



Map of the Sydney region

For the Ecology of Sydney Plant Species the Sydney region is defined as the Central Coast and Central Tablelands botanical subdivisions.

Ecology of Sydney plant species

Part 7a Dicotyledon families Nyctaginaceae to Primulaceae

Doug Benson and Lyn McDougall

Abstract

Benson, Doug and McDougall, Lyn (National Herbarium of New South Wales, Royal Botanic Gardens, Sydney, Australia 2000. Email: Doug_Benson@rbgsyd.gov.au) 1999 Ecology of Sydney plant species: Part 7a Dicotyledon families Nyctaginaceae to Primulaceae. Cunninghamia 6(2) 402 to 509. Ecological data in tabular form are provided on 149 plant species of the families Nyctaginaceae to Primulaceae, 75 native and 74 exotics, 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, Drummoyn, 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: Nyctaginaceae, Nymphaeaceae, Ochnaceae, Olacaceae, Oleaceae, Onagraceae, Oxalidaceae, Papaveraceae, Passifloraceae, Peperomiaceae, Piperaceae, Pittosporaceae, Plantaginaceae, Plumbaginaceae, Polemoniaceae, Polygalaceae, Polygonaceae, Portulacaceae, Primulaceae.

Data are 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 are 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 7 covers families from Nyctaginaceae to Rubiaceae, approximately 400 species, including Proteaceae, many species of which have a considerable amount of information. Because of the size of this Part, and the extent of research involved compared with other parts, it has been necessary to divide the work into two sections.

Part 7a of the *Ecology of Sydney plant species* covers the Dicotyledon families alphabetically from Nyctaginaceae to Primulaceae.

Part 7b, Proteaceae to Rubiaceae will be published in 2000.

Methods

Part 7a follows the format used in Parts 1–6 (Benson & McDougall 1993, 1994, 1995, 1996, 1997, 1998). 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) (Fig. 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, as defined here, 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 (*Cunninghamia* 3(2) 1993)

Part 2: Dicotyledon families Asteraceae to Buddlejaceae (*Cunninghamia* 3(4) 1994)

Part 3: Cabombaceae to Eupomatiaceae (*Cunninghamia* 4(2) 1995)

Part 4: Fabaceae (*Cunninghamia* 4(4) 1996)

Part 5: Flacourtiaceae to Myrsinaceae (*Cunninghamia* 5(2) 1997)

Part 6: Myrtaceae (*Cunninghamia* 5(4) 1998)

Part 7a: Nyctaginaceae to Primulaceae (*Cunninghamia* 5(6) 1999)

Part 7b: Proteaceae 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 the summer issue of *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 7b, Proteaceae to Rubiaceae, is planned for publication in 2000, and any information that readers would like included should be sent to the authors by 30 June 2000.

Ecological review papers may be appropriate for families in future issues, particularly the major families e.g. Proteaceae, but papers would also be welcomed for smaller families. Authors interested in contributing such papers should contact the Scientific Editor.

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, are 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.

A 'comments' section has been deliberately avoided — for all information retrieval purposes, all ecological material should be attributable to some life history aspect of the plant or its habitat although even with our broad categories there have been problems with 'Vegetation' and 'Substrate' sections for specialised lifeforms such as mistletoes. The main purpose of this information is to give a picture of the ecology of particular species as is currently known. It is not primarily for comparative purposes although it can be used in this way. One of our original aims was to demonstrate that closely related species may have different ecologies and that to generalise within genera for example rather than look at a particular species is an over simplification. We have also included reference to individualistic information resulting from specific research that will not necessarily be available for all species.

Similarly where we have observations on the effects of factors such as drought on particular species we have included these, though we have not included a category for 'drought' because of difficulties in definition. One of our aims is to be open-ended, to point out that there are many gaps in the ecological knowledge and to indicate areas and species where future work may be particularly useful.

Botanical nomenclature

Family/Genus/Species: Names currently recognised at the National Herbarium of NSW 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. There are very few references in the literature to the longevity of species or records of individual plants, particularly of the longer-lived species, yet this is an important factor in assessing importance of recruitment and changes in plant communities.

Most of the estimates given are based on the authors' judgement, based on the shape, size and growth rates of individuals, and the authors' experience in the field over 25 years, together with any historical data available. The figures given are conservative and represent minimal average ages. The authors would not be surprised if much greater ages are achieved in many cases.

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. The time required to accumulate a seedbank sufficient to ensure reasonable recruitment in the event of mass mortality is also an important consideration. Primary and secondary juvenile periods should not be considered as absolute and they may vary spatially as a function of habitat factors (moisture availability, nutrients etc.) and temporally (e.g. climatic variation).

Source: literature, field observations.

Reproduction: for Angiosperms, reproduction is separated into:

Flowers: predominant 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. Entries such as 'probably killed' mean that a species has no obvious morphological characteristics likely to assist in surviving and resprouting following fire. While species that resprout after fire may be readily noted, the death of individuals may not be observed unless the occurrence of the species in the area was well known prior to the fire.

For a given species some populations may be capable of resprouting while other populations may be killed. This may explain cases where contradictory evidence has been given though response to fire in some species may depend on fire intensity.

In view of the limited information available for many species, the categories of Gill and Bradstock have not been applied at this stage.

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. Naturalised species indicated by an asterisk following the botanical name.

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

Botanical subregions: occurrence of species in botanical subdivisions of NSW, 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 refer 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 (1979).

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 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 1996), with current updating for Rare or Threatened Australian Plants (ROTAP) database maintained by NSW NPWS; inclusion on schedules of the NSW *Threatened Species Conservation Act 1995*; comments on regional significance and adequacy of conservation within Sydney area are based on authors' knowledge of the abundance of species and their primary occurrence in major conservation areas. These comments apply to the Sydney region; a species may be common or rare elsewhere. 'Probably' is used in many cases as it is the authors' views that a definite categorisation of 'adequately conserved' needs to be based on a better knowledge of the species' biology and distribution than we have at present for most species.

Source: Herbarium records, field observations, literature.

General comments on part 7a

Part 7a covers 149 plant species of the families Nyctaginaceae to Primulaceae, 75 native and 74 naturalised exotics.

Excluded from this work are a number of exotic species that do not appear to be truly naturalised in the Sydney region (*Fagopyrum esculentum*, *Ligustrum vulgare*, *Plantago scabra*, *Rumex hymenosepalus*, *Rumex stenoglottis*).

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Dicotyledon families Nyctaginaceae to Primulaceae

Boerhavia coccinea

NYCTAGINACEAE

Tarvine

Life history

Growth form: Prostrate to decumbent perennial herb, with hairy stems.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pink.

Fruit/seed: 1-seeded indehiscent fruit with glandular hairs, mucilaginous when wet, 3–5-ribbed, 3–4 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC NT CT ?ST NWS CWS SWS NWP SWP NFWP SEWP; Qld, N.T., S.A., W.A.

Distribution Sydney area:

Select locations:

Habitat

Habitat: Riverbanks.

Altitude: 0–800 m

Annual rainfall: 600–800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassy sites.

Substrate: Alluvial soil, gravelly slopes, low to medium nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Mirabilis jalapa *

NYCTAGINACEAE

Four-o'clock, Marvel of Peru

Life history

Growth form: Erect perennial herb to 1 m high, with woody rootstock and large tuberous roots; leaves opposite.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, yellow or red, or a mixture of these colours; flowers open in the afternoon, March–April.

Fruit/seed: Dry, 1-seeded fruit, indehiscent, 7 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to America; introduced as ornamental.

Botanical subregions: NC CC; LHI, Qld, Vic.

Distribution Sydney area:

Select locations: CC: Woolloomooloo, Valley Heights (1954).

Habitat**Habitat:** Waste sites, embankments.**Altitude:** 0–400 m **Annual rainfall:** 1100–1400 mm**Typical local abundance:** Frequent.**Vegetation:** Weedy sites e.g. with *Lantana camara*.**Substrate:****Exposure:****Conservation****Conservation:** Occasional escape from cultivation, not common, unlikely to invade bushland.***Pisonia umbellifera*****NYCTAGINACEAE**

Birdlime Tree

Life history**Growth form:** Small, brittle tree 4–6 m high, with very sticky fruit.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pale green, without petals; male flowers bell-shaped, April.**Fruit/seed:** Dry, 1-seeded, 5-ribbed fruit 2–4 cm long. Exudes a dark sticky gum, mature February–May (Floyd 1989).**Dispersal, establishment & growth:** Diaspore: sticky fruit, dispersed by attachment to Flying Foxes (Fuller & Badans 1980) and birds.**Fire response:****Interaction with other organisms:** Sticky fruit sometimes sticks to birds, bats and reptiles causing death (Harden 1990).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; Qld, LHI, Malesia, Pac Is, Afr.**Distribution Sydney area:** Illawarra.**Select locations:** CC: Burning Palms RNP, Clifton, Austinmer, Minnamurra Falls, Saddleback Mountain.**Habitat****Habitat:** Gullies, rear of upper bench of escarpment (Fuller & Badans 1980).**Altitude:** 0–200 m **Annual rainfall:** 1400–1600 mm**Typical local abundance:** Occasional–common.**Vegetation:** Subtropical rainforest e.g. with *Streblus brunonianus*, *Dendrocnide excelsa*, *Dospyros australis*, *Cassinia australis*.**Substrate:** Clay soil on volcanics, high nutrients.**Exposure:****Conservation****Conservation:** Not common, conservation status unknown.

***Nymphaea caerulea* subsp. *zanzibarensis* ***

NYMPHAEACEAE

Cape Waterlily

Life history

Growth form: Perennial aquatic herb with floating leaves and small tubers that may develop into short vertical rhizomes; leaf circular with a radial slit.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Blue or rarely white; flowers remain open for 4–5 days, closing at night, late spring to early winter (Sainty & Jacobs 1981).

Fruit/seed: Berry, drawn below water surface by the spiralling stalk, with numerous seeds 2 mm long.

Dispersal, establishment & growth: Seeds germinate from spring to autumn on mud in water up to 1 m deep (Sainty & Jacobs 1981).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S Africa.

Botanical subregions: NC CC; Qld, S Afr.

Distribution Sydney area:

Select locations: CC: Cooranbong (1960), Moonee Moonee Creek, Gees Lagoon, Wheeny Creek, Marley Lagoon.

Habitat

Habitat: Creeks, lagoons.

Altitude: 0–200 m

Annual rainfall: 900–1600 mm

Typical local abundance: Frequent.

Vegetation: Semi-permanent fresh swamp e.g. with *Eleocharis sphacelata*, *Triglochin procerum*.

Substrate: Grows in shallow water usually to 1 m deep, but can tolerate up to 2 m; can grow in soft mud or heavier clays or in poorer soils with nutrient input e.g. dams (Sainty & Jacobs 1981).

Exposure: Full sun.

Conservation

Conservation: Naturalised in a wide range of perennial water bodies on the coast.

***Nymphaea mexicana* * and hybrids**

NYMPHAEACEAE

Life history

Growth form: Perennial aquatic herb with floating leaves and vertical rhizomes to 30 cm long, 4 cm thick. Stolons produced at the top of the rhizome.

Vegetative spread: Stolons or small plants produced at the end of stolons may break off and establish elsewhere (Sainty & Jacobs 1981).

Longevity:

Primary juvenile period:

Flowers: Yellow, November–February.

Fruit/seed: Berry with large dark brown seeds though rarely form in NSW (Sainty & Jacobs 1981).

Dispersal, establishment & growth:

Fire response: Unlikely to be burnt.

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to America.

Botanical subregions: CC; Qld, Amer.

Distribution Sydney area: Suburban ponds.

Select locations: CC: Eastlakes, Lane Cove, Lake Parramatta, Centennial Park.

Habitat

Habitat: Deep lagoons, dams or slow-flowing creeks (Sainty & Jacobs 1981).

Altitude: 0–20 m **Annual rainfall:** 1000–1200 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Can grow in water 2 m deep or more, encouraged by high nutrient input (Sainty & Jacobs 1981).

Exposure: Full sun.

Conservation

Conservation: Mainly cultivated but naturalised and spreading in some coastal areas.

Care needed to prevent establishment in water bodies with high nutrient input (Sainty & Jacobs 1981).

Ochna serrulata* **OCHNACEAE****Life history**

Growth form: Shrub 2–3 m high, with conspicuous lenticels on stems and branches; leaves with toothed margins.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Yellow, August.

Fruit/seed: Cluster of black fleshy fruits 5–8 mm long, embedded on the swollen red top of flower stalk, November.

Dispersal, establishment & growth: Diaspore: fruit, dispersed by birds and animals. Vertebrate-adapted dispersal (Westoby et al. 1990). Fruit reported from pellets of Currawongs (Buchanan 1989a).

