Habitat

Habitat: Gullies and hilltops (P. Kodela pers. comm.). Escarpment benches and slopes, watercourses (A. Bofeldt pers. comm.).

Altitude: 0–800 m

Annual rainfall: above 1000 mm

Typical local abundance: Occasional–frequent.

Vegetation: Subtropical and warm temperate rainforest e.g. with *Doryphora sassafras*. Warm temperate/cool temperate rainforest with *Ceratopetalum apetalum*, *Doryphora sassafras*, *Quintinia sieberi* (at Robertson NR, P. Kodela pers. comm.).

Substrate: Clay soils from shales and basalt, high nutrient, well-drained. Narrabeen Series, Coal Measures in Illawarra (A. Bofeldt pers. comm.).

Exposure: Mid-shade.

Conservation

Conservation: Well conserved in Illawarra (A. Bofeldt pers. comm.), status elsewhere unknown

Quintinia sieberi**ESCALLONIACEAE**

Possumwood

Life history

Growth form: Medium-sized tree to 25 m high, with reddish surface glands on young stems and leaves.

Vegetative spread: No.

Longevity: Long-lived.

Primary juvenile period:

Flowers: White, October–November.

Fruit/seed: Capsule 2–3 mm long with numerous seeds. Germination 4–6 weeks, probably no dormancy mechanism (A. Bofeldt pers. comm.).

Dispersal, establishment & growth: Diaspore: seed, frequently establishes epiphytically on trunks of tree ferns, particularly *Dicksonia antarctica*, also *Cyathea australis*, *C. leichhardtiana*, *Todea barbara* and mossy rocks, rarely germinates on ground (A. Bofeldt pers. comm.).

Fire response: Stems usually killed, resprouts from base (A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST; Qld.

Distribution Sydney area: Mainly Blue Mountains, Southern Highlands.

Select locations: Mt Coricudgy, Kurrajong Heights, Galston Gorge, St Helena, Minnamurra Falls, Cambewarra Mountain, Mt Wilson, Blackheath, Mt Werong, Robertson, Wingello.

Habitat

Habitat: Gullies and rock clefts, cliff faces. Also hilltops (e.g. Robertson NR, P. Kodela pers. comm.).

Altitude: 300–1000 m

Annual rainfall: above 900 mm

Typical local abundance: Rare–occasional.

Vegetation: Warm and cool temperate rainforest, particularly with *Ceratopetalum apetalum*, *Dicksonia antarctica*. Occasionally in sub-tropical rainforest (A. Bofeldt pers. comm.). Moist eucalypt forest.

Substrate: Sandy soils in gullies, clay loams on basalt, volcanic necks, low to high nutrient soils. Very well-drained, humus-enriched sands derived from Hawkesbury sandstone in Illawarra (A. Bofeldt pers. comm.).

Exposure: Sheltered, mid-shade.

Conservation

Conservation: Conservation status unknown.

Eucryphia moorei**EUCRYPHIACEAE**

Pinkwood, Plumwood

Life history

Growth form: Tree to 20 m, sometimes 30 m high (A. Bofeldt pers. comm.), or tall shrub, with numerous epicormic shoots from swollen base of trunk, sticky, resinous terminal buds, and pinnate leaves.

Vegetative spread: Limited to coppicing from old trunk (A. Bofeldt pers. comm.).

Longevity: More than 100 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: White (becoming orange perhaps after drying), January–April, sweet fragrance, attractive to bees.

Fruit/seed: Capsule 8–15 mm long, hairy, with few winged seeds, mature January–March, June–September. 52 million seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed. Germination with fresh seed (Floyd 1989). Seed viable in storage for 1–2 years, germinates 2–5 weeks, on tree fern trunks, on mossy rocks, rarely germinates on ground (A. Bofeldt pers. comm.).

Fire response: Probably killed (A. Bofeldt pers. comm.).

Interaction with other organisms: Seedlings often epiphytic on tree ferns (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT ST; Vic.

Distribution Sydney area: Woronora Plateau, Illawarra.

Select locations: Mt Keira, Austinmer, Cataract River, West Dapto, Macquarie Pass, Avon River, Minnamurra Falls, Cambewarra Mountain, Robertson, Fitzroy Falls, Bundanoon, Carrington Falls.

Habitat

Habitat: Hillsides and deep sheltered gullies, upper escarpments.

Altitude: 0–700 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent–occasional.

Vegetation: Mixed warm temperate/cool temperate rainforest e.g. with *Doryphora sassafras*, *Ceratopetalum apetalum*, *Tasmannia insipida*, *Todea barbara*.

Substrate: Clay soil on basalt, high nutrient, and bouldery alluvium along creeks. Humus-enriched sand from Hawkesbury Sandstone, Narrabeen Series, basalt (A. Bofeldt p. c.).

Exposure: Sheltered, mid-shade.

Conservation

Conservation: Mt Keira is northern geographical limit (P. Kodala pers. comm.).

Probably adequately conserved in Illawarra, except Robertson Plateau (A. Bofeldt pers. comm.).

Actephila lindleyi**EUPHORBIACEAE****Life history**

Growth form: Usually shrub 1–4 m, or small tree 4–6 m, sometimes to 10 m high. Illawarra specimens have shorter leaves than those on far North Coast (A. Bofeldt, M. Robinson pers. comm.).

Vegetative spread: No.

Longevity: More than 50 years (A. Bofeldt pers. comm.).

Primary juvenile period: 3–5 years (A. Bofeldt pers. comm.).

Flowers: Creamy white, unisexual, August–November (Floyd 1989), strong scented sweet/foetid, probably attracts flies (A. Bofeldt pers. comm.).

Fruit/seed: Globose capsule, 12 mm diam., mature April–June.

Dispersal, establishment & growth: Diaspore: seed, propelled many metres when capsule explodes violently at maturity. Germination 80–100%, 1–4 weeks, slow-growing (A. Bofeldt pers. comm.).

Fire response: Killed (A. Bofeldt pers. comm.).

Interaction with other organisms: Flowers eaten by Brown Cuckoo-dove (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC; Qld, N.G., Solomons, Moluccas, Sunda Is.

Distribution Sydney area: Illawarra.

Select locations: Mt Keira, Berkeley Hills, West Dapto, Wongawilli, Albion Park, Kiama.

Habitat

Habitat: Dry rocky slopes, moist gullies near watercourses (A. Bofeldt pers. comm.).

Altitude: 0–200 m

Annual rainfall: above 1200 mm

Typical local abundance: Rare–common (A. Bofeldt pers. comm.).

Vegetation: Subtropical rainforest, dry rainforest.

Substrate: Fertile soil, often rocky, derived from volcanic rocks, latite, basalt, and clay-rich sedimentary rocks, intermittent moisture, well-drained. On Budgong Sandstone, Coal Measures in Illawarra (A. Bofeldt pers. comm.).

Exposure: Mid-shade.

Conservation

Conservation: Regionally rare in Illawarra region and very poorly conserved, its lowland rainforest habitat is highly threatened, southern limit is Shoalhaven Gorge, only one small population is conserved (in Morton NP) (Mills 1988), next occurrence is Minmi near Newcastle (A. Bofeldt pers. comm.).

Adriana glabrata**EUPHORBIACEAE****Life history**

Growth form: Shrub 1.5–3 m high, dioecious. Young stems whitish, green or reddish. Two varieties, var. *glabrata*, var. *subglabra* are reported for the Sydney region but are often difficult to distinguish satisfactorily (Harden 1990).

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Spring, male and female flowers on different plants.

Fruit/seed: Capsule 8–12 mm long, covered with rough stellate hairs or glabrous, seeds with an appendage.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP; Qld, Vic., N.T., W.A.

Distribution Sydney area: Yerranderie.

Select locations: Yerranderie (1965) only record.

Habitat

Habitat: Along creek beds, rocky hillside.

Altitude: 0–500 m

Annual rainfall: 800 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Rocky hillsides, creekbank alluvium.

Exposure:

Conservation

Conservation: Rare, only one definite record for the Sydney area but possibly also recorded at Camden Park beside the Nepean River.

Alchornea ilicifolia**EUPHORBIACEAE**

Native Holly

Life history

Growth form: Small tree or straggly shrub to 2 m high. Leaves glabrous, stiff, prominently veined, margins with spine-tipped teeth.

Vegetative spread: Coppices and suckers (M. Robinson, A. Bofeldt pers. comm.).

Longevity: More than 30 years (A. Bofeldt pers. comm.).

Primary juvenile period: 3–5 years (A. Bofeldt pers. comm.).

Flowers: Greenish, male and female flowers on different plants. Female flowers can produce fruit without male flowers (A. Bofeldt pers. comm.).

Fruit/seed: 3-lobed capsule 7 mm diam., more or less explosive (A. Bofeldt pers. comm.).

Mature mainly September–November, 82,000 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: individual capsule lobe. Germination 4–10 weeks, slow-growing (A. Bofeldt pers. comm.).

Fire response: Stems killed, resprouts from base or roots (M. Robinson, A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CWS.

Distribution Sydney area: Now mainly Shellharbour to Jamberoo Valley.

Select locations: Grose Vale, Cobbitty, Razorback, Mt Kembla, Unanderra, Albion Park, Killalea SRA (Mills 1980).

Habitat

Habitat: Hillsides, clifftops, dry, steep, rocky slopes and ridges (A. Bofeldt pers. comm.).

Altitude: 0–400 m **Annual rainfall:** above 700 mm

Typical local abundance: Rare–frequent.

Vegetation: Dry rainforest e.g. with *Streblus brunonianus*, *Cassine australis*, *Citriobatus pauciflorus*, *Alectryon subcinereus*.

Substrate: Clay soils from Wianamatta Shale, well-drained, medium–high nutrient soils. Budgong Sandstone, Bombo Latite, volcanic rocks in Illawarra (M. Robinson, A. Bofeldt pers. comm.).

Exposure: Full sun–mid-shade (M. Robinson, A. Bofeldt pers. comm.).