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove and Narrabeen; secondary juvenile period less than 2 years (P. Kubiak pers. comm.).

Interaction with other organisms: Flowers visited by native bee and small weevils (Curculionidae) (P. Kubiak pers. comm.).

Distribution

Status/origin: Exotic, native to S Africa. Introduced as ornamental.

Botanical subregions: CC NC.

Distribution Sydney area: Widespread in suburban areas.

Select locations: CC: Gosford, Eastwood, Northbridge, Bradleys Head, Campbelltown, Wollongong.

Habitat

Habitat: Urban bushland.

Altitude: 0–200 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland e.g. with *Eucalyptus piperita*.

Substrate: Sandy soil on sandstone, low nutrients, well-drained.

Exposure: Mid to light shade.

Conservation

Conservation: Garden escape, frequently naturalised in urban bushland. Difficult to remove as it can resprout from a deep taproot; even removal of small plants is tricky because the taproot usually has a twisted section and easily breaks off.

Olax stricta**OLACACEAE****Life history**

Growth form: Erect shrub to 2 m high with yellowish-green leaves; hemiparasitic on the roots of other plants e.g. adheres to roots of any host plant within range by a large, soft, whitish cushion that may almost envelope the smaller roots of the host plant, absorbing organic and inorganic materials (McLuckie & McKee 1954).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White to yellowish, flowers throughout the year but with peak in September. Probably pollinated by honeybees and native bees, with wasps playing a minor role (P. Kubiak pers. comm.).

Fruit/seed: Fleshy, 4–8 mm long

Dispersal, establishment & growth:

Fire response: Stems killed, resprouts at base or below (Fox 1988); secondary juvenile period 3.5 years at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms: Possibly eaten by rabbits (P. Kubiak pers. comm.).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Kulnura, Woy Woy, Glenorie, Berkshire Park, Hornsby, Wahroonga, Waterfall, Manly, Bulli Pass, Springwood. CT: Rylstone, Yetholme, Mt Victoria, Hill Top, Robertson, Bundanoon.

Habitat

Habitat: Rocky ridges and hillsides.

Altitude: 0–1000 m **Annual rainfall:** 900–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland e.g. with *Eucalyptus haemastoma*, *Corymbia gummifera*, *Angophora hispida*; heath e.g. with *Banksia ericifolia*, *B. oblongifolia*, *Acacia suaveolens*, *Grevillea buxifolia*, *Lambertia formosa*.

Substrate: Shallow sandy soil on sandstone, often with ironstone gravel or sandy soil over clay subsoil, low nutrients.

Exposure: Full sun.

Conservation

Conservation: Occurs in major national parks e.g. Brisbane Water NP, Blue Mountains NP, Ku-ring-gai NP, Royal NP.

Ligustrum lucidum* **OLEACEAE**

Large-leaved Privet

Life history

Growth form: Shrub or small tree to 10 m high, with conspicuous lenticels on the stem; leaves opposite.

Vegetative spread: No.

Longevity: 50–100 years.

Primary juvenile period:

Flowers: White flowers strongly scented, January–February. Probably pollinated by honeybees mainly, also flies and beetles, with moths and butterflies playing a minor role (P. Kubiak pers. comm.).

Fruit/seed: Blue-black globose berry 8 mm long, May–August.

Dispersal, establishment & growth: Diaspore: fruit, vertebrate-adapted for dispersal (Westoby et al. 1990). Fruit reported from pellets of Currawongs (Buchanan 1989a). Seed germinates well at 15°C, poor germination above 20°C and below 10°C in shady conditions (M. Clarke pers. comm.).

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove, flowering in 3 years (P. Kubiak pers. comm.).

Interaction with other organisms: Can cause allergic reactions in humans (Bass 1990). Fruit eaten by Grey-headed Flying Fox *Pteropus poliocephalus* (Eby 1995). Fruit and leaves may be poisonous to small children and stock (Harden 1992).

Distribution

Status/origin: Exotic, native to China and Japan.

Botanical subregions: NC CC SC ST NWS CWS SWS; Qld.

Distribution Sydney area: Widespread.

Select locations: CC: Beecroft, Naremburn, Oatley, Casula, Douglas Park, Cobbity, Picton, Minnamurra Falls, Berry. CT: Robertson

Habitat

Habitat: Moist nutrient-rich sites on creekbanks, gullies, downslope of stormwater drains.

Altitude: 0–600 m **Annual rainfall:** 700–1600 mm

Typical local abundance: Occasional–frequent.

Vegetation: Rainforest e.g. with *Doryphora sassafras*; open-forest e.g. riverine forest.

Substrate: Clay soils on basalt, alluvium, high nutrients.

Exposure: Light shade.

Conservation

Conservation: Aggressive bushland weed forming dense stands, out-competing native vegetation e.g. on creekbanks; can occur in relatively undisturbed bushland.

Ligustrum sinense* **OLEACEAE**

Small-leaved Privet

Life history

Growth form: Shrub to 3 m high, with conspicuous lenticels on the stems. New growth pubescent; leaves opposite.

Vegetative spread: Very limited; can sucker from roots if main stems destroyed. Buried root segments can re-establish (Mowatt & Smith 1983).

Longevity: 50–100 years.

Primary juvenile period:

Flowers: White flowers strongly scented, September–January. Honeybees are probably the main pollinators, beetles and flies probably also significant, with butterflies and moths playing a minor role; *Ligustrum sinense* probably attracts a greater diversity of native insects than other weeds in Sydney bushland (P. Kubiak pers. comm.).

Fruit/seed: Black berry 5 mm long, May–September.

Dispersal, establishment & growth: Diaspore: fruit, vertebrate-adapted for dispersal (Westoby et al. 1990). Fruit reported from pellets of Currawongs (Buchanan 1989a). Almost all seed is viable but will not germinate until removed from the fruit; seed viability for at least 2 years if stored at low temperatures; seed killed during composting when temperatures c. 60° for several weeks (Mowatt & Smith 1983). Seed germinates well 15–25°C, in shady conditions (M. Clarke pers. comm.). Seedlings establish in low light conditions under adult plants forming dense thickets.

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove and Narrabeen; secondary juvenile period 2.5 years (P. Kubiak pers. comm.).

Interaction with other organisms: Can cause allergic reactions in humans (Bass 1990). Fruit eaten by Grey-headed Flying Fox *Pteropus poliocephalus* (Eby 1995). Seedlings apparently eaten by rabbits; fruit eaten by Crimson Rosellas *Platycercus elegans*, King Parrots *Alisterus scapularis*, Red Whiskered Bulbul *Pycnonotus jocosus*, and Silveryeyes *Zosterops lateralis* (P. Kubiak pers. comm.).

Distribution

Status/origin: Exotic, native to China. Introduced as ornamental and widely grown for hedges.

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

Distribution Sydney area: Widespread.

Select locations: CC: Lisarow, Matcham, Hornsby, Eastwood, Northbridge, Wallacia, Bass Hill, Glenfield, Douglas Park, Campbelltown, Kangaroo Valley. CT: Lithgow, Blackheath, Robertson.

Habitat

Habitat: Creeks, gullies.

Altitude: 0–1000 m **Annual rainfall:** 800–1600 mm

Typical local abundance: Frequent.

Vegetation: Open-forest e.g. with *Angophora floribunda*, *Eucalyptus saligna*, *E. pilularis*, *E. piperita*.

Substrate: Clay soils on shale, volcanic rocks, sandy alluvium, high nutrients. Can grow in drier sites than *L. lucidum* (Mowatt & Smith 1983).

Exposure: Mid-shade to full shade.

Conservation

Conservation: A major weed of bushland, commonly naturalised in northern Sydney suburbs by 1950s and spreading since then in moist gullies receiving enriched runoff.

Notelaea longifolia forma *intermedia*

OLEACEAE

Large Mock-olive, Large-leaved Olive

Life history

Growth form: Tree to 9 m high, with hairy leaves, stems and buds; characters intermediate between *Notelaea longifolia* and *N. microcarpa*.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Creamish-green, November–March.

Fruit/seed: Bluish black fleshy fruit 10–16 mm long, with one seed.

Dispersal, establishment & growth: Diaspore: fruit, bird-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CWS.

Distribution Sydney area: Coastal.

Select locations: CC: Wattagan SF, Bellbird Hill, Campbelltown, Razorback, Bomaderry Creek.

Habitat

Habitat:

Altitude: 0–400 m

Annual rainfall: 700–1200 mm

Typical local abundance: Occasional.

Vegetation: Moist eucalypt forest e.g. with *Acacia elata*, *Eucalyptus saligna*; dry forest e.g. with *Eucalyptus tereticornis*, *Alphitonia excelsa*, *Brachychiton populneus*.

Substrate: Clay soil on shale and sandstones, medium nutrients, well-drained.

Exposure:

Conservation

Conservation: Conservation status unknown.

Notelaea longifolia forma *longifolia*

OLEACEAE

Large Mock-olive, Large-leaved Olive

Life history

Growth form: Tree to 9 m high, usually with conspicuous white lenticels; most parts of plant hairy. Two forms recognised in Sydney area forma *longifolia*, forma *intermedia*. The primary root system is replaced by a positively geotropic lignotuber at an early age (Lacey & Jahnke 1984).

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Creamish green, April–July.

Fruit/seed: Bluish black fleshy fruit 10–16 mm long, with one seed. Mature December. 1065–1095 fruit per kilogram, 3820 seeds per kilogram (Floyd 1989).

Dispersal, establishment & growth: Diaspore: fruit, bird-dispersed, e.g. Currawongs (Wallace 1997). Not viable after storage at room temperature for 1 year; germination occurs after removal of pulp (Floyd 1989). The primary root is short-lived, adventitious roots are produced from the lignotuber at an early stage, and new plants can be grown from segments of the lignotuber (Lacey & Jahnke 1984).

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove; secondary juvenile period less than 2 years (P. Kubiak pers. comm.).

Interaction with other organisms: Fruit eaten by Brown Cuckoo-dove (Floyd 1989).

Food plant of butterfly Eastern Flat *Netrocoryne repandra repandra* (Common & Waterhouse 1982).

Distribution**Status/origin:** Native.**Botanical subregions:** NC CC SC CT ST CWS.**Distribution Sydney area:** Widespread.**Select locations:** CC: Kincumber, Cowan, Beecroft, North Head, Kurnell, Liverpool, Kowmung River, Bomaderry. CT: Wingello SF.**Habitat****Habitat:****Altitude:** 0–600 m**Annual rainfall:** 700–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Rainforest e.g. with *Doryphora sassafras*, *Ceratopetalum apetalum*; eucalypt open-forest e.g. with *Angophora costata*, *Eucalyptus botryoides*, *E. paniculata*, *E. piperita*, *E. maculata*, *Angophora floribunda*.**Substrate:** Clay soils on volcanic necks, limestone, alluvium, medium nutrients.**Exposure:****Conservation****Conservation:** Widespread and probably adequately conserved.***Notelaea neglecta*****OLEACEAE****Life history****Growth form:** Shrub to 2 m high or small tree, branchlets finely hairy to glabrous, axillary buds finely hairy.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow, spring.**Fruit/seed:** Fleshy fruit 5–6 mm long.**Dispersal, establishment & growth:** Diaspore: fruit**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT ST.**Distribution Sydney area:** Bungonia Gorge to Capertee.**Select locations:** CT: Capertee, Jenolan Caves, Colong–Yerranderie, Bullio, Wombeyan Caves, Tallong.**Habitat****Habitat:** Open-forest.**Altitude:** 600–1000 m**Annual rainfall:** 600–1100 mm**Typical local abundance:** Occasional.**Vegetation:** Eucalypt forest**Substrate:** Limestone or occasionally sandstone.**Exposure:****Conservation****Conservation:** May be uncommon, last collected 1969. Conservation status not known.