Conservation

Conservation: Regionally rare (category 2) in the Illawarra (Mills 1988), Kiama is the southern geographical limit. One population of 10 plants at Razorback Range in Western Sydney (A. Bofeldt pers. comm.). Inadequately conserved.

Amperea xiphoclada* var. *papillata**EUPHORBIACEAE****Life history**

Growth form: Herb to 50 cm high with leaves to 7 mm long, flowers sessile.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: September–October.

Fruit/seed:

Dispersal, establishment & growth:

Fire response: Resprouts from base (observation of Herbarium specimen L.McD.).

Interaction with other organisms:

Distribution

Status/origin:

Botanical subregions: CC SC.

Distribution Sydney area: Mainly coast.

Select locations: Cowan Creek, Hornsby, Pennant Hills, Oatley, Springwood, Wingello.

Habitat**Habitat:** Creeks and hillsides.**Altitude:** 0–600 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Eucalypt forest along creeks (Henderson 1992).**Substrate:** Sandy soils from alluvium and sandstone, medium nutrients.**Exposure:****Conservation****Conservation:** Endemic to Sydney region, coded 3K- on national rare species list (ROTAP 1995), mostly old collections in coastal Sydney area, and rare elsewhere, conservation status unknown.***Amperea xiphochlada* var. *pedicellata*****EUPHORBIACEAE****Life history****Growth form:** Herb to 40 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Female flowers on pedicels.**Fruit/seed:****Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:****Botanical subregions:** CC.**Distribution Sydney area:** Double Bay .**Select locations:** Double Bay (c. 1880) only known collection.**Habitat****Habitat:****Altitude:** 0–50 m**Annual rainfall:** 1200 mm**Typical local abundance:****Vegetation:** Swamp.**Substrate:** Probably sand or peaty sand.**Exposure:****Conservation****Conservation:** Extinct, coded 1 X on national rare species list (ROTAP 1995).***Amperea xiphochlada* var. *xiphochlada*****EUPHORBIACEAE****Life history****Growth form:** Herb to 1 m high.**Vegetative spread:** May be capable of limited vegetative spread induced by repeated burning.**Longevity:** Indefinite.**Primary juvenile period:****Flowers:** September–January.**Fruit/seed:** Capsule 4 mm long with smooth seeds.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Stems killed and resprouts from base (e.g. at Agnes Banks, Benson 1981). Flowering and fruiting within 1 year of high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).**Interaction with other organisms:**

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST CWS; Qld, Vic., S.A., Tas.

Distribution Sydney area: Widespread.

Select locations: Brooklyn, Pennant Hills, North Head, Kogarah, The Woolwash, Darkes Forest, Thirlmere Lakes, Macquarie Pass, Bundanoon, Mt Coricudgy, Mt Wilson, Mt Werong, Wombeyan Caves.

Habitat

Habitat: Steep slopes, rocky hillsides, ledges, sandsheets.

Altitude: 0–1200 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest, woodland e.g. with *Eucalyptus piperita*, *E. gummifera*, *Angophora costata*, *E. punctata*, *E. haemastoma*, *E. excimia*, *Angophora hispida*.

Substrate: Quartzite, sandstone and old dunes, damp sands with abundant humus, low nutrient soils, well-drained.

Exposure: Full sun–light shade.

Conservation

Conservation: Widespread and probably adequately conserved.

Baloghia inophylla**EUPHORBIACEAE**

Brush Bloodwood

Life history

Growth form: Medium-sized tree to 25 m high, with clear sap which turns red when stem is cut. Leaves opposite, thick, glabrous, 5–15 cm long, with oil dots and 2 glands on the leaf margin close to the base (Floyd 1989).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: September–November.

Fruit/seed: Capsule 12–18 mm diam., green turning brown and explosively separating into three 1-seeded units, mature October–November. Dried fruit 14,300 per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, dispersed explosively, germinates readily, 1–2 months (M. Robinson, A. Bofeldt pers. comm.), germination of fresh seed 25% after 50 days (Floyd 1989).

Fire response: Resprouts (M. Robinson pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CWS; L.H.I., Qld, N.I., N Cal.

Distribution Sydney area: Wyong, Illawarra.

Select locations: Palmgrove, Mt Keira, Albion Park, Bass Point, Saddleback, Foxground.

Habitat

Habitat: Sheltered rocky slopes.

Altitude: 0–300 m **Annual rainfall:** above 1100 mm

Typical local abundance: Occasional–frequent.

Vegetation: Sub-tropical rainforest with *Toona ciliata*, *Dendrocnide excelsa*, dry rainforest, dominant in patches (M. Robinson pers. comm.).

Substrate: Basalt or rarely sand. Soil fertile–infertile. Watertable mostly low, moisture supply intermittent, fresh. On Budgong Sandstone and Bombo Latite in Illawarra (M. Robinson pers. comm.).

Exposure: Sheltered situations. Usually in shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Conservation status not known, but typical lowland rainforest habitat in Illawarra not conserved (A. Bofeldt pers. comm.).

Bertya brownii**EUPHORBIACEAE****Life history**

Growth form: Slender shrub 1–3 m high covered with rusty tomentum.

Vegetative spread: No.

Longevity:

Primary juvenile period: Less than 5 years (L.McD.).

Flowers: June–September.

Fruit/seed: Capsule 9–10 mm long, containing 1 seed with an appendage.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Killed, recruitment from soil-stored seed after high-intensity fire (at Katandra 1994, L.McD.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC.

Distribution Sydney area: Narrabeen–Ingleside.

Select locations: Mona Vale, Deep Creek (Narrabeen) only Sydney records.

Habitat

Habitat: Damp sheltered gullies.

Altitude: 0–50 m **Annual rainfall:** 1200 mm

Typical local abundance: Rare–frequent.

Vegetation: Open-forest e.g. with *Angophora costata*, *Allocasuarina littoralis*, *Syncarpia glomulifera*, *Boronia mollis*.

Substrate: Grey sandy soil on sandstone, alluvium, low nutrient.

Exposure: Sheltered.

Conservation

Conservation: Very localised rare species, coded 2RC- on national rare species list (ROTAP 1995), small populations recorded in Katandra Bushland Sanctuary and Ku-ring-gai Chase NP, conservation status elsewhere unknown.

Bertya pomaderroides**EUPHORBIACEAE****Life history**

Growth form: Spreading shrub to 1 m high, sometimes multi-stemmed, usually with whitish–rusty tomentum. Other forms sometimes recognised.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, September–December, peak September.

Fruit/seed: Narrow, glabrous capsule 10 mm long; 1 seed with an appendage, mature September–October.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC ST CWS.

Distribution Sydney area: Woronora Plateau.

Select locations: The Woolwash, Heathcote Creek, Woronora River, Cataract Dam, Bargo River, Cambewarra.

Habitat

Habitat: Rivers and creekbanks.

Altitude: 0–100 m **Annual rainfall:** above 800 mm

Typical local abundance: Rare–occasional.

Vegetation: Riparian sandstone scrub e.g. with *Leptospermum polygalifolium*, *Ceratopetalum apetalum*, *Tristaniopsis laurina*, *Grevillea oleoides*.

Substrate: Sandy alluvium from sandstone, low nutrient.

Exposure:

Conservation

Conservation: Conservation status unknown.

Bertya rosmarinifolia

EUPHORBIACEAE

Life history

Growth form: Bushy heath-like shrub to 3 m high with short whitish tomentum.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, October.

Fruit/seed: Capsule 4–6 mm long containing 1 seed with an appendage

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC NT CT ST NWS CWS; Vic.

Distribution Sydney area: Hawkesbury–Nepean and Cox–Kowmung rivers.

Select locations: Nepean/Grose River Junction (1802), Kowmung River, Coxs River, Tallowa Dam (Shoalhaven River).

Habitat

Habitat: Riverbanks, particularly in gorges.

Altitude: 0–700 m

Annual rainfall: above 800 mm

Typical local abundance:

Vegetation: Riparian scrub e.g. with *Casuarina cunninghamiana*.

Substrate: Gravelly flood channel, cracks in bedrock near waters edge.

Exposure:

Conservation

Conservation: Rare in Sydney area and probably extinct on Hawkesbury–Nepean River, last recorded on Coxs River in 1904).

Beyeria lasiocarpa

EUPHORBIACEAE

Life history

Growth form: Tall shrub or small tree 1–6 m high. Possible intermediates with

Beyeria viscosa reported from Glen Alice and Widdin Brook.

Vegetative spread: No.

Longevity: Possibly 10–20 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Whitish, summer.

Fruit/seed: Capsule 8–10 mm long, densely hairy with a persistent stigma.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT; Qld, Vic.

Distribution Sydney area: Jenolan area.

Select locations: Jenolan Gorge, Jenolan River, Jamberoo.

Habitat

Habitat: Steep hillsides, rocky dry slopes.

Altitude: 800 m

Annual rainfall: 1000–1200 mm

Typical local abundance: Occasional.

Vegetation: Woodland e.g. with *Eucalyptus tereticornis*, *E. melliodora*, *E. punctata*, *E. tenella*. Dry rainforest/open-forest ecotone with e.g. *Zieria granulata* (A. Bofeldt pers. comm.).

Substrate: Sandy soils on granite, clay loams on quartzite, sandstones, siltstone, well-drained, low-medium nutrients. Latite, rocky volcanic loam in Illawarra (A. Bofeldt p. c.).

Exposure: Full sun, possibly intolerant of shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Localised occurrence in Sydney area, but probably within National Park. Only known population in Illawarra less than 50 plants, not conserved (A. Bofeldt pers. comm.).

Beyeria viscosa**EUPHORBIACEAE****Life history**

Growth form: Shrub 3–4 m high, to small tree 5–8 m high, frequently dioecious (A. Bofeldt pers. comm.).

Vegetative spread: No.

Longevity: Probably 50 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: September–November. Wind-pollinated (A. Bofeldt pers. comm.).

Fruit/seed: Sticky capsule 6–8 mm long, with persistent stigma, mature August–November, tick-like seed with a red-brown aril (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, explosively dispersed from capsule (A. Bofeldt pers. comm.), loses viability if stored at room temperature for more than 1 year (Floyd 1989).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, N.T., W.A.