Notelaea ovata

OLEACEAE

Life history**Growth form:** Shrub to 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pale yellow, May–November.**Fruit/seed:** Purplish-black fleshy fruit 8–12 mm long, mature autumn (L. Parkinson pers. comm.).**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:** Resprouts.**Interaction with other organisms:** Readily grazed by horses.**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CWS; Qld.**Distribution Sydney area:** Mainly coastal.**Select locations:** CC: Morisset, Lindfield, Nielson Park, Oatley, Earlwood, Abbotsford, Silverdale, Yerranderie, Austinmer, Bargo River.**Habitat****Habitat:** Open-forest.**Altitude:** 0–100 m**Annual rainfall:** 900–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Open-forest e.g. with *Angophora costata*, *Eucalyptus piperita*, *E. fibrosa*, *E. crebra*.**Substrate:** Sandy soil over sandstone though often with clay-influence, low–medium nutrients.**Exposure:****Conservation****Conservation:** Conservation status unknown.**Notelaea venosa**

OLEACEAE

Veined Mock-olive, Smooth Mock-olive

Life history**Growth form:** Shrub or small tree to 6 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow or greenish-white, spring–summer.**Fruit/seed:** Purple to blackish fleshy fruit 15–20 mm long, at any time.**Dispersal, establishment & growth:** Diaspore: fruit, vertebrate-adapted for dispersal (Westoby et al. 1990).**Fire response:****Interaction with other organisms:** Fruit eaten by Wonga Pigeon (Floyd 1989).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT ST CWS; Qld, Vic.**Distribution Sydney area:** Widespread.**Select locations:** CC: Mt Warrawolong, Bilpin, Wondabyne, Springwood, Bulli, Wollongong, Bass Point, Albion Park, Cambewarra Range. CT: Mt Darcy, Mt Wilson, Wentworth Falls, Kanangra, Hill Top, Robertson, Wingello SF.**Habitat****Habitat:** Deep gullies, along creeks.**Altitude:** 0–1000 m**Annual rainfall:** 900–1600 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Rainforest e.g. with *Ceratopetalum apetalum*, *Doryphora sassafras*; rainforest margins, moist open-forest e.g. with *Eucalyptus pilularis*, *Syncarpia glomulifera*, *Eucalyptus smithii*.**Substrate:** Clay soils on basalt, shale, gravelly alluvium.**Exposure:** Full shade to mid-shade.**Conservation****Conservation:** Conservation status unknown.

***Olea europaea* subsp. *africana* ***

OLEACEAE

Common Olive

Life history

Growth form: Much-branched tree 2–15 m high; lower surface of leaves green or yellowish brown.

Vegetative spread: No.

Longevity: Probably more than 100 years.

Primary juvenile period:

Flowers: Greenish white or cream, November–December.

Fruit/seed: Fleshy fruit 15–25 mm long, green turning black at maturity.

Dispersal, establishment & growth: Diaspore: fruit, vertebrate-adapted dispersal (Westoby et al. 1990). Fruit reported from pellets of Currawongs (Buchanan 1989a). Seedlings establish under isolated trees used by birds. Seedlings established under parent trees.

Fire response: Probably resprouts, though seedlings may be killed.

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Africa and Asia, introduced as ornamental.

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

Distribution Sydney area: Cumberland Plain.

Select locations: CC: Croydon (1893), St Marys, Coogee, Cambelltown, Camden, Razorback, Elderslie.

Habitat

Habitat: Dry hillsides.

Altitude: 0–300 m

Annual rainfall: 700–1400 mm

Typical local abundance: Frequent–dominant.

Vegetation: Dry rainforest and grassy woodland e.g. *Eucalyptus moluccana*, *E. tereticornis*, *E. crebra*.

Substrate: Clay soil on Wianamatta Shale, particularly withy alkaline influence.

Exposure: Full sun to mid shade.

Conservation

Conservation: Major woody weed in dry rainforest and grassy woodland remnants in western Sydney, particularly in Campbelltown–Camden area on shale soils, forming dense thickets and crowding out other species. Isolated trees form focus for introduction by birds. Noted as a serious weed in 1960s, probably originally spreading from hedge plantings.

Epilobium billardierianum* subsp. *billardierianum

ONAGRACEAE

Life history**Growth form:** Erect stoloniferous perennial herb to 1 m high, with toothed leaves 6–18 mm wide.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Purplish pink or white, January–May.**Fruit/seed:** Hairy capsule 3–7.5 mm long, with hairy seeds 1 mm long.**Dispersal, establishment & growth:** Diaspore adapted for wind-dispersal (McIntyre et al. 1995).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC CT; Vic., Tas., S.A.**Distribution Sydney area:** Coast south from Botany Bay.**Select locations:** CC: Botany, Lady Robinsons Beach, La Perouse, Kurnell.**Habitat****Habitat:** Clifflines.**Altitude:** 0–50 m**Annual rainfall:** 1200–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Coastal herbland e.g. with *Samolus repens*, *Baumea juncea*.**Substrate:** Moist sandy soils, low nutrients.**Exposure:****Conservation****Conservation:** Conservation status unknown, northern geographical limit is Botany.***Epilobium billardierianum* subsp. *cinereum***

ONAGRACEAE

Life history**Growth form:** Erect stoloniferous perennial herb to 1 m high, with toothed leaves 6–18 mm wide.**Vegetative spread:** Yes (McIntyre et al. 1995).**Longevity:****Primary juvenile period:****Flowers:** Purplish pink or white, peaks February–March and November–December.**Fruit/seed:** Hairy capsule 3–7.5 mm long, with hairy seeds 1 mm long, February–March, November–December.**Dispersal, establishment & growth:** Diaspore adapted for wind-dispersal (McIntyre et al. 1995).**Fire response:** Resprouted after high intensity fire (1/94) at Lane Cove; secondary juvenile period less than 3 months (P. Kubiak pers. comm.).**Interaction with other organisms:** Foodplant for larvae of Grapevine Moth *Phalaenoides glyciniae* (Common 1990).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS SWP; LHI, Qld, Vic., Tas., S.A., W.A., N.Z.**Distribution Sydney area:** Widespread but mainly Tablelands.**Select locations:** CC: Hornsby, Carlingford, Bundeena, Campbelltown, Bulli, Albion Park.**CT:** Winburndale, Ilford, Bathurst, Mt Victoria, Mt Werong, Moss Vale, Abercrombie Caves, Wombeyan Caves, Wingello.**Habitat****Habitat:** Hillsides, gullies, creekflats.**Altitude:** 0–1000 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Occasional.**Vegetation:** Open-forest e.g. with *Eucalyptus fastigata*, *E. viminalis*; woodland e.g. with *Eucalyptus macrorhyncha*, *E. bridgesiana*, *E. pauciflora*, *E. stellulata*.**Substrate:** Clay soils on basalt, shale, Devonian sediments, granite, medium–high nutrients.**Exposure:****Conservation****Conservation:** Probably adequately conserved.

Epilobium billardierianum* subsp. *hydrophilum

ONAGRACEAE

Life history**Growth form:** Erect stoloniferous perennial to 1 m high.**Vegetative spread:** Yes (McIntyre et al. 1995).**Longevity:****Primary juvenile period:****Flowers:** Purplish pink or white. January.**Fruit/seed:** Hairy capsule 3–7.5 mm long, with hairy seeds 1 mm long.**Dispersal, establishment & growth:** Diaspore adapted for wind-dispersal (McIntyre et al. 1995).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC NT CT ST; Qld, Vic., Tas.**Distribution Sydney area:** Tablelands.**Select locations:** CT: Orange, Sunny Corner, Mt Wilson, Jenolan SF, Wombeyan Caves.**Habitat****Habitat:** Moist sites, creekbanks.**Altitude:** 600–1000 m **Annual rainfall:** 800–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Open-forest e.g. with *Eucalyptus radiata*, *E. ovata*.**Substrate:** Moist soil on Permian sediments, sometimes in running water**Exposure:****Conservation****Conservation:** Conservation status unknown though habitat is vulnerable to weed invasion.***Epilobium ciliatum* ***

ONAGRACEAE

Life history**Growth form:** Erect herb to 2 m high**Vegetative spread:** Leafy rosettes at base of stem produce their own root systems.**Longevity:** Perennial but often behaves as an annual, relying on abundant seed (Preston 1988).**Primary juvenile period:** 5.5 weeks (Preston 1988).**Flowers:** Purplish pink or white, self-pollinated (Preston 1988).**Fruit/seed:** Capsule 4–8 cm long, with numerous seeds 1 mm long. Seeds with tuft of hairs; can retain viability for several years (Preston 1988).**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed (Preston 1988).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America. A weed in nurseries (Herb. note).**Botanical subregions:** CC CT ST; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:****Select locations:** CC: Ermington, Royal Botanic Gardens, Glenfield. CT: Mittagong.**Habitat****Habitat:** Plant nurseries and propagation areas.**Altitude:** 0–600 m **Annual rainfall:** 800–1200 mm**Typical local abundance:** Frequent.**Vegetation:****Substrate:** Nursery and potting media.**Exposure:****Conservation****Conservation:** Naturalised in Sydney by 1930s (Preston 1988) as a weed in nurseries but does not appear naturalised into bushland; all records relate to horticultural situations.

Epilobium gunnianum**ONAGRACEAE****Life history**

Growth form: Erect perennial herb to 80 cm high.

Vegetative spread: Stoloniferous.

Longevity:

Primary juvenile period:

Flowers: Purplish pink, pale pink or white, January–April.

Fruit/seed: Capsule 3.5–7.5 cm long, with numerous seeds about 1 mm long, February–April.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Tablelands.

Select locations: CC: Cambewarra, Saddleback Mountain. CT: Mt Vincent, Clarence, Winburndale NR, Boyd Plateau, Wingcarribee Swamp, Tallong.

Habitat

Habitat: Creekbanks, swampy areas.

Altitude: 480–1200 m

Annual rainfall: 700–1600 mm

Typical local abundance: Occasional.

Vegetation: Woodlands e.g. with *Eucalyptus radiata*, *E. mannifera*, *E. viminalis*, *E. pauciflora*, *E. dalrympleana*, *E. stellulata*; sedgeland e.g. with *Sphagnum*, *Geranium neglectum*, *Baloskion australe* (*Restio australis*).

Substrate: Peaty soil, moist or water up to 10 cm deep, clay soil on basalt, medium nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Epilobium hirtigerum**ONAGRACEAE****Life history**

Growth form: Robust, hairy perennial herb to more than 1 m high, often greyish.

Vegetative spread: Stoloniferous spread?

Longevity:

Primary juvenile period:

Flowers: Purplish pink, or white, November–February.

Fruit/seed: Hairy capsule 3.5–6 cm long, with numerous hairy seeds about 1 mm long, November–April.

Dispersal, establishment & growth: Diaspore adapted for wind-dispersal (McIntyre et al. 1995).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Gosford, Castle Hill, Cheltenham, Toongabbie, Glenbrook, Elderslie, Loftus, Appin, Seven Mile Beach. CT: Ilford, Blackmans Flat, Mt Victoria, Jenolan Caves, Kowmung Creek.

Habitat

Habitat: Creeks, swamps, sometimes disturbed sites.

Altitude: 0–1000 m

Annual rainfall: 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland e.g. with *Eucalyptus resinifera*, *E. capitellata*, *E. dalrympleana*, *E. viminalis*, *E. macrorhyncha*.

Substrate: Clay soils on shale, alluvium, medium nutrients.

Exposure:

Conservation

Conservation: A native species able to cope with disturbed sites. Conservation status unknown.

Epilobium pallidiflorum

ONAGRACEAE

Life history**Growth form:** Erect, perennial herb to more than 1 m high.**Vegetative spread:** Stoloniferous.**Longevity:****Primary juvenile period:****Flowers:** Purplish pink, or white, February–April.**Fruit/seed:** Hairy capsule 6.5–9.5 cm long, with numerous hairy seeds about 1 mm long, April.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC CT ST; Vic., Tas., S.A., N.Z.**Distribution Sydney area:** Localised.**Select locations:** CC: Pagewood (1965–70). CT: Wingecarribee Swamp.**Habitat****Habitat:** Swamp margins.**Altitude:** 0–800 m**Annual rainfall:** 1200–1600 mm**Typical local abundance:** Frequent.**Vegetation:** Montane swamp e.g. with *Carex*, *Juncus*, *Phragmites australis*.**Substrate:** Peaty or sandy soils, sometimes in standing water to 15 cm deep, low to high nutrients.**Exposure:****Conservation****Conservation:** Sydney region is northern geographical limit, conservation status unknown.

Probably extinct at Pagewood, reported from Wingecarribee Swamp in 1992.

***Gaura lindheimeri* ***

ONAGRACEAE

Life history**Growth form:** Much branched perennial herb to 1.5 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, becoming reddish or yellow.**Fruit/seed:** Indehiscent, woody, nut-like, 6–8 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to America.**Botanical subregions:** CC CT; S.A.**Distribution Sydney area:** Camden district (Harden 1991).**Select locations:****Habitat****Habitat:****Altitude:** 0–300 m**Annual rainfall:** 700 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Occasional garden escape, not invasive of bushland.

Ludwigia peploides subsp. *montevidensis*

ONAGRACEAE

Water Primrose

Life history

Growth form: Prostrate, often hairy perennial aquatic herb with creeping or floating stems to 4 m long, rooting at the nodes.

Vegetative spread: Creeping or floating stems root at nodes attached to soil or hanging in water (Sainty & Jacobs 1981).

Longevity: Indefinite, dies back in winter.

Primary juvenile period:

Flowers: Yellow, November–March, peak January.

Fruit/seed: Capsule 1–3 cm long, with numerous seeds 1 mm diam., January.

Dispersal, establishment & growth: Diaspore: seed and stem fragments, dispersed by water. Growth in summer.

Fire response:

Interaction with other organisms: Seeds a food source for water birds (Sainty & Jacobs 1988).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NWS CWS SWS NWP SWP NFWP; Qld, Vic., S.A., N.Z., S Amer.

Distribution Sydney area: Coast and Western Sydney.

Select locations: CC: Narara, Centennial Park, Richmond (1804), Doonside, Glenfield, Regentville, Mount Annan, Dapto, Nowra.

Habitat

Habitat: Edges of lakes and streams, common in permanent water.

Altitude: 0–50 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Open-water with *Eleocharis sphacelata*, *Paspalum distichum*, *Pericaria strigosa*.

Substrate: Creeping on mud or floating, able to survive dry conditions, medium–high nutrients. Water table mostly high–permanently high.

Exposure: Not in shade.

Conservation

Conservation: Conserved in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Ludwigia peruviana *

ONAGRACEAE

Life history

Growth form: Hairy shrub to 3 m high, sometimes with pneumatophores arising from submerged or buried roots. Deciduous in winter in Sydney, with regrowth in spring; has a woody taproot with shallow laterals (Parsons & Cuthbertson 1992).

Vegetative spread: By layering of stems (C. Williams pers. comm.)

Longevity:

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

Flowers: Yellow, November–April.

Fruit/seed: Erect capsule 1–2 cm long, with numerous small seeds, mature February–October.

Dispersal, establishment & growth: Diaspore: seed. Seeds germinate readily in spring, in drying mud at edges of streams and swamps, on mats of floating vegetation, and in mud in shallow water (Parsons & Cuthbertson 1992).

Fire response: Resprouted after high intensity fire (1/94) at Narrabeen; secondary juvenile period 5 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America. Probably introduced to Australia as a garden ornamental in ponds (Parsons & Cuthbertson 1992).

Botanical subregions: CC.

Distribution Sydney area: Widespread on coast.

Select locations: CC: Gosford (1984), Oxford Falls (1993), Frenchs Forest (1986), Manly Vale (1971), Little Bay (1999), Eastlakes (1971), Woronora River (1982), Heathcote Creek (1983), Smiths Creek Campbelltown (1991).

Habitat

Habitat: Creekbanks, swampy lake margins, still or slow-flowing water.

Altitude: 0–200 m

Annual rainfall: 200–1400 mm

Typical local abundance: Frequent–dominant.

Vegetation: Riparian vegetation, generally disturbed e.g. with *Ligustrum sinense*, *Ageratina adenophora*, *Lantana camara*.

Substrate: Sandy alluvium, poorly drained, low–high nutrients.

Exposure:

Conservation

Conservation: First reported established in Botany Swamps–Eastlakes (1971) and has since spread to waterways north and south of Sydney, particularly nutrient-enriched creeks. Has the potential to spread to all Australian waterways, dominating wetlands and displacing native flora and fauna (Parsons & Cuthbertson 1992). Killed by chemical spraying, followed by burning; resprouts from swollen root after ‘cut and paint’ method (C. Williams pers. comm.).

Oenothera affinis* **ONAGRACEAE****Life history**

Growth form: Erect annual herb to 150 cm high.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, becoming reddish, March.

Fruit/seed: A capsule 2–4 cm long, with numerous seeds.

Dispersal, establishment & growth: Prolific seeder and germinator, vegetative reproducer, dispersed by gravity or water (Anon 1991).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America.

Botanical subregions: NC CC SC NWS CWS NWP; Qld, S.A., W.A.

Distribution Sydney area:

Select locations: CC: Kangy Angy (1970), Wondabyne (1922), Richmond (1970), Rockdale (1902).

Habitat

Habitat: River edges, roadsides, disturbed areas.

Altitude: 0–100 m

Annual rainfall: 700–1200 mm

Typical local abundance:

Vegetation: Margins of forest e.g. with *Syncarpia glomulifera*, *Eucalyptus saligna*.

Substrate: Clay soil, medium nutrients.

Exposure: Full sun.

Conservation

Conservation: Widely cultivated and naturalised.

***Oenothera drummondii* ***

ONAGRACEAE

Life history**Growth form:** Perennial herb to 60 cm high, with a basal rosette and strong taproot.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow.**Fruit/seed:** Densely hairy capsule 3–5 cm long, with numerous seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America.**Botanical subregions:** NC CC SC; LHI, Qld.**Distribution Sydney area:****Select locations:** CC: Woollooware Bay (1980), Marayong (1969).**Habitat****Habitat:****Altitude:** 0–100 m**Annual rainfall:** 700–1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Naturalised, chiefly north of Sydney.***Oenothera glazioviana* ***

ONAGRACEAE

Life history**Growth form:** Usually biennial to 100 cm high.**Vegetative spread:****Longevity:** 2 years.**Primary juvenile period:** Less than 2 years.**Flowers:** Yellow, becoming reddish.**Fruit/seed:** Capsule 2–3 cm long, with numerous seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, probably native to N America. Widely cultivated and naturalised.**Botanical subregions:** NC CC SC NT CT ST NWS CWS; Qld, Vic., Tas.**Distribution Sydney area:****Select locations:** CC: Collaroy, Neutral Bay, Arncliffe, Blaxland. CT: Perthville, Hampton, Katoomba, Wentworth Falls.**Habitat****Habitat:** Roadsides, railways, beaches.**Altitude:** 0–1000 m**Annual rainfall:** 600–1200 mm**Typical local abundance:** Rare–abundant.**Vegetation:****Substrate:** Sandy soils on sandstone, beach sand, low nutrients.**Exposure:** Full sun.**Conservation****Conservation:** Minor weed of disturbed places.

***Oenothera indecora* subsp. *bonariensis* ***

ONAGRACEAE

Life history**Growth form:** Erect annual herb to 60 cm high, hybridizes with *O. stricta*.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow, becoming reddish, October–January.**Fruit/seed:** Hairy capsule 2–3 cm long, with numerous seeds, November–December.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to S America.**Botanical subregions:** NC CC NWS CWS NWP; Qld, W.A.**Distribution Sydney area:** Mainly coastal suburbs.**Select locations:** CC: Ourimbah, Patonga Beach, Windsor, Narrabeen, Balgowlah, Eastlakes, La Perouse, Sans Souci, Menangle Park, Campbelltown.**Habitat****Habitat:** Roadsides, beaches, disturbed sites.**Altitude:** 0–50 m **Annual rainfall:** 700–1400 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Lawns, grassy verges.**Substrate:** Sandy soil, low nutrients.**Exposure:****Conservation****Conservation:** A minor weed of disturbed sites.***Oenothera longiflora* ***

ONAGRACEAE

Life history**Growth form:** Annual or biennial herb to 1 m high, with basal rosette.**Vegetative spread:****Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** Yellow, becoming dark red, October–April.**Fruit/seed:** Capsule 3–4 cm long, with numerous seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** Flowers after being eaten by cattle (Herb. note).**Distribution****Status/origin:** Exotic, native to S America.**Botanical subregions:** NC CC SWS.**Distribution Sydney area:** Mainly Albion Park–Minnamurra.**Select locations:** CC: Menangle (1893), Albion Park, Minnamurra River.**Habitat****Habitat:** Creekbanks.**Altitude:** 0–200 m **Annual rainfall:** 800–1400 mm**Typical local abundance:** Frequent.**Vegetation:****Substrate:** Sandy alluvial soil, medium nutrients.**Exposure:****Conservation****Conservation:**

Oenothera mollissima* **ONAGRACEAE****Life history**

Growth form: Annual herb to 1 m high; stems often woody.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period: Less than one year.

Flowers: Yellow, becoming reddish, August–May.

Fruit/seed: Hairy capsule 25 mm long, with numerous seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America.

Botanical subregions: NC CC NWS NWP; Qld.

Distribution Sydney area:

Select locations: CC: St Huberts Island, Woy Woy (1969), Windsor, Mosman, Centennial Park, East Lakes, La Perouse, Minnamurra River.

Habitat

Habitat: Roadsides, footpaths.

Altitude: 0–100 m

Annual rainfall: 700–1200 mm

Typical local abundance: Frequent–occasional.

Vegetation:

Substrate: Sandy soil.

Exposure:

Conservation

Conservation: Naturalised in disturbed sites. Possibly spreading.

Oenothera rosea* **ONAGRACEAE****Life history**

Growth form: Perennial shrub to 60 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Deep pink, November.

Fruit/seed: Hairy, ribbed capsule 5–7 mm long, with numerous seeds, mature November.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to America.

Botanical subregions: CC NT NWS; Qld, Vic.

Distribution Sydney area:

Select locations: CC: Windsor (1955), Killara (1994), Grose Vale (1910).

Habitat

Habitat: River edges.

Altitude: 0–200 m

Annual rainfall: 900–1400 mm

Typical local abundance:

Vegetation: Roadside weeds including *Plantago lanceolata*.

Substrate:

Exposure:

Conservation

Conservation: Widely cultivated and occasionally naturalised. Earliest Sydney area record is for Gose Vale (1910) where it had been 'found on roadside for last 18 years..... gardens not far away but no sign of it spreading from any garden.' Subsequent records suggest it has not spread much. The Windsor and Killara sites may be separate introductions from gardens.

Oenothera speciosa* **ONAGRACEAE****Life history****Growth form:** Annual or perennial subshrub or herb to 50 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pink or white.**Fruit/seed:** Hairy, ribbed capsule 10–15 mm long, with numerous seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America.**Botanical subregions:** CC CWS NWP SWP; Vic.**Distribution Sydney area:** Penrith.**Select locations:** CC: Regentville, Penrith (1951).**Habitat****Habitat:****Altitude:** 0–200 m**Annual rainfall:** 800 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Local population, probably garden escape rather than thoroughly naturalised (Herb. note).***Oenothera stricta* *****ONAGRACEAE****Life history****Growth form:** Erect herb to 1 m high. Hybridizes with *O. indecora*.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** Yellow, becoming reddish, October–June.**Fruit/seed:** Capsule 3–4 cm long, with numerous seeds, mature January–April.**Dispersal, establishment & growth:** No particular morphology for dispersal (McIntyre et al. 1995).**Fire response:****Interaction with other organisms:** Roots eaten by Sulphur-crested Cockatoo *Cacatua galerita*, seed eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).**Distribution****Status/origin:** Exotic, native to Chile and Argentina. Cultivated, sometimes naturalised.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** CC: Wyong, Narrabeen Lake, Emu Plains, La Perouse, Bankstown, Casula. CT: Orange, Bathurst, Wentworth Falls, Medlow Bath, Jenolan Caves, Tallong.**Habitat****Habitat:** Roadsides, drains, disturbed sites.**Altitude:** 0–1000 m**Annual rainfall:** 700–1400 mm**Typical local abundance:** Frequent.**Vegetation:** Roadside sites e.g. with *Verbena bonariensis*, *Persicaria prostrata*, *Geranium* sp.**Substrate:** Mostly sandy soils, but also on basalt.**Exposure:****Conservation****Conservation:** Widely naturalised but appears to be confined to disturbed sites.

Oenothera tetraptera* **ONAGRACEAE****Life history**

Growth form: Perennial herb 15–50 cm high, with basal rosette.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White or pink.

Fruit/seed: Hairy, ribbed capsule 10–15 mm long, with numerous seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to tropical America. Cultivated and occasionally naturalised.

Botanical subregions: NC CC NT CWS; Qld.

Distribution Sydney area: Grose Vale.

Select locations: CC: Grose Vale (1910) only record.

Habitat

Habitat:

Altitude: 200 m

Annual rainfall: 900 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Mainly recorded further north. Only one record for Sydney area, Grose Vale (1910). Current status unknown.

Oxalis articulata* **OXALIDACEAE****Life history**

Growth form: Herb with very short stem and woody rhizome 10 cm long; no bulb or bulbils.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pink or purple, March–December, peak October.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America. Introduced as a garden plant.

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

Distribution Sydney area: Widespread.

Select locations: CC: Lisarow, Parramatta, Coogee, Austinmer, Kangaroo Valley.

CT: Wentworth Falls, Orange, Bathurst, Hampton, Oberon, Mittagong, Yerranderie.

Habitat

Habitat: Roadsides, cemeteries, footpaths.

Altitude: 0–1000 m

Annual rainfall: 600–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassy areas.

Substrate: Clay soils.

Exposure:

Conservation

Conservation: Garden escape, local minor weed in disturbed open areas.

Oxalis bifurca* **OXALIDACEAE****Life history**

Growth form: Herb with very short stem; bulbs to 3 cm long, bulbils formed in old bulbs.