Distribution Sydney area: Mainly Georges and Nepean Rivers.

Select locations: Glenfield, Casula, Wallacia, Nortons Basin, Erskine Creek, Douglas Park, Macquarie Pass, Jamberoo, Kowmung River, Capertee Valley.

Habitat

Habitat: Rocky slopes above river, and river banks.

Altitude: 0–600 m **Annual rainfall:** 600–1500 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt open-forest and woodland e.g. with *Eucalyptus eximia*, *E. sparsifolia*, *Acacia binervia*, *Tristaniopsis laurina*, *Commersonia fraseri*. Dry rainforest and regrowth margins, ecotone with open-forest e.g. with *Planchonella australis*, *Backhousia myrtifolia*, *Notelaea venosa* (A. Bofeldt pers. comm.).

Substrate: Sandy skeletal soils and cracks in sandstone, sandstone scree slopes, colluvium, low nutrient, well-drained. Also on rocky soils derived from latite, well-drained, moderate to high nutrient soil (A. Bofeldt pers. comm.).

Exposure: Usually semi-shade, dies out in heavy shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Status unknown, habitat vulnerable to changes in water quality and weed invasion.

Breynia oblongifolia**EUPHORBIACEAE**

Coffee Bush

Life history

Growth form: Erect monoecious shrub to 3 m high, leaves pseudopinnate. May be confused with *Phyllanthus gastroemii* but generally *Breynia* has larger leaves.

Vegetative spread: Capable of root-suckering up to 5 m away, forming localised patches.

Longevity: Probably long-lived, more than 20 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: October–January.

Fruit/seed: Globular berry 6 mm diameter, orange-pinkish turning black with age, matures November–May. Fruit contains about 6 seeds each with ant-adapted food body (Westoby et al. 1990).

Dispersal, establishment & growth: Diaspore: fruit, probably bird-dispersed; seed, ant-dispersed. Soil-stored seedbank (Fox 1988). Germinates easily, 1–7 weeks and grows quickly (A. Bofeldt pers. comm.).

Fire response: Resprouted from base (St Albans 1994, E. Ashby pers. comm.), mature fruit within 1 year of high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT NWS CWS; Qld, N.G.

Distribution Sydney area: Widespread.

Select locations: Putty Rd, Culoul Range, Mooney Mooney, Wahroonga, Duck River, Oatley, Albion Park, Berry, Duck River, Razorback, Kanangra.

Habitat

Habitat: Creek banks, slopes, gullies, sand dunes.

Altitude: 0–800 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: In or near littoral, dry and subtropical rainforest or moist eucalypt forest and woodland.

Substrate: On sandstone but generally with additional enrichment, eg from shale. Also alluvial soils of moderate fertility, but possibly poorer than needed for *Phyllanthus gasstroemii*. Moderate nutrient soils, watertable mostly low, moisture supply intermittent, fresh. On Budgong Sandstone, Bombo Latite and Marine deposited sands in Illawarra (M. Robinson p. c.).

Exposure: Light shade to full sun. Less vigorous in full sun (A. Bofeldt, M. Robinson p. c.).

Conservation

Conservation: Likely to be adequately conserved.

Chamaesyce dallachyana

EUPHORBIACEAE

Caustic Weed

Life history

Growth form: Glabrous herb with prostrate, ascending or decumbent stems to 20 cm long, arising from stout rootstock.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Red with pink or white, summer.

Fruit/seed: Capsule, green, 1.5–1.8 mm long, seeds pink–brown, January–May.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms: Reported as causing HCN poisoning in sheep (Harden 1990). Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT NWS CWS SWS NWP SWP; Qld.

Distribution Sydney area: Coast.

Select locations: Wybong, Lane Cove, Ermington, Toongabbie, Casula, Menangle, Unanderra, Bombo.

Habitat

Habitat: Creekbanks, drainage channels, or near railways, footpaths.

Altitude: 0–200 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Creekside herbland e.g. with *Casuarina glauca*, *Eclipta platyglossa*, *Isolepis nodosa* and weed species.

Substrate: Clay loam on alluvium, shale, conglomerate.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.

Chamaesyce drummondii

EUPHORBIACEAE

Caustic Weed

Life history

Growth form: Herb with prostrate, ascending or decumbent stems to 20 cm long, with thick or woody rhizome. Variable species that includes distinct taxa that may be published as subspecies.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Red with pink or white, summer.

Fruit/seed: Capsule.

Dispersal, establishment & growth: Diaspore:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC *CC NT CT ST NWS CWS SWS SWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area:

Select locations: Mt Colah (1921).

Habitat

Habitat:

Altitude: 0–100 m **Annual rainfall:** 1200 mm

Typical local abundance:

Vegetation:

Substrate: Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Occurs in drier parts of the State and probably introduced to Sydney area with stock.

Chamaesyce hirta

EUPHORBIACEAE

Asthma Plant

Life history

Growth form: Decumbent to almost erect herb, to 40 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Mainly spring–summer.

Fruit/seed: Capsule 1.5 mm diam., with red-brown seeds 1 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NWP; Qld, N.T., W.A.

Distribution Sydney area:

Select locations: Homebush (1896) only record.

Habitat

Habitat:

Altitude: 0–50 m **Annual rainfall:** 1000 mm

Typical local abundance:

Vegetation:

Substrate: Probably clay soils on shale.

Exposure:

Conservation

Conservation: Rare, recorded once from Sydney area (Homebush 1896), and regarded as native to the area. Weed of cultivation in northern Australia.

Chamaesyce nutans* **EUPHORBIACEAE****Life history**

Growth form: Herb to 60 cm high.
Vegetative spread:
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Mainly summer.
Fruit/seed: Capsule 2.–2.5 mm long, with blackish seeds.
Dispersal, establishment & growth: Diaspore: seed.
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to America.
Botanical subregions: NC CC NT CT.
Distribution Sydney area: Sydney suburbs.
Select locations: East Lakes (1984), Ashfield (1917).

Habitat

Habitat: Road edges.
Altitude: 0–100 m **Annual rainfall:** above 1000 mm
Typical local abundance: Rare.
Vegetation:
Substrate: Sandy soil.
Exposure:

Conservation

Conservation: Infrequent weed species.

Chamaesyce prostrata* **EUPHORBIACEAE**

Red Caustic Weed

Life history

Growth form: Prostrate herb, with several stems to 20 cm long, forming dense mats.
Vegetative spread: Mat-forming.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Mainly summer.
Fruit/seed: Capsule 1.3 mm long, with pale brown seeds 1 mm long.
Dispersal, establishment & growth: Diaspore:
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to tropical America.
Botanical subregions: NC CC; Qld.
Distribution Sydney area: Sydney suburbs.
Select locations: Lane Cove, Petersham (1922), Strathfield, Windsor.

Habitat

Habitat: Cracks of paths and in gardens.
Altitude: 0–100 m **Annual rainfall:** above 700 mm
Typical local abundance: Occasional.
Vegetation:
Substrate: Paths with cracks, gravel and possibly responding to limestone / calcium influence.
Exposure:

Conservation

Conservation: Occasional garden weed, not invasive or natural habitats.

Chamaesyce sparmannii**EUPHORBIACEAE****Life history**

Growth form: Glabrous, prostrate, mat-forming herb, often from stout, woody rootstock forming mats to 1 m across.

Vegetative spread: No.

Longevity: 5–30 years (Clarke 1989).

Primary juvenile period: Less than 1 year.

Flowers: Summer.

Fruit/seed: Capsule 2.5 mm diam., with pale brown seeds 1–1.5 mm long, mature autumn–winter.

Dispersal, establishment & growth: Diaspore: seed, water-dispersed, spring–summer growth, secondary sand coloniser.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; L.H.I., Qld.

Distribution Sydney area: Coastal beaches.

Select locations: Wamberal Beach, Avoca Beach, Palm Beach, Collaroy, Cronulla.

Habitat

Habitat: Sand dunes near the sea (Harden 1990).

Altitude: 0–20 m **Annual rainfall:** above 1200 mm

Typical local abundance: Rare.

Vegetation: With *Leptospermum laevigatum*, *Scaevola calendulacea*, *Pelargonium australe*.

Substrate: Beach sand on incipient foredune and the foredune (Clarke 1989), not far above high tide, low nutrient, tolerant of salinity.

Exposure:

Conservation

Conservation: Uncommon (Harden 1990), inadequately conserved

Chamaesyce supina* **EUPHORBIACEAE**

Red Caustic Weed

Life history

Growth form: Prostrate to ascending herb, with several stems to 30 cm long.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: White to pink,

Fruit/seed: Capsule 1.3 mm long, with pale brown seeds.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Probably killed by high intensity fire (1/1994 at Lane Cove River), fruiting within 3 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to N America.

Botanical subregions: NC CC CWS; L.H.I., Qld.

Distribution Sydney area: Sydney suburbs.

Select locations: Lane Cove (1987), Paddington (1976), Leichhardt (1976).

Habitat

Habitat: Gardens, cracks and paths.

Altitude: 0–50 m **Annual rainfall:** above 1000 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Sandy garden soils, cracks in brick paving and paths.

Exposure:

Conservation

Conservation: Garden weed.