Vegetative spread: By bulbils.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Pink to mauve, March–April.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth: Diaspore: bulb, dispersed in soil or garden refuse.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S Africa. Introduced as a garden plant.

Botanical subregions: CC.

Distribution Sydney area:

Select locations: CC: Campbelltown (1955–1994).

Habitat

Habitat: Cemetery.

Altitude: 0–100 m

Annual rainfall: 700–800 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Clay soil on Wianamatta Shale.

Exposure:

Conservation

Conservation: Recorded only from St Peters Church of England Cemetery at Campbelltown where it was probably originally planted and has persisted since at least 1955.

Oxalis bowiei* **OXALIDACEAE****Life history**

Growth form: Herb with almost no stem; tapered bulb 1.5–4 cm long.

Vegetative spread: Spread by bulbils.

Longevity:

Primary juvenile period:

Flowers: Light pink with greenish yellow at base.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native of S Africa. Introduced as ornamental.

Botanical subregions: CC CWS SWS SWP; S.A.

Distribution Sydney area:

Select locations: CC: Eastwood, Mount Druitt, Campbelltown.

Habitat

Habitat: Cemetery, gardens.

Altitude: 0–200 m

Annual rainfall: 700–1200 mm

Typical local abundance: Occasional.

Vegetation: Disturbed woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*.

Substrate: Clay soils on shale, well-drained.

Exposure: Mid-shade.

Conservation

Conservation: A garden weed, persisting where planted or dumped but not truly naturalised.

Oxalis chnoodes**OXALIDACEAE****Life history**

Growth form: Herb with decumbent or creeping branches to 40 cm long; roots fibrous, no bulbs.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, September–April, peak November.

Fruit/seed: Capsule usually held above leaves, with ribbed seeds, mature September–May.

Dispersal, establishment & growth: Diaspore: seed, ballistic dispersal (Westoby et al. 1990).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT ST NWS CWS NWP SWP NFWP SFWP; Qld, Vic., N.G. & Bismark Archipelago.

Distribution Sydney area:

Select locations: CC: Avoca Beach, Penrith, Razorback Mountain, Werrong Beach, Otford, Five Islands, Albion Park. CT: Barbers Creek.

Habitat

Habitat:

Altitude: 0–800 m

Annual rainfall: 700–1400 mm

Typical local abundance: Occasional.

Vegetation: Rainforest, moist forest e.g. with *Eucalyptus pilularis*, *Syncarpia glomulifera*.

Substrate: Clay soils of shale, high–medium nutrients, also rocky slopes and screes.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999).

Oxalis corniculata* **OXALIDACEAE**

Creeping Oxalis

Life history

Growth form: Prostrate herb with branches sometimes creeping to 30 cm long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, August–June, peak September.

Fruit/seed: Slender capsule 8–16 mm long, with ribbed seeds, mature August–June, peak September.

Dispersal, establishment & growth: Diaspore: seed. Dispersed in mud on cars (Wace 1977).

Fire response: Regrowth and suckers from rootstocks and lateral roots, seedlings recorded less than 1 year after fire (Purdie 1977), produced flowers after 10 weeks after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms: Butterfly larvae *Lucia limbaria* usually feed on the plant during the day, attended by numerous small black ants, *Iridomyrmex* species, which excavate tunnels 5–6 cm deep in the soil at the base of the plant (Common & Waterhouse 1981).

Distribution

Status/origin: Exotic, probably native to Europe, cosmopolitan weed.

Botanical subregions: CC CT; Qld, Vic., Tas., N.T., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: CC: Kincumber, Blaxland, Hornsby, Penrith, Lane Cove, Balmain, Maroubra, Campbelltown, Stanwell Park, Shellharbour, Bomaderry. CT: Orange, Blackheath, Cambewarra Lookout, Mittagong, Penrose.

Habitat

Habitat: Gardens, parks, footpaths, lawns.

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent.

Vegetation: Lawns, gardens, with introduced species.

Substrate: Sandy soils to clay soils.

Exposure: Full sun.

Conservation

Conservation: Weed, commonly naturalised in and around populated areas, often in gardens and parks.

Oxalis debilis* var. *corymbosa* **OXALIDACEAE****Life history**

Growth form: Herb, with reduced stem not easily seen; bulbs 1–3 cm long, with sessile bulbils formed from old bulbils.

Vegetative spread: By bulbils.

Longevity:

Primary juvenile period:

Flowers: Pink, August–May.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth: Diaspore: bulbils, remain dormant for long periods, withstanding extremes of drought and cold; seed not produced (Chancellor 1980).

Fire response: Probably resprouts. Flowered within 5 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America. Introduced as ornamental.

Botanical subregions: NC CC SC; Qld, Vic., N.T., S.A., W.A.

Distribution Sydney area: Sydney suburbs.

Select locations: CC: Beecroft, Northbridge, Summer Hill, Burwood, Government House (1902), Centennial Park, Picnic Point, Campbelltown, Balmain.

Habitat

Habitat: Gardens, roadsides.

Altitude: 0–200 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation:

Substrate:

Exposure: Full sun.

Conservation

Conservation: A common garden weed, sometimes found in disturbed sites such as roadsides. Digging spreads bulblets, which should be burnt (Chancellor 1980).

Oxalis exilis**OXALIDACEAE****Life history**

Growth form: Procumbent tufted herb, with ascending or creeping branches to 35 cm long; no bulbs.

Vegetative spread: Possibly rooting at nodes (Herb. specimen).

Longevity:

Primary juvenile period:

Flowers: Yellow, October–May.

Fruit/seed: Capsule usually held above leaves, with ribbed seeds, mature October–May.

Dispersal, establishment & growth: Dispersal: ballistic (Westoby et al. 1990), no particular morphology for dispersal (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; Vic., Tas., N.I., N Cal., N.Z.

Distribution Sydney area: Widespread.

Select locations: CC: Ourimbah, Cromer, Pymble, Lane Cove, Ashfield, Loftus, Kincumber, Nowra. CT: Orange, Blackheath, Abercrombie Caves, Yerranderie, Burradoo, Penrose.

Habitat

Habitat: Disturbed sites, bushland, gardens.

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland e.g. with *Eucalyptus sclerophylla*; open-forest e.g. with *Eucalyptus paniculata*, *E. saligna* as well as grassland and garden beds.

Substrate: Sandy soils to clay soils.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Oxalis incarnata* **OXALIDACEAE****Life history**

Growth form: Erect herb 5–25 cm high, with rhizome 3–8 cm long and bulbs 1.5 cm long; bulbils form in leaf axils and on rhizome.

Vegetative spread: Yes

Longevity:

Primary juvenile period:

Flowers: White, pale mauve, or pale pinkish purple and greenish at base, September–April, peak October.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth: Diaspore: bulbils, spread in soil or garden refuse.

Fire response: Probably resprouted after high intensity fire (1/94) at Lane Cove, flowering in 4 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S Africa. Probably introduced as ornamental.

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

Distribution Sydney area: Mainly coastal.

Select locations: CC: Hornsby, Beecroft, Cheltenham, Campbelltown, Austinmer, Yallah (1927). CT: Mittagong.

Habitat

Habitat: Roadsides, gardens, creeks.

Altitude: 0–600 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Occasional.

Vegetation: Weedy vegetation e.g. with *Lantana camara*, *Ligustrum lucidum*, *Lonicera japonica*, *Tradescantia fluminensis*.

Substrate: Moist sites on sandy soils.

Exposure: Mid-shade.

Conservation

Conservation: Weed of gardens and roadsides.

Oxalis latifolia* **OXALIDACEAE****Life history**

Growth form: Herb, with reduced stem not easily seen; bulbs 1.5 cm long, bulbils formed from old bulbs on stolons 0.5–4 cm long.

Vegetative spread: Colonies increase in size and density from bulbils (Parsons & Cuthbertson 1992).

Longevity:

Primary juvenile period:

Flowers: Pink to purple, with white at base, December–June, peak April.

Fruit/seed: Fruit not developed in Australia (Harden 1992).

Dispersal, establishment & growth: Diaspore: bulb, spread by soil movement and by dumping of garden refuse. Bulbs produce leaves and stolons in autumn, and a thick carrot-like main taproot at the base of the bulb; after 6–8 weeks bulbils form at the base of the old bulb; flower stems are produced after 15–16 weeks (Parsons & Cuthbertson 1992).

Fire response: Possibly resprouts. Flowered within 2 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms: Control is difficult; regular and frequent defoliation by mowing or use of chemicals is more effective at bulb exhaustion stage before bulbils are mature enough to survive (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Exotic, native to Mexico. Introduced as ornamental.

Botanical subregions: NC CC CT NWS SWS; Vic., Tas., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: CC: Wahroonga, Turramurra, Strathfield, Hurstville, Campbelltown.

CT: Orange, Lawson, Fitzroy Falls.

Habitat

Habitat: Gardens, roadsides and disturbed areas.

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent.

Vegetation: Mainly in gardens.

Substrate: Garden soils on clay and basalt.

Exposure:

Conservation

Conservation: A weed of gardens, rarely reported from bushland, and then clumped and apparently dumped.

Oxalis perennans**OXALIDACEAE****Life history**

Growth form: Herb, sometimes creeping to 25 cm long, stout taproot; no bulbils.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, March to December.

Fruit/seed: Capsule usually held above the leaves, with ribbed seeds, mature at any time of year, peak November.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Gibber Swamp, Longneck Lagoon, Castlereagh NR, Hornsby, Long Reef, Lane Cove, Watsons Bay, Homebush, East Hills, Kurnell, Engadine, Silverdale, Razorback Mountain, Seven Mile Beach. CT: Blackheath, Orange, Katoomba, Cambewarra.

Habitat

Habitat: Disturbed sites, lawns, remnant bushland.

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland e.g. with *Eucalyptus crebra*, *E. fibrosa*, *E. sclerophylla*; seacliffs with *Lomandra longifolia*.

Substrate: Clay soils on shale, Tertiary alluvium. Also rocky sites and sand dunes.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Oxalis pes-caprae* **OXALIDACEAE**

Soursob

Life history

Growth form: Rhizomatous herb, with bulbs and bulbils, stem only developed when the plant is crowded or shaded.

Vegetative spread: By rhizome, bulb and bulbils.

Longevity:

Primary juvenile period:

Flowers: Yellow, May–November, peak August–September.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth: Diaspore: bulb or bulbil, spread by soil movement or dumping of garden refuse, and through nursery trade. Birds are responsible for some spread when they eat bulbs; shoots can emerge from bulbs buried up to 60 cm deep (Parsons & Cuthbertson 1992).

Fire response: Probably resprouted and flowered within 7 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers comm.).

Interaction with other organisms: Bulbils eaten by Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990). Control more effective at bulb exhaustion stage; poisonous to sheep and cattle over time as oxalic acid content causes an accumulation of precipitates in brain and kidney tissue (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Exotic, native to S Africa. Introduced as ornamental in Adelaide Botanic Gardens in 1841 (Parsons & Cuthbertson 1992).

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

Distribution Sydney area: Sydney suburbs.

Select locations: CC: Lisarow, Cheltenham, Government House (1902), Glenfield, Ermington, Belmore, Liverpool, Tamarama.

Habitat

Habitat: Gardens, roadsides.

Altitude: 0–100 m **Annual rainfall:** 900–1400 mm

Typical local abundance: Frequent.

Vegetation: Gardens.

Substrate:

Exposure: Full sun.

Conservation

Conservation: Weed of gardens and roadsides. Rarely invades undisturbed plant communities (Parsons & Cuthbertson 1992). A more significant weed in South Australia (B. Briggs pers. comm.).

Oxalis purpurea* **OXALIDACEAE****Life history**

Growth form: Herb with very short stem; rhizome to 15 cm long and bulbs 1–3.5 cm long.

Vegetative spread: By rhizome.

Longevity:

Primary juvenile period:

Flowers: Pink–purple.

Fruit/seed: Fruit not known in Australia (Harden 1992).

Dispersal, establishment & growth: Diaspore: bulb, dispersed by soil movement and dumping of garden refuse.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S Africa. Introduced as ornamental.

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

Distribution Sydney area:

Select locations: CC: Hornsby, Cheltenham, North Head, Oatley, Audley, Warrimoo, Albion Park.

Habitat

Habitat: Roadsides, cemeteries, lawns.

Altitude: 0–300 m **Annual rainfall:** 900–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation:

Substrate: Sandy and clay soils.

Exposure:

Conservation

Conservation: Occasional weed of grassy areas, not aggressive.

Oxalis radicata**OXALIDACEAE****Life history**

Growth form: Herb with erect, ascending, or creeping hairy branches to 30 cm long. Sometimes has a stout woody taproot.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, September–April.