Claoxylon australe

EUPHORBIACEAE

Brittlewood

Life history**Growth form:** Shrub or small tree to 9 m, with brittle branches.**Vegetative spread:** No.**Longevity:** More than 20 years.**Primary juvenile period:****Flowers:** Greenish, male and female flowers on separate plants, October–December.**Fruit/seed:** Capsule 5–6 mm diam., splits at maturity and falls away leaving 3 red seeds still attached (A. Bofeldt pers. comm.). Mature summer.**Dispersal, establishment & growth:** Diaspore: seed. Vertebrate and ant-adapted dispersal (Westoby et al. 1990). Germination variable, 5–15 weeks (A. Bofeldt pers. comm.).**Fire response:** Resprouts (M. Robinson pers. comm.).**Interaction with other organisms:** Fruit eaten by Brown Cuckoo-dove and King Parrots (Floyd 1989).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT ST CWS; Qld.**Distribution Sydney area:****Select locations:** Wyong, Mountain Lagoon, Razorback, Bola Creek, Helensburgh, Mt Keira, Bulli, Bass Point, Kiama, Minnamurra Falls.**Habitat****Habitat:** Slopes, benches, escarpments, gullies (A. Bofeldt pers. comm.).**Altitude:** 0–200 m **Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Warmer rainforest and moist eucalypt forest e.g. with *Acmena smithii*, *Glochidion ferdinandi*, *Hibiscus heterophyllus*, *Breynia oblongifolia*, *Rhodammia rubescens*. Littoral, dry, warm temperate and subtropical rainforest (M. Robinson, A. Bofeldt pers. comm.).**Substrate:** Clay soils from shales, medium to high nutrients, well-drained. Coastal sand, volcanic rocks, Budgong Sandstone, Bombo Latite in Illawarra (M. Robinson, A. Bofeldt p. c.).**Exposure:****Conservation****Conservation:** Conservation status unknown. Vulnerable in Western Sydney (Benson & McDougall 1991). Conserved in Illawarra (M. Robinson pers. comm.).***Croton insularis***

EUPHORBIACEAE

Silver Croton

Life history**Growth form:** Small tree to 15 m high, occasional leaves turning red or orange before falling. Leaves with oil dots (Floyd 1989).**Vegetative spread:** No.**Longevity:** More than 50 years (A. Bofeldt pers. comm.).**Primary juvenile period:****Flowers:** Silvery-brown.**Fruit/seed:** Capsule 6 mm diam., silvery-scaly, ripe December–February. Seeds dark brown, 3 mm long.**Dispersal, establishment & growth:** Diaspore: seed, shed explosively from capsule (A. Bofeldt pers. comm.). Fresh seed germinates without special treatment (Floyd 1989).**Fire response:** Possibly killed (A. Bofeldt pers. comm.).**Interaction with other organisms:** Fruit probably eaten by Parrots (Barker & Vestjens 1989, 1990).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC.**Distribution Sydney area:** Kurrajong.**Select locations:** Kurrajong (1975) only Sydney record.

Habitat

Habitat: Rocky, steep slopes (A. Bofeldt pers. comm.).
Altitude: 0–500 m **Annual rainfall:** 1000–1200 mm
Typical local abundance: Rare–frequent.
Vegetation: Dry rainforest.
Substrate: Clay soils on shale, medium nutrients.
Exposure: Shade tolerant (A. Bofeldt pers. comm.).

Conservation

Conservation: Kurrajong is southern geographical limit and only Sydney area record. Kurrajong population not conserved (A. Bofeldt pers. comm.).

Croton verreauxii**EUPHORBIACEAE**

Green Cascarilla, Native Cascarilla

Life history

Growth form: Shrub 2–3 m high or small tree (to 20 m in Illawarra, A. Bofeldt pers. comm.), with purplish young stems and petioles, leaves alternate, with translucent dots, stalked glands where petioles join stems, old leaves often turning orange before falling.
Vegetative spread: No.
Longevity: More than 30 years (A. Bofeldt pers. comm.).
Primary juvenile period:
Flowers: Yellow–green (Floyd 1989), November–December.
Fruit/seed: 3-lobed capsule 6 mm diam., orange-brown, ripe March–September, splitting to release seeds, red-brown, 2 mm diam. (Floyd 1989).
Dispersal, establishment & growth: Diaspore: Seeds, dispersed explosively. Germination sporadic, variable, 5–20 weeks (A. Bofeldt pers. comm.).
Fire response: Killed (A. Bofeldt pers. comm.).
Interaction with other organisms: Fruit probably eaten by Parrots (Barker & Vestjens 1989, 1990).

Distribution

Status/origin: Native.
Botanical subregions: NC CC SC; N.T.
Distribution Sydney area: Mainly Illawarra.
Select locations: Matcham, Kurrajong, Cobbitty, Razorback, Mt Kembla, Albion Park, Mt Keira, Minnamurra Falls.

Habitat

Habitat: Dry rocky slopes, steep gullies, escarpment benches, creek banks (A. Bofeldt pers. comm.).
Altitude: 0–500 m **Annual rainfall:** above 700 mm
Typical local abundance: Occasional–common.
Vegetation: Dry rainforest e.g. with *Streblus brunonianus*, *Alectryon subcinereus*, *Alphitonia excelsa*, *Clerodendrum tomentosum*, or moist eucalypt forest e.g. with *Eucalyptus acmenoides*, *E. maculata*, *Syncarpia glomulifera*, *Cryptocarya microneura*, *Rhodammia rubescens*. Margins of dry rainforest and grassland, subtropical rainforest, rainforest/open-forest ecotone, common in mature communities, often co-dominant (A. Bofeldt pers. comm.).
Substrate: Clay loam on shale, volcanics, moderate–high nutrient soils. Budgong Sandstone, Bombo Latite, and Coal Measures in Illawarra (M. Robinson pers. comm.).
Exposure: Full sun–mid-shade.

Conservation

Conservation: Rare in Gosford area (only 1 record), and probably extinct in Western Sydney (Benson & McDougall 1991). More frequent in Illawarra, but poorly conserved (A. Bofeldt pers. comm.).

***Euphorbia lathyris* ***

EUPHORBIACEAE

Caper Spurge

Life history

Growth form: Stout herb to 1 m high, with fleshy taproot and fibrous lateral roots, exudes white latex-like sap when cut.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period: 6 months for spring seedlings but autumn seedlings many not mature until second season (Parsons & Cuthbertson 1992).

Flowers: Separate male and female flowers ? on the same plant, summer.

Fruit/seed: 3-lobed, pod-like capsule, 10–15 cm diam., containing 3 seeds. Seeds 6 mm long, wrinkled when dry. Mature summer–autumn, flowers and mature fruit found together on same plant (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: seed, dispersed explosively for several metres, longer range dispersal by water, in mud on animals and machinery; main germination in spring, autumn seedlings become dormant in winter but develop rapidly in spring with spring seedlings; plants die in autumn or early winter after flowering (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms: Fruits purgative and toxic, suspected of poisoning cattle and sheep, potential source of hydrocarbons and sugar for use as fuel, very sensitive to weed competition (Parsons & Cuthbertson 1992). Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990).

Distribution

Status/origin: Naturalised exotic, native to Europe. First Australian record at Collarenebri 1892 (Parsons & Cuthbertson 1992).

Botanical subregions: CC SC NT CT ST NWS CWS NWP; Qld, Vic., S.A.,

Distribution Sydney area: Widespread, particularly in tablelands.

Select locations: Woy Woy (1912), Ashfield (1912), Picton, Macquarie Rivulet, Kiama–Jamberoo, Mt Wilson, Megalong Valley, Jenolan Caves (1900), Sofala, Abercrombie, Kangaloon.

Habitat

Habitat: Riverbanks, pastures (P. Kodela pers. comm.).

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: With other riverbank weeds e.g. *Rubus*, *Conium maculatum*. Grassland (P. Kodela pers. comm.).

Substrate: Sandy alluvium, and more clayey soils (P. Kodela pers. comm.), medium nutrient, well-drained.

Exposure: Full sun.

Conservation

Conservation: Widely naturalised weed.

***Euphorbia peplus* ***

EUPHORBIACEAE

Petty Spurge, Radium Plant

Life history

Growth form: Erect or ascending to 40 cm high

Vegetative spread: No.

Longevity: 6 months.

Primary juvenile period: 2–3 months.

Flowers: July–December.

Fruit/seed: Capsule 2 mm long, seeds 1.2 mm long, reddish orange, with an appendage.

Dispersal, establishment & growth: Diaspore: seed, dispersed in mud on cars (Wace 1977), and in garden refuse.

Fire response: Probably killed by high intensity fire (1/1994 at Lane Cove River), seedlings seen, fruiting within 9 weeks (P. Kubiak pers. comm.). Germinates prolifically following fire near developed areas (R. Buchanan pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe and Asia. Reported by Robert Brown to be introduced to Sydney by 1804 (Maiden 1909).

Botanical subregions: NC CC SC CT ST NWS SWP; L.H.I., Vic., Tas., N.T., S.A., W.A.

Distribution Sydney area: Dural, Cheltenham, Wahroonga, Port Jackson (1885), Homebush, Badgerys Creek, Glenbrook, Campbelltown, Mt Wilson, Jenolan Caves (1899).

Select locations: Gardens, roadsides.

Habitat

Habitat: Moist, disturbed places, near habitation.

Altitude: 0–1000 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: With other weeds of disturbance.

Substrate: Clay loams, sand, medium nutrients.

Exposure: Mid shade.

Conservation

Conservation: Widespread, common weed in moist disturbed places, especially gardens.

Glochidion ferdinandi* var. *ferdinandi**EUPHORBIACEAE**

Cheese Tree

Life history

Growth form: Shrub to medium sized tree to 20 m high. Partially deciduous in Winter (Fuller 1980).

Vegetative spread: Limited, suckers in response to disturbance (M. Robinson pers. comm.).

Longevity: Long lived, more than 60 years.

Primary juvenile period: 2–5 years (A. Bofeldt pers. comm.).

Flowers: Greenish yellow (Floyd 1989), July–December.

Fruit/seed: Fruits greenish 12–20 mm diam., resembling a miniature pumpkin (Floyd 1989), opening to expose seeds covered by a red aril, December–April. 30–34,000 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seeds with dry aril, bird-dispersed. Possible dormancy mechanism, 20% germination after soaking in concentrated sulphuric acid for 20 mins (Floyd 1989). Seeds germinate in 1–4 months (A. Bofeldt pers. comm.). Sometimes establish in crevices in brickwork — possibly calcareous response. Established plants survive well in disturbed bushland parks around Sydney, though slow growing seedlings cannot compete with dense exotic weed growth. Rapid growth noted on deep sand at Ettalong.