Fruit/seed: Erect capsule 7–20 mm long, with ribbed seeds, mature October–November.

Dispersal, establishment & growth: No particular morphology for dispersal (McIntyre et al. 1995). V. Klapake (Herb. note 1991) suggested that it was possibly being spread about by grading machinery.

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., S.A., Afr., Asia, Pac Is.

Distribution Sydney area: Widespread.

Select locations: CC: Pitt Town, Casula, Eastlakes, Loftus. CT: Blackheath, Jenolan Caves, Mittagong.

Habitat

Habitat:

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Occasional.

Vegetation: Floodplain forest e.g. with *Eucalyptus baueriana*, *E. botryoides*, *Angophora floribunda*; woodland e.g. with *Eucalyptus crebra*, *E. fibrosa*, *E. tereticornis*; open grassy areas.

Substrate: Sandy soil on alluvium.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Oxalis rubens**OXALIDACEAE****Life history**

Growth form: Herb with erect or ascending branches to 35 cm long; roots fibrous, no bulbils.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Yellow, November–February.

Fruit/seed: Erect hairy capsule 15–18 mm long, with ribbed seeds, mature November–April.

Dispersal, establishment & growth: Disperse: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; LHI, Qld, Vic., S.A., N.Z.

Distribution Sydney area: Mainly along coastline.

Select locations: CC: Lane Cove, Eastlakes, Maroubra, Long Bay, Breakfast Creek, Glenbrook, Five Islands, Windang Island, Minnamurra River.

Habitat

Habitat: Islands, headlands, sand dunes, steep gully slopes.

Altitude: 0–100 m **Annual rainfall:** 900–1400 mm

Typical local abundance: Occasional.

Vegetation: Rocky headlands e.g. with *Melaleuca nodosa*, *Melaleuca armillaris*, *Westringia fruticosa*.

Substrate: Sandy soils on sandstone.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Oxalis thompsoniae**OXALIDACEAE****Life history**

Growth form: Prostrate or decumbent creeping herb with slender taproot to 4.5 mm diam. (Conn & Richards 1994).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, November–March.

Fruit/seed: Erect hairy capsule 5.5–16 mm long, arranged in group of three, with dark purple- brown seeds, mature at any time.

Dispersal, establishment & growth: Readily colonises disturbed areas.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native with close affinities to native species of this region but occurs in disturbed sites similar to many cosmopolitan species (Conn & Richards 1994).

Botanical subregions: NC CC SC CT ST NWS CWS NWP; Vic., S.A., N.Z.

Distribution Sydney area: Widespread.

Select locations: CC: Kincumber, Windsor, Lane Cove, Casula, Maroubra, Campbelltown, Waterfall, Bomaderry. CT: Bathurst, Orange, Mittagong, Penrose.

Habitat

Habitat: Disturbed areas e.g. gardens, lawns, parklands, footpaths, around stockyards and farm buildings.

Altitude: 0–900 m **Annual rainfall:** 600–1400 mm

Typical local abundance: Frequent.

Vegetation: Disturbed heath, woodland and grassland in damp areas or on margins of these communities.

Substrate: Sandy soils from sandstone to heavy, clay-rich soils from shale or slate. Low to high nutrients.

Exposure: Full sun.

Conservation

Conservation: Locally common in disturbed areas, not regarded as endangered (Conn & Richards 1994).

Argemone ochroleuca* subsp. *ochroleuca* **PAPAVERACEAE**

Mexican Poppy

Life history

Growth form: Erect, glaucous, several-stemmed prickly herb to 1.5 m high, with yellow sap (Parsons & Cuthbertson 1992).

Vegetative spread: No (Parsons & Cuthbertson 1992).

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Creamy white to yellow, summer.

Fruit/seed: Spiny capsule 2–4 cm long, with numerous seeds.

Dispersal, establishment & growth: Disperse: seed. Seeds dormant when shed, germinating after a few weeks to several months at any time of year if moisture is available; a rosette is formed during winter, flowering stems in spring, with flowering during summer (Parsons & Cuthbertson 1992).

Fire response: Probably killed.

Interaction with other organisms: Toxic to animals including humans and birds; contamination of food or cooking oil by seed or Argemone oil is believed to cause dropsy and glaucoma in humans (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Exotic, native to America. Weed of cultivation.

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

Distribution Sydney area: Widespread.

Select locations: CC: Hornsby, Cheltenham, Faulconbridge, Nepean & Warragambi Rivers (1886), Campbelltown, Thirlmere, Shellharbour. CT: Rockley.

Habitat

Habitat: Waste areas, roadsides, railways, paddocks.

Altitude: 0–1000 m

Annual rainfall: 700–1400 mm

Typical local abundance:

Vegetation:

Substrate: Sandy alluvium. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Widespread weed of cultivation.

Eschscholzia californica* **PAPAVERACEAE**

Californian Poppy

Life history

Growth form: Erect annual herb to 50 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow to bright orange, October–March.

Fruit/seed: Capsule 6–9 cm long, with numerous seeds.

Dispersal, establishment & growth:

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to America. Introduced as ornamental.

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

Distribution Sydney area:

Select locations: CC: Richmond (1902), Campbelltown. CT: Lithgow, Mount Victoria, Medlow Bath.

Habitat**Habitat:** Railway embankments, wasteland.**Altitude:** 0–1000 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Frequent.**Vegetation:****Substrate:** Embankments.**Exposure:** Full sun.**Conservation****Conservation:** Widely cultivated, sometimes naturalised. Minor weed.***Papaver aculeatum*****PAPAVERACEAE**

Native Poppy

Life history**Growth form:** Erect annual herb to 40 cm high.**Vegetative spread:** No.**Longevity:** Less than 1 year.**Primary juvenile period:****Flowers:** Red.**Fruit/seed:** Capsule 15 mm long, with numerous seeds, December.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Doubtfully native. Widespread weed in cultivation and native plant communities (Harden 1990).**Botanical subregions:** NC CC ST NWS CWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., S Afr.**Distribution Sydney area:****Select locations:** CC: Lower Budgong.**Habitat****Habitat:** Riverbank.**Altitude:** 0–50 m**Annual rainfall:** 1200 mm**Typical local abundance:****Vegetation:****Substrate:** Sandy alluvium.**Exposure:****Conservation****Conservation:** Only one record for Sydney area at Lower Budgong, north-west of Nowra, recorded in 1939. Conservation status unknown.

***Papaver dubium* ***

PAPAVERACEAE

Longhead Poppy

Life history**Growth form:** Herb to 1 m high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Red, October–December, flowers last 1 day before being shed (A. N. Rodd Herb. specimen).**Fruit/seed:** Cylindrical–oblong capsule 15–25 mm long, with numerous seeds, probably wind- gravity-dispersed, October–December.**Dispersal, establishment & growth:** Diaspore: seed, probably wind- gravity-dispersed.**Fire response:** Probably killed.**Interaction with other organisms:** Suspected of poisoning stock (Cunningham et al. 1981).**Distribution****Status/origin:** Exotic, native to Europe.**Botanical subregions:** CC NT CT ST NWP SWP NFWP SFWP; S.A.**Distribution Sydney area:** Widespread.**Select locations:** CC: Glebe, Casula. CT: Orange, Moss Vale.**Habitat****Habitat:** Roadsides, railways.**Altitude:** 0–1000 m**Annual rainfall:** 700–1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Widespread, common minor weed.***Papaver hybridum* ***

PAPAVERACEAE

Rough Poppy

Life history**Growth form:** Erect annual hairy herb to 50 cm high, with milky sap.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Crimson with a purplish blotch at base of petals, October–November.**Fruit/seed:** Ribbed capsule with bristles; seeds numerous, October–November.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:** Rarely eaten by stock due to offensive odour and taste but reported to cause disorders in stock when large quantities consumed in hay (Cunningham et al. 1981).**Distribution****Status/origin:** Exotic, native to Europe.**Botanical subregions:** NC CC SC CT ST NWS SWS NWP SWP NFWP SFWP; Vic., N.T., S.A., W.A.**Distribution Sydney area:****Select locations:** CC: Putty (1902), Richmond, Chatswood, Flemington, Cooks River, Yellow Rock.**Habitat****Habitat:** Gardens, roadsides, saleyards, waste areas.**Altitude:** 0–1000 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Frequent–occasional.**Vegetation:****Substrate:** Clay soils on shale, basalt.**Exposure:** Full sun.**Conservation****Conservation:** Widespread minor weed.

Papaver somniferum* subsp. *setigerum* **PAPAVERACEAE**

Opium Poppy

Life history

Growth form: Glaucous annual herb to about 1 m high. Robust hollow stem; taproot with many branching laterals (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 12 months.

Primary juvenile period: 6–8 months.

Flowers: Pink with a purple spot at the base of the petals, October–November.

Fruit/seed: Roundish dehiscent capsule usually less than 2 cm diam., with numerous minute seeds, released from pores, November–December.

Dispersal, establishment & growth: Diaspore: seed, dispersed short distance by gravity, wind and water, or long distance in mud sticking to animals or machinery; germinates in autumn and early winter, producing a rosette of leaves; stems are produced in early spring and flowers in October and November, with flowering continuing while moisture is available; plants die in autumn (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms: Potentially toxic to stock if grazed in large quantities (Cunningham et al. 1981). Source of many drugs used in medicine; weed control by prevention of seeding — potential biological control with curculionid weevils, a root parasite and fungus (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Exotic, native to Asia and Europe. Cultivated as an ornamental.

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

Distribution Sydney area: Widespread.

Select locations: CC: Peats Ridge, Parramatta, Leichhardt, Ingleburn, Campbelltown, Douglas Park. CT: Orange, Wallerawang, Moss Vale.

Habitat

Habitat: Roadsides, embankments, riverbanks.

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: With weeds of disturbance, pasture grasses.

Substrate: Sandy alluvium, disturbed rock, rubble and subsoil.

Exposure: Full sun.

Conservation

Conservation: Weed of cultivation.

Papaver somniferum* subsp. *somniferum* **PAPAVERACEAE**

Opium Poppy

Life history

Growth form: Glaucous annual herb to about 1 m high. Robust stem hollow; taproot with many branching laterals (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Pink with a purple spot at the base, November–December.

Fruit/seed: Indehiscent capsule to 5 cm diam., with numerous minute seeds.

Dispersal, establishment & growth: Diaspore: seed, dispersed short distance by gravity, wind and water, or long distance in mud sticking to animals or machinery; germinates in autumn and early winter, producing a rosette of leaves; stems are produced in early spring and flowers in October and November, with flowering continuing while moisture is available; plants die in autumn (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms: Source of many drugs used in medicine (Parsons & Cuthbertson 1992) and 'poppy seed'.

Distribution

Status/origin: Exotic, native to Asia and Europe. Cultivated as an ornamental.

Botanical subregions: CC ST NWS CWS.

Distribution Sydney area:

Select locations: CC: Yarramundi, Parramatta, Everleigh, Cobbity, Macquarie Pass.

Habitat

Habitat: Roadsides, railways, disturbed sites.

Altitude: 0–200 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Clay soils.

Exposure:

Conservation

Conservation: Rare weed of cultivation, occasionally naturalised. Controlled by prevention of seeding — potential biological control with curculionid weevils, a root parasite and fungus (Parsons & Cuthbertson 1992).

Passiflora caerulea* **PASSIFLORACEAE**

Blue Passionflower

Life history

Growth form: Glabrous climber, with mostly 5-lobed leaves and axillary tendrils. A vigorous climber with long wiry stems and leathery leaves (Jones & Gray 1988).

Vegetative spread: By climbing stems.

Longevity:

Primary juvenile period:

Flowers: Greenish white and bluish or purplish, December.

Fruit/seed: Yellow to orange berry 6 cm long.

Dispersal, establishment & growth: Diaspore: fruit. Grows easily from cuttings (Jones & Gray 1988), possibly dispersed from dumped prunings.

Fire response:

Interaction with other organisms: Sometimes used as rootstock for commercial selections (Jones & Gray 1988).

Distribution

Status/origin: Exotic, native to Brazil. Sometimes cultivated as an ornamental.

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

Distribution Sydney area: Sporadic.

Select locations: CC: Wongawilli (West Dapto), Epping. CT: Leura (1923).

	Habitat
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Habitat: Disturbed sites.	
Altitude: 0–1000 m	Annual rainfall: 1100–1600 mm
Typical local abundance: Rare.	
Vegetation: Disturbed rainforest	
Substrate: Clay soils on shale, medium nutrients.	
Exposure: Tolerant of frosts (Jones & Gray 1988).	
	Conservation
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Conservation: Occasionally naturalised in disturbed sites.	

Passiflora cinnabarina**PASSIFLORACEAE**

Red Passionflower

Life history

Growth form: Slender glabrous climber with leaves usually 3-lobed, and axillary tendrils.
Vegetative spread: By climbing stems.
Longevity:
Primary juvenile period:
Flowers: Red, greenish on underside of petals, August–January.
Fruit/seed: Greenish-grey berry 2 cm long, December–January.
Dispersal, establishment & growth: Diaspore: fruit. Germination from fresh seed; cuttings strike readily (Jones & Gray 1988).
Fire response:
Interaction with other organisms: Fruit of native Passionfruit species eaten by Grey-headed Flying Fox *Pteropus poliocephalus* (Eby 1995).

Distribution

Status/origin: Native.
Botanical subregions: CC SC NT CT ST CWS SWS; Vic.
Distribution Sydney area: Mainly Illawarra and Upper Blue Mountains.
Select locations: CC: Yerranderie, Macquarie Pass, Cambewarra Mountain, Kangaroo Valley, Minnamurra Falls. CT: Mt Pomany, Mt Tomah, Jenolan Caves.

Habitat

Habitat: Coast and ranges.	
Altitude: 0–1000 m	Annual rainfall: 900–1600 mm
Typical local abundance: Occasional.	
Vegetation: Open-forest e.g. with <i>Eucalyptus fastigata</i> , <i>E. blaxlandii</i> , <i>E. radiata</i> , <i>E. punctata</i> , <i>E. sieberi</i> .	
Substrate: Edge of basalt areas, medium-nutrient soils, well-drained.	
Exposure: Partial sun, tolerant of frosts (Jones & Gray 1988).	
	Conservation
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Conservation: Relatively rare species, conservation status unknown.	

Passiflora edulis* **PASSIFLORACEAE**

Common Passionfruit

Life history**Growth form:** Glabrous climber with axillary tendrils; leaves usually deeply 3-lobed.**Vegetative spread:** By climbing stems.**Longevity:****Primary juvenile period:** Fruited in 2.8 years after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).**Flowers:** White, tinged with purple.**Fruit/seed:** Purple berry 3–4 cm diam., with edible pulp.**Dispersal, establishment & growth:** Diaspore: fleshy fruit, vertebrate-adapted for dispersal (Westoby et al. 1990).**Fire response:** Probably killed.**Interaction with other organisms:** Foodplant of Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989,1990). Bug ?Scolypopa australis (Ricanidae) seen on the stem (P. Kubiak pers. comm.). Food plant of butterfly larvae *Acraea andromacha andromacha* (Common & Waterhouse 1981).**Distribution****Status/origin:** Exotic, native to America. Widely cultivated for edible fruit.**Botanical subregions:** NC CC; Qld, N.G., Pac Is.**Distribution Sydney area:** Coastal.**Select locations:** CC: Wyong, Pymble, Cheltenham, Casula, Otford, Wollongong, Kangaroo Valley.**Habitat****Habitat:** Margins of rainforest, moist gullies, or other areas with high rainfall.**Altitude:** 0–200 m **Annual rainfall:** 1200–1600 mm**Typical local abundance:** Occasional.**Vegetation:** Moist forest e.g. with *Eucalyptus saligna*.**Substrate:** Clay soils on shale, basalt, medium to high nutrients.**Exposure:** Full sun to medium shade. Tolerant of frost (Jones & Gray 1988).**Conservation****Conservation:** Locally naturalised in moist forest.***Passiflora filamentosa* *****PASSIFLORACEAE****Life history****Growth form:** Slender trailer with hairy stems and axillary tendrils; leaves sometimes hairy, mostly 5-lobed.**Vegetative spread:** By trailing stems.**Longevity:****Primary juvenile period:****Flowers:** Greenish white, banded with blue, November–March.**Fruit/seed:** Berry 4 cm long, does not set seed in Australia (Harden 1990).**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to America.**Botanical subregions:** CC NWS SWP.**Distribution Sydney area:****Select locations:** CC: Camden (1965–1983).**Habitat****Habitat:** Cemetery.**Altitude:** 0–100 m **Annual rainfall:** 700 mm**Typical local abundance:** Frequent.**Vegetation:** Graves and non-mown areas.**Substrate:** Clay soil on shale.**Exposure:****Conservation****Conservation:** Reported naturalised at Camden cemetery 1965–1983. Potential to spread elsewhere unknown.

Passiflora herbertiana* subsp. *herbertiana**PASSIFLORACEAE**

Native Passionfruit

Life history**Growth form:** Climber with hairy leaves and axillary tendrils.**Vegetative spread:** By climbing stems.**Longevity:** A few years (Jones & Gray 1988).**Primary juvenile period:****Flowers:** Yellow to orange, all year, peak July–September.**Fruit/seed:** Green spotted berry 5 cm long. Ripens sporadically (Jones & Gray 1988).**Dispersal, establishment & growth:** Diaspore: fruit. Germination of fresh seed; cuttings strike readily (Jones & Gray 1988).**Fire response:** Probably resprouted after high intensity fire (1/94) at Lane Cove; secondary juvenile period less than 2.5 years (P. Kubiak pers. comm.).**Interaction with other organisms:** Fruit of native Passionfruit species eaten by Grey-headed Flying Fox *Pteropus poliocephalus* (Eby 1995). Honeybees feed on nectar; small black ants feed on petiolar glands near base of leaf (P. Kubiak pers. comm.). Extensive plant in Royal Botanic Gardens virtually defoliated by black caterpillars 3 cm long on 6/1/86.**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT; Qld.**Distribution Sydney area:** Coast, adjacent plateaus, lower Blue Mountains.**Select locations:** CC: Wyong, Gosford, Wisemans Ferry, Kurrajong, Wheeny Creek, Bilpin, Cheltenham, Nortons Basin, Razorback, Douglas Park, Otford.**Habitat****Habitat:** Moist forest on coast and ranges.**Altitude:** 0–400 m**Annual rainfall:** 700–1600 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Moist forests e.g. with *Eucalyptus pilularis*, *Syncarpia glomulifera*, *Eucalyptus saligna*, *E. deanei*, *E. acmenoides*, *E. paniculata*.**Substrate:** Sandy alluvium, medium–high nutrient soils. Good supply of water, well-drained (Jones & Gray 1988).**Exposure:** Filtered sunlight, tolerant of frost (Jones & Gray 1988).**Conservation****Conservation:** Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Passiflora mollissima* **PASSIFLORACEAE**

Banana Passionfruit

Life history**Growth form:** Climber with hairy stems and petioles, and axillary tendrils; leaves deeply 3-lobed.**Vegetative spread:** By climbing stems.**Longevity:****Primary juvenile period:****Flowers:** Pink.**Fruit/seed:** Yellow berry 7 cm long, with edible pulp.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:** Food plant of butterfly larvae *Acraea andromacha andromacha* (Common & Waterhouse 1981).**Distribution****Status/origin:** Exotic, native to Andes Mountains. Introduced as an ornamental.**Botanical subregions:** NC CC; Qld, Vic.**Distribution Sydney area:****Select locations:** CC: Kurrajong Heights, Springwood (1967), Glenfield, Mt Keira.**Habitat****Habitat:** Moist gullies.**Altitude:** 0–500 m**Annual rainfall:** 1000–1400 mm**Typical local abundance:** Frequent.**Vegetation:** Weedy areas, rainforest edges.**Substrate:** Clay soils on shales, medium nutrients.**Exposure:** Full sun to light shade.**Conservation****Conservation:** Cultivated for showy flowers and edible fruit. Rarely naturalised in NSW (Harden 1990). Naturalised in cooler parts of Victoria and NSW, clambering to tops of large trees and smothering surrounding vegetation (Jones & Gray 1988). Potential invader of native vegetation (L.McD.).***Passiflora morifolia* *****PASSIFLORACEAE****Life history****Growth form:** Twiner with scattered hairs on young stems and leaves; leaves usually 3-lobed, with axillary tendrils.**Vegetative spread:** By twining stems.**Longevity:****Primary juvenile period:****Flowers:** White, banded with purple or blue.**Fruit/seed:** Deep purple berry 2 cm diam.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to America. Introduced as ornamental.**Botanical subregions:** CC.**Distribution Sydney area:****Select locations:** CC: Milperra (1992).**Habitat****Habitat:** Near habitation.**Altitude:** 0–20 m**Annual rainfall:** 900–1000 mm**Typical local abundance:** Frequent.**Vegetation:** Floodplain forest e.g. with *Eucalyptus baueriana*.**Substrate:** Sandy alluvium, medium nutrients.**Exposure:****Conservation****Conservation:** Occasionally naturalised near habitation, weed potential unknown.

Passiflora suberosa* **PASSIFLORACEAE**

Cork Passionflower, Small Passionfruit

Life history**Growth form:** Slender vine with corky older stems and axillary tendrils; leaves usually deeply lobed.**Vegetative spread:** By climbing stems.**Longevity:****Primary juvenile period:****Flowers:** Pale greenish, February–March.**Fruit/seed:** Purple-black berry 15 mm diam., February–March.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to S America. Introduced as an ornamental.**Botanical subregions:** NC CC; Qld, N.T.**Distribution Sydney area:****Select locations:** CC: Eastwood (1966), RBG Sydney.**Habitat****Habitat:****Altitude:** 0–50 m**Annual rainfall:** 1100–1200 mm**Typical local abundance:** Rare.**Vegetation:** Garden.**Substrate:** Cultivated soil.**Exposure:****Conservation****Conservation:** Sometimes cultivated. Occasionally naturalised in gardens.***Passiflora subpeltata* *****PASSIFLORACEAE**

White Passionflower

Life history**Growth form:** Glabrous climber with axillary tendrils; leaves usually 3-lobed.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, tinged with green, November–April.**Fruit/seed:** Green berry 4 cm long; not edible.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to Brazil. Introduced as ornamental.**Botanical subregions:** NC CC SC CWS; Qld, Vic.**Distribution Sydney area:** Coast, particularly Illawarra.**Select locations:** CC: Eastwood, Ingleburn, Royal NP, Camden, Menangle, Austinmer, Otford, Mt Kembla, Jamberoo, Macquarie Pass.**Habitat****Habitat:** Disturbed moist forest sites.**Altitude:** 0–200 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Frequent.**Vegetation:** Margins of coastal rainforest and moist open-forest.**Substrate:** Clay soils on shale, medium–high nutrients.**Exposure:****Conservation****Conservation:** Weed of coastal moist forest areas, gradually spreading since early 1900s.

Peperomia blanda* var. *floribunda**PEPEROMIACEAE****Life history**

Growth form: Succulent herb to 30 cm high, erect–decumbent, rooting at nodes (Forster 1993).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, without sepals and petals.

Fruit/seed: Sticky, papillate drupe, 0.8–0.9 mm long; seeds noticeably sticky — mucilaginous substance around the papillate protuberances may aid in wide dispersal (Forster 1993).

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native. Widely distributed in Africa, India, Malesia and Melanesia (Forster 1993).

Botanical subregions: NC CC; Qld, Pac Is.

Distribution Sydney area: Coastal.

Select locations: CC: Olney SF, West Gosford, Long Island NR (L.McD.), Cowan, Neilson Park, Razorback, Albion Park.

Habitat

Habitat: Usually on rocks, or terrestrial.

Altitude: 0–300 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Occasional.

Vegetation: Dry rainforest.

Substrate: On rocks, sandstone, 'calcareous' sandstone. Can stand drier conditions than other *Peperomia* species (Forster 1993).

Exposure: Semi-shade.

Conservation

Conservation: Southern geographical limit is Albion Park but conservation status in Sydney region unknown. Well conserved in south-east Queensland (Forster 1993).

Peperomia tetraphylla**PEPEROMIACEAE****Life history**

Growth form: Succulent herb to 10 cm high, stems erect–decumbent, rooting at nodes (Forster 1993).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, without sepals and petals.

Fruit/seed: Smooth, sticky drupe 1 mm long (Forster 1993).

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native. Widely distributed in Africa, Malesia (Forster 1993).

Botanical subregions: NC CC SC ?NT CT ST; LHI, Qld, NZ, Pac; Is, Asia, Afr.

Distribution Sydney area: Mainly coast.

Select locations: CC: West Gosford, Burralow Creek, Stanwell Park, Mt Kembla, Albion Park, Minnamurra Falls, Bomaderry Creek. CT: Jenolan Caves, Kanangra.

Habitat

Habitat: On rocks, moist situations in rainforest.

Altitude: 0–1000 m **Annual rainfall:** 1100–1600 mm

Typical local abundance: Rare–occasional.

Vegetation: Wetter rainforest e.g. with *Ceratopetalum apetalum*, *Eupomatia laurina*, *Backhousia myrtifolia*.