Fire response: Stems killed, resprouts from base. A few resprouting from the trunk after high intensity fire, fruit mature in less than 5 months (1/1994 at Lane Cove River, Narrabeen Lake (P. Kubiak pers. comm.).

Interaction with other organisms: Fruit eaten by Topknot Pigeon *Lopholaimus antarcticus*, Brown Cuckoo-Dove *Macropygia amboinensis* and Australian King Parrot *Alisterus scapularis* (Barker & Vestjens 1989, 1990) and Figbird, Lewins' Honeyeater, Olive-backed Oriole and White-headed Pidgeon (Floyd 1989). Eaten by Pied Currawong and regurgitated (M. Robinson pers. comm.). Rainbow Lorikeets feed on young leaves.

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NWS; Qld, N.T., W.A.

Distribution Sydney area: Mostly coastal.

Select locations: Narrara, Bouddi, Newport, Sydney Harbour NP, Eastwood, Woolwash, Warragamba, Yallah, Albion Park, Bass Point, Bomaderry.

Habitat

Habitat: Moist sheltered gullies, creek and river banks, coastal dunes.

Altitude: 0–300 m **Annual rainfall:** 1000–1400 mm

Typical local abundance: Frequent.

Vegetation: In littoral, subtropical, and riverine rainforest where it is often a dominant tree, in open-forest e.g. with *Eucalyptus botryoides*, *E. longifolia*, *E. tereticornis*, *E. eugenioides*, *Casuarina glauca* (A. Bofeldt, M. Robinson pers. comm.).

Substrate: Deep coastal sands, sandy alluvium, clay soils from Wianamatta Shale, Narrabeen Group. Soil infertile–fertile. Watertable mostly low, moisture supply intermittent, fresh. Well-drained (A. Bofeldt pers. comm.).

Exposure: Sheltered situations. Appears to tolerate low light conditions. Mid-shade to full sun.

Conservation

Conservation: Inadequately conserved in Illawarra where typical habitat is riparian forest on alluvial flats — this lowland rainforest type is not conserved in the region (A. Bofeldt pers. comm.). Conservation status elsewhere unknown.

Glochidion ferdinandi var. *pubens*

EUPHORBIACEAE

Hairy Cheese Tree

Life history

Growth form: Small tree to 6 m high (to 15 m tall, Illawarra), with leaves and fruit covered with fine hairs.

Vegetative spread: Suckers from roots, can form thickets (A. Bofeldt pers. comm.).

Longevity: More than 50 years.

Primary juvenile period:

Flowers:

Fruit/seed: Stalked, multilobed capsule, 12–20 mm diam., green turning whitish pink to deep red when ripe, with 2 flattened seeds per lobe, seeds covered by a red aril, ripe November–February.

Dispersal, establishment & growth: Diaspore: seed. Germination 1–4 months (A. Bofeldt p. c.).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC

Distribution Sydney area: Coastal.

Select locations: Lake Munmorah, Hawkesbury River (1888), Port Hacking, Wombarra, Avondale, Windang.

Habitat

Habitat: Gullies, watercourses.

Altitude: 0–150 m **Annual rainfall:** above 1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Littoral rainforest e.g. with *Syzigium paniculatum*, *Melaleuca quinquenervia*, *Rhodomyrtus* and fern understorey. Riverine rainforest (A. Bofeldt pers. comm.).

Substrate: Grey sandy soil on coastal sand, low nutrients, well-drained. Clayey loams, medium nutrients, Budgong Sandstone in Illawarra (A. Bofeldt pers. comm.).

Exposure: Full sun–shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Not common, Lake Munmorah is northern geographical limit, conservation status unknown. Uncommon in Illawarra district (A. Bofeldt pers. comm.).

Mallotus philippensis

EUPHORBIACEAE

Red Kamala

Life history

Growth form: Tree to 20 m high, more or less covered with stellate hairs, lowers surface of leaves greyish-hairy with red surface glands.

Vegetative spread: Coppices and suckers (A. Bofeldt pers. comm.).

Longevity: More than 50 years (A. Bofeldt pers. comm.).

Primary juvenile period:

Flowers: Yellow–brown, mainly June–November (Floyd 1989), male and female flowers on different plants.

Fruit/seed: Capsule 6–9 mm diam. covered with dark red glands and 3 black seeds, ripe spring–summer. Seed in January, May, July in Illawarra (A. Bofeldt pers. comm.); 4000 fruits and 48,000 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, germination from very fresh seed only (Floyd 1989).

Fire response: Usually killed, but can resprout from base and sucker from roots (A. Bofeldt pers. comm.).

Interaction with other organisms: Birds eat fruit/seed (A. Bofeldt pers. comm.). Red powdery substance covering fruit capsule used for dyeing e.g. silk in India where it is known as Kamala (Floyd 1989).

Distribution

Status/origin: Native.

Botanical subregions: NC CC CWS; Qld, Malesia, Asia.

Distribution Sydney area: Mt Keira.

Select locations: Mt Keira (only Sydney record).

Habitat

Habitat: Creekbanks, dry ridges and slopes, often rocky and steep.

Altitude: 40–150 m (A. Bofeldt pers. comm.). **Annual rainfall:** above 1200 mm

Typical local abundance: Rare–occasional.

Vegetation: Subtropical and dry rainforests, often in regrowth (A. Bofeldt pers. comm.).

Substrate: Clay loam soils on Illawarra Coal Measures, medium–high nutrients, well-drained (A. Bofeldt pers. comm.).

Exposure: Sheltered, partial shade, but tolerant of sun/deeper shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Only record for Sydney region is at Mt Keira which is also southern geographical limit. Reported as regionally rare, category 1, in Illawarra region (Mills 1988). Only 50–100 plants seen on foothills of Mt Keira below 150 m, mostly mature, but only 10 fruiting trees (A. Bofeldt pers. comm.). Elsewhere the species is found mainly north from Hunter River.

***Manihot flabellifolia* ***
EUPHORBIACEAE

Life history

Growth form: Shrub or small tree 2–5 m high, with milky latex.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Green with purplish stripes, summer.

Fruit/seed: 3-lobed capsule 1.4–2 cm diam., 3 seeds 10 mm long, mottled grey.

Dispersal, establishment & growth: Diaspore:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native of tropical America.

Botanical subregions: NC CC NWS.

Distribution Sydney area: Camden Park.

Select locations: Camden Park (only Sydney record).

Habitat

Habitat: Riverbank.

Altitude: 0–100 m **Annual rainfall:** above 700 mm

Typical local abundance: Rare.

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Cultivated in warmer districts, occasionally naturalised (Harden 1990).

Micranthemum ericoides**EUPHORBIACEAE****Life history**

Growth form: Heath-like shrub to 70 cm high, often multistemmed and much-branched from stout taproot.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: July–October, peak September.

Fruit/seed: 3-lobed capsule, 6–7 mm long, seed oblong with an appendage, July–March.

Dispersal, establishment & growth: Diaspore: seed, ant-adapted food body for dispersal (Westoby et al. 1990, Rice & Westoby 1981).

Fire response: Killed by high intensity fire (1/1994 at Lane Cove, Narrabeen), seedlings seen, flowering within 1 year (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT; Qld.

Distribution Sydney area: Coast and Blue Mountains.

Select locations: Wisemans Ferry, Asquith, Pymble, Manly, Liverpool, Loftus, Menai, Wilton, Wallacia, Springwood, Tomat Creek.

Habitat

Habitat: Hillsides, lower slopes, seacliffs.

Altitude: 0–600 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Scrubby woodland e.g. with *Eucalyptus eximia*, *Angophora bakeri*, *Eucalyptus punctata*, *E. piperita*, *E. squamosa*, *Angophora costata*, and heath e.g. with *Angophora hispida*, *Acacia myrtifolia*, *Banksia spinulosa*, *Grevillea sericea*, *Allocasuarina littoralis*, occasionally seacliff scrub.

Substrate: Sandy loam over sandstone, low nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Micranthemum hexandrum**EUPHORBIACEAE****Life history**

Growth form: Erect multistemmed shrub to 2 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, cream, yellow, July–November, peak September.

Fruit/seed: 3-lobed capsule 6–7 mm long, seed oblong with an appendage.

Dispersal, establishment & growth: Diaspore: seed, probably has ant-adapted foodbody for dispersal.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC NT CT ST; Qld, Vic., Tas.

Distribution Sydney area: Mainly Georges River area.

Select locations: Boorai Creek, Colo River, Kentlyn, Macquarie Fields, Wedderburn, O'Hares Creek, Maldon, Bargo, Berrima.

Habitat

Habitat: Along rivers and creeks in sandstone country, moist gullies.

Altitude: 0–700 m

Annual rainfall: 700–1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest e.g. with *Angophora costata*, *Eucalyptus agglomerata*, *E. piperita*, or riparian scrub e.g. with *Tristaniopsis laurina*, *Backhousia myrtifolia*, *Glochidion ferdinandi*, *Leptospermum polygalifolium*.

Substrate: Sandy soils near creeks, on sandstone, low nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Monotaxis linifolia
EUPHORBIACEAE

Life history

Growth form: Subshrub, usually densely multi-stemmed, with thick woody base and glabrous, thin, wiry stems 15–30 cm long.

Vegetative spread:

Longevity: 5–20 years (D. Keith pers. comm.).

Primary juvenile period:

Flowers: White, minute, September–November.

Fruit/seed: Capsule 2.5 mm long, seeds with an appendage.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Resprouts, secondary juvenile period 2 years (D. Keith pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC CT ST; Qld.

Distribution Sydney area: Mainly coast.

Select locations: Wisemans Ferry, Jerusalem Bay, Belrose, Dee Why Lagoon, La Perouse, Royal NP, Mt Ousley, Robertson.

Habitat

Habitat: Wet ground on sandstone.

Altitude: 0–800 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Sedge swamp e.g. with *Empodisma minus*, *Epacris obtusifolia*, *Lepyrodia scariosa*, *Gymnoschoenus sphaerocephalus*, and wet heath with *Leptospermum* and *Banksia*.

Substrate: Silty sand over sandstone, also, gravelly ‘lateritic’ soil, low nutrients, poorly-drained.

Exposure:

Conservation

Conservation: Conservation status unknown.

***Omalanthus nutans* (O. populifolius)**
EUPHORBIACEAE

Bleeding Heart, Native Poplar

Life history

Growth form: Bushy shrub or small tree, sometimes more than 6 m high; old leaves turn red or crimson before falling (Floyd 1989).

Vegetative spread: No.

Longevity: 20–30 years.

Primary juvenile period: 3 years.

Flowers: October–December, peak November. Separate male and female flowers on same plant.

Fruit/seed: Capsule 8–10 mm wide, matures December–March. Outer covering ‘explodes’ to expose ripe seeds with oily elaiosome (fleshy aril) — seeds remain attached to central column (Floyd 1990), 47,000 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, bird-dispersed, fruit reported from regurgitated pellets of Currawongs (Buchanan 1989). Germination with fresh seed (Floyd 1989). Grows quickly in disturbed sites e.g. after clearing of undershrubs in bush regeneration. Sensitive to low temperatures, symptoms are darkening of leaves with black patches on margins and leaves may redden following periods of cold weather (Jones & Elliot 1986).

Fire response: Some plants resprouting and scattered seedlings noted after high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).

Interaction with other organisms: Fruit eaten by Brown Cuckoo-dove, Lewin's Honeyeater, Olive-backed Oriole, Silvereve (Floyd 1989), also Satin Bowerbird, Currawongs, catbirds, Brown Pigeon (A. Bofeldt pers. comm.).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT NWS; L.H.I., Qld.

Distribution Sydney area: Widespread. Coast and Upper Blue Mtns.

Select locations: Gordon, Beecroft, Eastwood, Manly, Kurnell, Mt Keira, Albion Park, Cambewarra, Razorback, Blackheath.

Habitat

Habitat: Disturbed moist forest, also establishes in gardens.

Altitude: 0–900 m **Annual rainfall:** above 1200 mm

Typical local abundance: Frequent–occasional–rare.

Vegetation: Rainforest margins or eucalypt forest in gullies; Dry, subtropical, warm-temperate and riverine rainforest in Illawarra (M. Robinson pers. comm.), occasionally in heath near urban areas.

Substrate: Medium to high nutrient soils, shale or alluvium influenced, watertable mostly low, moisture supply intermittent, fresh.

Exposure: Sheltered sites, mid-shade to full sun. Sun required by young plants (A. Bofeldt pers. comm.), can tolerate occasional salt spray (M. Robinson pers. comm.).

Conservation

Conservation: Likely to be adequately conserved. Early coloniser of disturbed forest sites, and one of the few native species to establish in gardens.

Omalthus stillingifolius

EUPHORBIACEAE

Life history

Growth form: Shrub to 2 m high; can be confused with Chinese Tallow Tree *Sapium sebiferum* in urban areas.

Vegetative spread: No.

Longevity: 5–10 years (A. Bofeldt pers. comm.).

Primary juvenile period: 1–2 years (A. Bofeldt pers. comm.).

Flowers: July–December, peak Oct.

Fruit/seed: Capsule 5 mm wide, seeds without fleshy aril like *O. populifolius* but with a small hard knob on the surface, mature in spring.

Dispersal, establishment & growth: Diaspore: seeds, released when capsule splits.

Fire response: Probably killed (A. Bofeldt pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT CWS; Qld.

Distribution Sydney area: Lower Blue Mtns, Illawarra.

Select locations: Boorai Creek, Wheeny Creek, Razorback, Mt Warrigal, Bass Point, Minnamurra, Douglas Park, Yerranderie, Kowmung River, Murdering Gully.

Habitat

Habitat: Rocky hillsides and gullies, in quarry rubble (M. Robinson pers. comm.).

Altitude: 0–800 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Frequent–occasional–rare.

Vegetation: Eucalypt forest or woodland e.g. with *Eucalyptus punctata*, *Acacia implexa*. Dry rainforest margins (A. Bofeldt pers. comm.).

Substrate: Rocky, skeletal soils from slates and sandstones. Low to medium nutrient soil. Watertable mostly low, moisture supply intermittent. Budgong Sandstone, Bombo Latite in Illawarra (M. Robinson pers. comm.).

Exposure: Westerly aspect, exposed (M. Robinson pers. comm.).

Conservation

Conservation: Conservation status unknown.

Phyllanthus gastroemii**EUPHORBIACEAE****Life history****Growth form:** Erect shrub 1–2 m high.**Vegetative spread:** No.**Longevity:** Short-lived 3–8 years (A. Bofeldt pers. comm.).**Primary juvenile period:** 1–2 years (A. Bofeldt pers. comm.).**Flowers:** Separate male and female flowers on the same plant, September–December, February–March.**Fruit/seed:** Capsule, 3–4 mm diam., with seeds 1.5 mm long, mature late spring–autumn (L. Parkinson pers. comm.).**Dispersal, establishment & growth:** Diaspore: seed, possibly dispersed explosively (A. Bofeldt pers. comm.). Fast growing pioneer species.**Fire response:** Resprouts.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS; Qld.**Distribution Sydney area:** Widespread.**Select locations:** Gosford, Upper Colo, Kurrajong, Milperra, Newington, Penshurst, Audley, Wollongong, Elderslie, Yerranderie, Thirlmere, Mt Brown, Wollongong, Jenolan River.**Habitat****Habitat:** Levee banks, rocky sites.**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm**Typical local abundance:** Occasional.**Vegetation:** Creek vegetation e.g. with *Acacia floribunda*, *Backhousia myrtifolia*, *Tristaniopsis laurina*, or grassy woodland e.g. with *Eucalyptus crebra*, *E. tereticornis*, *E. moluccana*. Also dry rainforest margins and rainforest/open-forest ecotone (A. Bofeldt pers. comm.).**Substrate:** Clay loams from Wianamatta Shale, Devonian sediments etc., or sandy alluvium, moderate-fertile soils. On Coal Measures, latite, Budgong Sandstone, Narrabeen Series in Illawarra (A. Bofeldt pers. comm.).**Exposure:** Exposed, full sun to light shade (A. Bofeldt pers. comm.).**Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991), widespread, but not well conserved in Illawarra (A. Bofeldt pers. comm.), status elsewhere unknown.***Phyllanthus gunnii*****EUPHORBIACEAE****Life history****Growth form:** Erect shrub to 2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** December.**Fruit/seed:** Capsule, 4 mm diam., December–January.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS NWP SWP; Qld, Vic., Tas.**Distribution Sydney area:** Hawkesbury–Nepean River, Illawarra.**Select locations:** Yarramundi, Wallacia, Douglas Park, Bola Creek, Mt Kembla, Minnamurra.

Habitat

Habitat: Riverbanks.

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance:

Vegetation: Riverside vegetation e.g. with *Casuarina cunninghamiana*, *Trema aspera*, *Commersonia fraseri*, *Backhousia myrtifolia*, *Acacia floribunda*.

Substrate: Sandy alluvial soils, medium nutrients.

Exposure: Full sun to light shade.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.

Phyllanthus hirtellus* (P. thymoides)*EUPHORBIACEAE****Life history**

Growth form: Spreading shrub to 80 cm high, covered with hairs, and with leaves usually less than 8 mm long. A variable species, informal forms are sometimes recognised (Harden 1990).

Vegetative spread:

Longevity: ? medium

Primary juvenile period:

Flowers: At any time, but peaks September–October.

Fruit/seed: Dehiscent capsule, 4 mm diam., seeds 2 mm long, June–January.

Dispersal, establishment & growth: Diaspore: seed, ballistic dispersal (Westoby et al. 1990).

Fire response: Resprouted from base (at Marramarra NP, Mountain Lagoon), Flowering and fruiting within 10 months of high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS CWS SWS SWP; Qld, Vic.

Distribution Sydney area: Coast and mountains.

Select locations: Somersby, Patonga, Pennant Hills, Maroubra, Liverpool, Nortons Basin, Hilltop, Springwood, Mt Tomah, Mt Coricudgy, Wingello.

Habitat

Habitat: Upper slopes on sandstone.

Altitude: 0–1200 mm

Annual rainfall: above 800 mm

Typical local abundance: Occasional–frequent.

Vegetation: Heath and scrubby eucalypt forest e.g. with *Eucalyptus gummifera*, *E. eximia*, *E. piperita*.

Substrate: Sandy soil, often rocky, on sandstone, low nutrient.

Exposure: Full sun to light shade.

Conservation

Conservation: Probably adequately conserved.

Phyllanthus similis**EUPHORBIACEAE****Life history**

Growth form: Erect, glabrous subshrub to 60 cm high, with distinctly reddish stems and branches, rhizomatous.

Vegetative spread: Spreads by rhizome to form small colonies 1–2 m across.

Longevity: Indefinite.

Primary juvenile period: Less than 1 year (A. Bofeldt pers. comm.).

Flowers: Greenish, separate male and female flowers on same plant, stamen filaments free, styles bifid, September, March.

Fruit/seed: Pale yellow-orange, capsule, 3.5–4 mm diam., seeds orange-brown, mature October–May.

Dispersal, establishment & growth: Diaspore: seed. Explosive capsule propels seeds several metres, also water-dispersed, soil-stored seedbank possibly 1–3 years, germination 1–3 months (A. Bofeldt pers. comm.).

Fire response: Stem probably killed but can reshoot from rhizome (A. Bofeldt p. c.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT NWS CWS; Qld.

Distribution Sydney area: Mainly western Sydney, Illawarra.

Select locations: Kurrajong, Doonside, Nortons Basin, Douglas Park, Garie Beach, Mt Keira, Shellharbour, Kiama, Kowmung River.

Habitat

Habitat: Levee banks, rocky slopes.

Altitude: 0–500 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Dry eucalypt open-forest e.g. with *Eucalyptus tereticornis*, *Bursaria spinosa*, *Hymenanthera dentata*, *Ajuga australis*, to moist eucalypt forest e.g. with *Acacia elata*, *Cissus hypoglauca*. Dry rainforest e.g. with *Streblus brunonianus*, *Alchornea ilicifolia*, subtropical rainforest, and rarely warm temperate rainforest (M. Robinson, A. Bofeldt p. c.).

Substrate: Alluvial and colluvial soil from shale, sandstone, medium–high nutrient soils, well-drained, intermittent moisture supply. Bombo Latite member, Budgong Sandstone, Coal Measures, and Narrabeen series in Illawarra (A. Bofeldt pers. comm.).

Exposure: Sheltered. Usually mid-shade (A. Bofeldt pers. comm.).

Conservation

Conservation: Rare. Vulnerable in Western Sydney (Benson & McDougall 1991).

Rare to uncommon in Illawarra, more frequent at low altitudes less than 100 m (A. Bofeldt pers. comm.).

Phyllanthus virgatus

EUPHORBIACEAE

Life history

Growth form: Prostrate to erect herb or subshrub to 50 cm high, with woody carrot-like base and numerous erect to decumbent slender branches. Includes several closely related taxa requiring revision.

Vegetative spread: No (McIntyre et al. 1995).

Longevity:

Primary juvenile period:

Flowers: November–April.

Fruit/seed: Glabrous dehiscent capsule 1.5–3 mm diam., seeds 1.5 mm long, November–April.

Dispersal, establishment & growth: No particular dispersal morphology (McIntyre et al. 1995).

Fire response: Probably resprouts.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT NWS CWS NWP SWP; Qld

Distribution Sydney area: Cumberland Plain and northern Hornsby Plateau

Select locations: Howes Valley, Vineyard, Toongabbie, Glenfield, Nortons Basin, Narellan, Kowmung River, Glen Alice.

Habitat

Habitat: Lower hillslopes.

Altitude: 0–600 m **Annual rainfall:** 700–900 mm

Typical local abundance: Rare–occasional.

Vegetation: Woodland and open-forest with grassy understorey e.g. with *Eucalyptus tereticornis*, *E. crebra*, *E. moluccana*, *Bursaria spinosa*.

Substrate: Clay soil on Wianamatta Shale, or other shales, medium nutrient soils, well-drained.

Exposure: Mid shade to full sun.

Conservation

Conservation: Rare. Vulnerable in Western Sydney (Benson & McDougall 1991).

Poranthera corymbosa**EUPHORBIACEAE****Life history**

Growth form: Erect shrub 80 cm high.

Vegetative spread: No.

Longevity: Probably short.

Primary juvenile period:

Flowers: White, male and female flowers on same plant, August–December, peak October.

Fruit/seed: Capsule 3 mm diam., dehisces explosively.

Dispersal, establishment & growth: Diaspore: seed, recruitment from soil-stored seed after fire or disturbance.

Fire response: Killed. Flowers profusely season after high intensity wildfire (R. Lembit pers. comm.). Seedlings established and flowered within 3 years of fire (at Leura). Seedlings in bud less than 1 year after high intensity fire (1/94 at Lane Cove, P. Kubiak pers. comm.). Not recorded in woodland unburnt for 20 years.

Interaction with other organisms: Eaten by cattle (Herbarium note).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT NWS CWS.

Distribution Sydney area: Widespread.

Select locations: Foresters Beach, Mt Colah, Avalon, Lane Cove, Royal NP, Sublime Point, Macquarie Pass, Cambewarra, Glenbrook, Yerranderie, Buxton, Mt Jellore, Rylstone, Glen Davis, Blackheath.

Habitat

Habitat: Hillsides, among rocks.

Altitude: 0–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland–open forest e.g. with *Eucalyptus haemastoma*, *E. sieberi*, *Angophora costata*, *Eucalyptus smithii*.

Substrate: Sandy soil, from sandstone or sand dunes, low nutrient, one record from basalt soil (Tayan Pic). On Coal Measures in Illawarra (M. Robinson pers. comm.).

Exposure: Sheltered sites, mid-shade.

Conservation

Conservation: Conservation status unknown.

Poranthera ericifolia**EUPHORBIACEAE****Life history**

Growth form: Erect shrub 15–30 cm high.

Vegetative spread:

Longevity:

Primary juvenile period: 1 year (Benson 1985)

Flowers: White, male and female flowers on same plant, August–December, peak September–October.

Fruit/seed: Capsule 3 mm diam.

Dispersal, establishment & growth: Diaspore: seed, both ballistic and ant-adapted dispersal mechanism (Westoby et al. 1990).

Fire response: Killed by high intensity fire (1/1994 at Narrabeen Lake), some seedlings flowering and fruiting within 1 year of high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT ST.

Distribution Sydney area: Widespread, coast and Blue Mountains.

Select locations: Howes Valley, Woy Woy, Hornsby, Maroubra, Oatley, Waterfall, Cambewarra, Mt Irvine, Leura, Gaspers Mountain, Robertson.

Habitat**Habitat:** Eucalypt woodland.**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Eucalypt woodland e.g. with *Eucalyptus haemastoma*, *E. gummifera*, *E. considiniana*, *Angophora costata* and heath e.g. with *Eucalyptus stricta*.**Substrate:** Sandy soil from sandstone, low nutrient.**Exposure:****Conservation****Conservation:** Probably adequately conserved.***Poranthera microphylla*****EUPHORBIACEAE****Life history****Growth form:** Low, diffuse, glabrous herb 8–15 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White–pink, male and female flowers on same plant, August–February, peak November.**Fruit/seed:** Capsule 1.5–2 mm diam.**Dispersal, establishment & growth:** Diaspore: seed. Both ballistic and ant-adapted dispersal mechanism (Westoby et al. 1990, Rice & Westoby 1981). Soil-stored seedbank (Fox 1988). Coloniser.**Fire response:** Killed (Fox 1988), early re-coloniser. Seedlings recorded less than 1 year after fire (Purdie 1977). Some seedlings flowering and fruiting within 5 months of high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS; Qld, Vic., Tas., N.T., W.A.**Distribution Sydney area:** Widespread coast and Blue Mountains.**Select locations:** Wattagan Stater Forest, Denistone, Dee Why, Kurnell, Appin, Albion Park, Olinda, Newnes State Forest, Wentworth Falls, Bundanoon.**Habitat****Habitat:** Dry forest after fire.**Altitude:** 0–1200 m **Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Dry eucalypt forest e.g. *Eucalyptus sieberi*, *E. macrorhyncha*, *E. piperita* and moist forest e.g. *Eucalyptus saligna*, *E. paniculata*, *E. fasigata*.**Substrate:** Sandy soil from sandstone or more clayey soils from shale.**Exposure:** Mid-shade to full sun.**Conservation****Conservation:** Conservation status unknown.***Pseudanthus divaricatissimus*****EUPHORBIACEAE****Life history****Growth form:** More less prostrate shrub with stems to 20 cm long, with stout taproot.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Spring.**Fruit/seed:** Dehiscent, 1-locular capsule, 5 mm long, with 1 seed.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:** Probably resprouts.**Interaction with other organisms:**

Distribution

Status/origin: Native.

Botanical subregions: SC CT CWS; Vic.

Distribution Sydney area: Upper Blue Mountains.

Select locations: Wentworth Falls, Narrowneck, Clarence, Newnes Plateau, Kanangra Walls, Tallong.

Habitat

Habitat: Rocky sites.

Altitude: 700–1200 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Montane heath e.g. with *Allocasuarina nana*, *Eucalyptus stricta*, *Banksia ericifolia*, and dry eucalypt open-forest e.g. with *Eucalyptus sieberi*, *Eucalyptus macrorhyncha*.

Substrate: Shallow sandy to rocky soils on sandstone, low nutrients.

Exposure: Exposed, windswept sites, full sun to light shade.

Conservation

Conservation: Coded 3RCa on national rare species list (ROTAP 1995). Probably adequately conserved, e.g. Blue Mountains NP, Kanangra-Boyd NP.

Pseudanthus orientalis**EUPHORBIACEAE****Life history**

Growth form: Rigid, glabrous shrub with decumbent stems to 30 cm long.

Vegetative spread:

Longevity: 25–60 years (D. Keith pers. comm.).

Primary juvenile period:

Flowers: Yellowish, late summer–autumn.

Fruit/seed: Dehiscent, 1-locular, glossy, brown capsule, 4 mm long, with 1 seed.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Killed, recruitment mainly after fire from soil-stored seedbank (D. Keith pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coastal.

Select locations: Bouddi (McRae 1990), Bondi (1886), Rose Bay (1886), La Perouse, Kurnell, Audley, Darkes Forest.

Habitat

Habitat: Coastal rock platforms and sand dunes.

Altitude: 0–500 m **Annual rainfall:** above 1200 mm

Typical local abundance: Rare–occasional.

Vegetation: Coastal heath e.g. with *Banksia ericifolia*, *B. serrata*, *Persoonia lanceolata*, *Ricinus pinifolius*, *Eucalyptus gummifera*, *E. luehmanniana*, and swamp e.g. with *Empodisma minus*, *Xyris operculata*, *Darwinia leptantha*, *Lepyrodia scariosa*.

Substrate: Shallow sandy soils, over sandstones, low nutrients. Also reported on sandhills.

Exposure:

Conservation

Conservation: Uncommon in Sydney area, more than 50% of specimens collected pre 1920, in areas now suburban. Conserved in Botany Bay NP and Royal NP but adequacy of conservation unknown. Darkes Forest is southern geographical limit for species (Keith 1994).

Pseudanthus pimeleoides**EUPHORBIACEAE****Life history**

Growth form: Erect, glabrous shrub to 1 m high, monoecious.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Clustered at ends of branches, male flowers yellowish-white, female flowers inconspicuous, August–November, peak September.

Fruit/seed: Oblong capsule 5–6 mm long, with 1 seed.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT CWS.

Distribution Sydney area: Widespread.

Select locations: Maroota (L.McD.), Culoul Range, Patonga, Woolwash, Heathcote, OHares Creek, Cataract River, Coricudgy, Mt Hay.

Habitat

Habitat: Rocky hillsides, creekbanks and flood terraces.

Altitude: 0–1000 m

Annual rainfall: above 1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest to woodland e.g. with *Angophora costata*, *E. agglomerata*, *E. piperita*, *E. punctata*, *E. rossii*, *E. sclerophylla*, *E. sieberi*.

Substrate: Shallow soil over sandstone and deeper alluvial soils, low nutrient.

Exposure: Exposed to sheltered sites.

Conservation

Conservation: Uncommon (Harden 1994), conservation status unknown.

Ricinocarpos bowmannii**EUPHORBIACEAE****Life history**

Growth form: Shrub to 1 m high, with woolly/hairy branches.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pink or white, winter–early summer.

Fruit/seed: Capsule 8–10 mm diam., densely hairy, seeds with an appendage.

Dispersal, establishment & growth: Diaspore: seed, possibly ant-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC ST NWS CWS SWS NWP SWP; Qld.

Distribution Sydney area: Dharug.

Select locations: Mill Creek (Dharug NP) only record for Sydney area.

Habitat

Habitat: Near creeks.

Altitude: 0–50 m

Annual rainfall: 800 mm

Typical local abundance: Rare.

Vegetation: Moist gully forest e.g. with *Ceratopetalum apetalum*, *Tristaniopsis laurina*, *Backhousia myrtifolia*, *Pultenaea flexilis*.

Substrate: Moist sandy, low nutrient soil.

Exposure: Sheltered.

Conservation

Conservation: Rare and localised in Sydney area.

Ricinocarpus pinifolius

EUPHORBIACEAE

Wedding Bush

Life history**Growth form:** Erect to spreading shrub.**Vegetative spread:** No.**Longevity:** medium-long.**Primary juvenile period:****Flowers:** Usually white, sometimes pinkish, July–October, peak September.**Fruit/seed:** Globose capsule 12 mm diam., densely spiny, seeds with an appendage, mature October–December.**Dispersal, establishment & growth:** Diaspore: seed, with ant-adapted food body for dispersal (Westoby et al. 1990, Rice & Westoby 1981). Difficult to grow from seed (A. Bofeldt pers. comm.).**Fire response:** Stem killed and resprouts from base after low–high intensity fires. May flower within 2 years of fire (Bradley 1972). Resprouted population flowering within 1 year of high intensity fire (1/94 at Lane Cove River, P. Kubiak pers. comm.).**Interaction with other organisms:** Mycorrhizal fungi association (Jones & Elliot 1986).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT; Qld, Vic., Tas., N.T.**Distribution Sydney area:** Coast and lower elevation plateaus.**Select locations:** Howes Mountain, Norah Head, Somesby, Cheltenham, Manly, La Perouse, Oatley, Helensburgh, Grose Vale, Agnes Banks, Glenbrook, Elderslie, Bargo.**Habitat****Habitat:** Dry heath on sandy soil.**Altitude:** 0–600 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Dry heath e.g. with *Banksia serrata*, *B. aemula*, *B. spinulosa*, *Lambertia formosa*, and woodland e.g. with *Eucalyptus sclerophylla*, *E. gummifera*, *E. piperita*, *E. eximia*. Open scrub e.g. with *Leptospermum laevigatum*, open-forest e.g. with *Eucalyptus botryoides* in Illawarra (M. Robinson pers. comm.).**Substrate:** Sandy soil on sandstone, and old perched dunes, low nutrient soils, well-drained.**Exposure:** Full sun to light shade.**Conservation****Conservation:** Probably adequately conserved, though populations on isolated sand deposits e.g. at Agnes Banks, have been reduced to small size.***Ricinus communis* ***

EUPHORBIACEAE

Castor Oil Plant

Life history**Growth form:** Tall shrub, herbaceous, or tree-like with woody stem, with milky sap, thick and fibrous roots. Leaves have nauseating odour if crushed (Parsons & Cuthbertson 1992).**Vegetative spread:****Longevity:** Perennial, or annual where frosts are heavy and frequent.**Primary juvenile period:** 6 months.**Flowers:** Reddish green, with yellow stamens, separate male and female flowers, December–March (Parsons & Cuthbertson 1992).**Fruit/seed:** Spiny, 3-lobed capsule, 15 mm diam., with 3 seeds, 12–15 mm long, mottled silvery and brown with a fleshy appendage, resembling an engorged tick (Parsons & Cuthbertson 1992).**Dispersal, establishment & growth:** Diaspore: seeds, pod explodes violently when ripe dispersing seeds over several metres, dispersed during road grading, in garden refuse and in mud adhering to animals and vehicles (Parsons & Cuthbertson 1992), dispersed by birds (Bennett 1860). Soil-stored seedbank with long seed viability (R. Buchanan pers. comm.). Germinates readily after disturbance, seedlings may emerge from depth of 30 cm, rapid growth rate in suitable conditions, 6 m in 12 months after germination, thrives in high rainfall, stems killed by frosts and regrows in spring (Parsons & Cuthbertson 1992).

Fire response: May regrow from old crowns. Seedlings seen, flowering and producing mature fruit within 10 months of high intensity fire (1/1994 at Lane Cove River, P. Kubiak pers. comm.).

Interaction with other organisms: Seeds toxic to animals and humans if eaten (Harden 1990). Leaves unpalatable to stock, poisoning only if seed contaminates grain, chemical extract used in manufacture of paints, varnishes, plastics, foams, explosives etc. (Parsons & Cuthbertson 1992). Contains a toxic protein (ricin), one of the most powerful plant toxins known, but it is water soluble and not present in the oil fraction (castor oil) which has been used as a laxative (Blackwell 1990). Oil extracted to supply machinery lubricant in India. Seeds were exported to England as domestic laxatives but are now known to be very dangerous, 2–8 seeds can kill (Low 1990), extract used by KGB for assassinations (R. Buchanan pers. comm.), or was it the Bulgarian secret police? (M. Reed pers. comm.). Juice, leaves and stems can cause severe contact dermatitis (Bass 1990). Larvae of moth *Achaea serva* seen on plant (Common 1990).

Distribution

Status/origin: Exotic, native to Africa and Asia. Introduced during early settlement and listed as present in 1803 (Parsons & Cuthbertson 1992). Apparently naturalised in NSW by 1860 (Bennett 1860).

Botanical subregions: NC CC SC CWS SWS NWP NFWP SFWP; LHI, Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area: Coast.

Select locations: Eastwood, Forestville Park (L.McD.), Vaucluse, Little Bay, Ermington, Emu Plains, Albion Park, Macquarie Rivulet.

Habitat

Habitat: Soil fill, railway embankments, riverbanks, roadsides.

Altitude: 0–200 m **Annual rainfall:** above 700 mm

Typical local abundance: Occasional.

Vegetation: Wasteland weeds.

Substrate: Clay soils, fill, disturbed soils, medium nutrient. Tolerates some salinity (R. Buchanan pers. comm.).

Exposure: Withstands drought, but very susceptible to frosts (Parsons & Cuthbertson 1992).

Conservation

Conservation: Weed of waste areas.

Vernicia fordii *

EUPHORBIACEAE

Tung Oil Tree

Life history

Growth form: Tree to 10 m high, new growth and leaves covered with fine hairs.

Vegetative spread:

Longevity:

Primary juvenile period: 3 years.

Flowers: White with reddish markings, turning pink with age.

Fruit/seed: Fleshy fruit 5–7 mm diam., with 3–7 seeds.

Dispersal, establishment & growth: Diaspore:

Fire response:

Interaction with other organisms: Oil from seeds used in paint industry (Harden 1990).

Distribution

Status/origin: Naturalised exotic, native to Asia.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Hawkesbury and Colo Valley (Harden 1990).

Select locations: Central Colo (1961, 1986).

Habitat

Habitat: Creek banks, river flats.

Altitude: 0–200 m **Annual rainfall:** above 900 mm

Typical local abundance: Occasional.

Vegetation:

Substrate: Well-drained loam, medium nutrients.

Exposure:

Conservation

Conservation: Localised to Colo area. Not known if spreading.

Eupomatia laurina**EUPOMATIACEAE**

Bolwarra

Life history

Growth form: Erect glabrous shrub or small tree to 15 m high, with shiny leaves 7–12 cm long, branchlets often black.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Heavily scented, January–February. Pollinated by beetles that feed on the staminodes (Harden 1990).

Fruit/seed: Succulent, urn-shaped, edible fruit 2 cm diam. (Floyd 1989), green turning brownish, with numerous, angular seeds, mature June–July. 45,000 seeds per kg (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fruit, probably bird-dispersed. Germination of 90% fresh seed after removal of pulp in 3–7 weeks (Floyd 1989), and 3–8 weeks (A. Bofeldt pers. comm.).

Fire response: Resprouts from base after high-intensity fire (at Katandra Bushland Sanctuary 1/1994, L.McD.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST CWS; Qld, Vic., N.G.

Distribution Sydney area: Coast and adjacent plateaus

Select locations: Gosford, Pittwater, North Rocks, Narrabeen, Royal NP, Bulli, Dapto, Macquarie Pass, Minnamurra Falls, Katoomba, Wingello, Bundanoon.

Habitat

Habitat: Gullies, sheltered sites. Escarpment slopes and benches in Illawarra (A. Bofeldt pers. comm.).

Altitude: 0–1000 m **Annual rainfall:** above 1000 mm

Typical local abundance: Occasional.

Vegetation: Moist eucalypt open-forest e.g. with *Eucalyptus pilularis*, *E. saligna*, *E. smithii*, *Syncarpia glomulifera*, subtropical, warm temperate and littoral rainforest or creekside scrub.

Substrate: Deep sandy loams from sandstone colluvium or basalt, medium to high nutrients. Shales, latite, mudstones in Illawarra (A. Bofeldt pers. comm.).

Exposure: Sheltered.

Conservation

Conservation: Probably adequately conserved, but creekside habitats are vulnerable to disturbance promoting weed invasion. Well conserved in Illawarra (A. Bofeldt pers. comm.).

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