Substrate: Moss-covered rocks, sandstone.

Exposure: Semi-shade.

Conservation

Conservation: In Eastern Australia, populations tend to be disjunct and restricted to wetter rainforest, not threatened (Forster 1993), though vulnerable to degradation of habitat by weed invasions.

Phytolacca octandra* **PHYTOLACCACEAE**

Inkweed

Life history

Growth form: Herb 1–2 m high, often woody at base, stems and inflorescences green to pinkish.

Vegetative spread:

Longevity: 1–3 years.

Primary juvenile period: 5 months.

Flowers: Green to pinkish, December–August.

Fruit/seed: 8-lobed berry 4–6 mm diam., red turning black when ripe, with 8 seeds, December–August.

Dispersal, establishment & growth: Diaspore: berry, bird-dispersed, fruit reported from pellets of Currawongs (Buchanan 1989a). Soil-stored seedbank, seeds germinate very poorly unless heated (Floyd 1966).

Fire response: Seedlings grew vigorously after high-intensity fire at Katandra 1994, fruiting 5 months after fire (L.McD.).

Interaction with other organisms: Fruits eaten by Brown Pidgeon at Berrilee (J. Howell 6.93 pers. comm.). Seeds eaten by Yellow-throated Scrubwren *Sericornis citreogularis* (Barker & Vestjens 1989,1990). Small black ants feed on nectar (P. Kubiak pers. comm.).

Distribution

Status/origin: Exotic, native to tropical America.

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

Distribution Sydney area: Widespread.

Select locations: CC: Kenthurst, Cheltenham, Mascot, Strathfield, Grose Vale, Campbelltown, Thirlmere, Austinmer, Mt Keira, Kiama, Cambewarra Range. CT: Bathurst, Mt Wilson, Kanangra, Robertson.

Habitat

Habitat: Disturbed sites, creeks.

Altitude: 0–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Disturbed sites in moist eucalypt forest and rainforest.

Substrate: Clay soils on shale, sandy alluvium, medium to high nutrients.

Exposure: Full sun to light shade.

Conservation

Conservation: Weed of disturbed sites.

Piper novae-hollandiae

PIPERACEAE

Giant Pepper Vine

Life history**Growth form:** Large glabrous climber, with adventitious roots.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Separate male and female flowers, August.**Fruit/seed:** Fleshy fruit 5 mm long, October–December.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT; Qld.**Distribution Sydney area:** Coast.**Select locations:** CC: Peats Ridge, Austinmer, Bulli Pass, Mt Keira, Albion Park, Kiama, Cambewarra,**Habitat****Habitat:** Coastal rainforest, steep slopes.**Altitude:** 0–100 m**Annual rainfall:** 1200–1600 mm**Typical local abundance:** Frequent.**Vegetation:** Dry subtropical rainforest e.g. with *Cassine australis*, *Elaeocarpus kirtonii*, *Dendrocnide excelsa*, *Diospyros australis*, *Polyscias elegans*.**Substrate:** Clay soils on basalt.**Exposure:****Conservation****Conservation:** Conservation status unknown.***Billardiera scandens* var. *scandens***

PITTOSPORACEAE

Appleberry, Snotberry, Apple Dumplings

Life history**Growth form:** Climber or scrambler with twining stems to 3 m long; leaves linear to ovate with lower surface glabrous or more or less hairy. The varieties intergrade in NSW and are sometimes difficult to identify satisfactorily.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:****Primary juvenile period:****Flowers:** Cream to greenish-yellow, most of the year, peak September–November.**Fruit/seed:** Cylindrical berry 10–40 mm long, weight about 880 mg, with about 70 seeds per fruit enclosed in mucilaginous pulp (extra data on seed & pulp characteristics in French 1991), September–May.**Dispersal, establishment & growth:** Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995), vertebrate-adapted (Westoby et al. 1990).**Fire response:** Resprouts at base or below from surviving rootstocks (Fox 1988), seedlings recorded less than 1 year after fire (Purdie 1977). Secondary juvenile period 1.9 years after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).**Interaction with other organisms:** Eaten by rabbits (P. Kubiak pers. comm.).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST CWS SWS; Qld, Vic., Tas.**Distribution Sydney area:****Select locations:** CC: Ourimbah, Wilberforce, Cheltenham, Northbridge, Balls Head, Nielsen Park, Parramatta, Liverpool, Menangle, Picton, Mt Cambewarra. CT: Rylstone, Blackheath, Mt Wilson, Jenolan Caves, Mt Werong, Fitzroy Falls, Wingello.

Habitat: Gullies, hillsides. Altitude: 0–1000 m Annual rainfall: 800–1400 mm Typical local abundance: Occasional–frequent. Vegetation: Moist open-forest e.g. with <i>Eucalyptus saligna</i> ; dry open-forest e.g. with <i>Angophora bakeri</i> , <i>Corymbia eximia</i> ; heath and scrub. Substrate: Clay soil and basalt, volcanic rocks, sandy soils on sandstone, medium to high nutrients. Exposure:	Habitat
Conservation: Widespread and probably adequately conserved.	Conservation

Billardiera scandens* var. *sericata**PITTOSPORACEAE**

Appleberry, Snotberry, Apple Dumplings

Growth form: Climber or scrambler with twining stems to 3 m long; leaves elliptic to narrow-elliptic with lower surface hairy. Vegetative spread: Longevity: Primary juvenile period: Flowers: Cream to greenish-yellow, September–November. Fruit/seed: Cylindrical berry 10–40 mm long, with seeds encased in mucilaginous pulp (extra data on seed & pulp characteristics in French 1991). Dispersal, establishment & growth: Diaspore: fruit, adapted for dispersal by ingestion (McIntyre et al. 1995), vertebrate-adapted (Westoby et al. 1990). Fire response: Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: NC CC SC; Qld. Distribution Sydney area: Select locations: CC: Castle Hill, Glenbrook, Peakhurst, Waterfall.	Distribution
Habitat: Altitude: 0–300 m Annual rainfall: 1000–1200 mm Typical local abundance: Vegetation: Scrub e.g. with <i>Leptospermum</i> . Substrate: Exposure:	Habitat
Conservation: Appears to be much rarer and limited in distribution than <i>B. scandens</i> var. <i>scandens</i> , poorly-conserved.	Conservation

Bursaria calicola (Cayzer et al. 1999)

PITTOSPORACEAE

Native Blackthorn

Life history**Growth form:** Spinescent shrub to 3 m high, erect or sprawling.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Cream, November.**Fruit/seed:** Flattened purse-like capsule 7–9 mm long, with 1–6 winged seeds

4 x 2 mm, January.

Dispersal, establishment & growth: Diaspore: seed. Germination fairly slow, 4–5 months with about 50–60% success (Cayzer et al. 1999).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT.**Distribution Sydney area:****Select locations:** CT: Wombeyan Caves, Wolgan Valley.**Habitat****Habitat:** Rocky situations.**Altitude:** 600–900 m**Annual rainfall:** 600–800 mm**Typical local abundance:****Vegetation:** Eucalypt woodland e.g. with *Brachychiton populneus*, *Acacia chalkeri*, *Bursaria spinosa*.**Substrate:** Clay soils on limestone.**Exposure:****Conservation****Conservation:** Local endemic regarded as endangered (Cayzer et al. 1999). Reported from Wombeyan Caves Reserve.**Bursaria longisepala** (Cayzer et al. 1999)

PITTOSPORACEAE

Native Blackthorn

Life history**Growth form:** Shrub, often procumbent and less than 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Creamy green sepals, white petals, January.**Fruit/seed:** Flattened purse-like capsule 5–6 mm long, with 1–3 seeds, seeds

4 x 2 mm, unevenly winged, May–June.

Dispersal, establishment & growth:**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT.**Distribution Sydney area:** Upper Blue Mountains.**Select locations:** CT: Wentworth Falls, Katoomba (Giant Staircase to Scenic Railway).**Habitat****Habitat:** South-facing sandstones, cliffs and bluffs.**Altitude:** 900–1000 m**Annual rainfall:** 1200–1400 mm**Typical local abundance:****Vegetation:** Open-forest; woodland**Substrate:** Sandy soils on sandstone.**Exposure:****Conservation****Conservation:** Regarded as local endemic restricted to Upper Blue Mountains, conservation status unknown.

Bursaria spinosa* subsp. *lasiophylla

PITTOSPORACEAE

Native Blackthorn

Life history

Growth form: Multi-stemmed shrub to 5 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White to cream.

Fruit/seed: Capsule 5–7 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT.

Distribution Sydney area: Tablelands.

Select locations: CT: Ben Bullen, Lidsdale, Jenolan, Abercrombie Caves, Moss Vale, Tallong.

Habitat

Habitat: Gullies, hillsides.

Altitude: 800–1000 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Occasional.

Vegetation: Eucalypt forest.

Substrate: Sandy soils on alluvium, granite, metamorphic rocks.

Exposure:

Conservation

Conservation: Conservation status unknown.

Bursaria spinosa subsp. **spinosa** (Cayzer et al. 1999)

PITTOSPORACEAE

Native Blackthorn

Life history

Growth form: Rigid, much-branched shrub or tree to 5–10 m high, usually with thorny branches.

Vegetative spread: No.

Longevity: Medium-long, 25–60 years.

Primary juvenile period:

Flowers: White or cream, January–August, peak January–March.

Fruit/seed: Purse-like capsule, 5–7 mm long, shedding seeds at maturity, April–May, empty by June.

Dispersal, establishment & growth: Diaspore: seed, wind-dispersed (Westoby et al. 1990). May form dense thickets on ungrazed rural land. Allan Cunningham reported that it increased in abundance on farmed land (Benson & Howell 1990). Coloniser.

Fire response: Adults resprouted from base; susceptibility of seedlings unknown. Secondary juvenile period 16 months.

Interaction with other organisms: Foodplant of moth larvae *Proselena annosana* (Common 1990), *Palaeosia bicosta* and *Ectropis subtinctaria*; *Xanthodule ombrophanes* feeds on lichens and algae often found on the branches; foodplant of butterfly larvae *Paralucia aurifera* attended by small black ants *Iridomyrmex ?nitidiceps*, *Paralucia pyrodiscus pyrodiscus* attended by small black ants *Notoncus* sp., *Paralucia spinifera* associated with small black ants in nests at base of the plant (Common & Waterhouse 1981). Only known larval host plant for Australian Jewel Beetle *Astraeus crassus* which tunnels into dead and dying branches; appears to be under-utilised by the native wood-boring beetle fauna of Australia possibly due to chemical and physical defences of the plant (Turner & Hawkeswood 1996). Cattle may graze young plants but not mature plants. Also grazed by rabbits and may have increased in abundance on Cumberland Plain after destruction of rabbits in 1950s (R. Venables pers. comm.).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread, Cumberland Plain forest and coastal estuaries.

Select locations: CC: Putty, Gosford, Mooney Mooney Creek, Pennant Hills, Doonside, Penrith, Campbelltown, Razorback, Meryla.

Habitat

Habitat: Eucalypt woodland.

Altitude: 0–1000 m **Annual rainfall:** 700–1600 mm

Typical local abundance: Frequent.

Vegetation: Dry eucalypt woodland and forest e.g. with *Eucalyptus moluccana*, *E. tereticornis*, *Themeda australis*.

Substrate: Clay soils from Wianamatta Shale and good indicator of shale areas on Cumberland Plain. May be indicator of calcareous soils. Common in volcanic necks — north Blue Mountains (R. Lembit pers. comm.). Often on non-siliceous, medium-nutrient soils.

Water table permanently low, moisture supply intermittent, fresh.

Exposure: Light shade to full sun.

Conservation

Conservation: Widespread and probably adequately conserved.

Cheiranthera cyanea var. **cyanea**

PITTOSPORACEAE

Finger Flower

Life history

Growth form: Small shrub to 50 cm high, with thick rootstock.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Blue, November–January.

Fruit/seed: Hard capsule 12–18 mm long, with numerous seeds, February.

Dispersal, establishment & growth:

Fire response: Probably resprouts.

Interaction with other organisms:

Distribution**Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST NWS CWS SWS NWP SWP NFWP; Qld, Vic.**Distribution Sydney area:** Mainly Tablelands.**Select locations:** CC: Ebenezer (1937), Kurrajong Heights (1908). CT: Rylstone, Ophir, Orange, Bathurst, Marrangaroo Creek, Abercrombie Caves, Peelwood.**Habitat****Habitat:** Disturbed sites.**Altitude:** 0–1000 m**Annual rainfall:** 600–1000 mm**Typical local abundance:** Occasional.**Vegetation:** Woodland e.g. with *Eucalyptus mannifera*, *E. macrorhyncha*.**Substrate:** Sandy or stony soils on metamorphic rocks.**Exposure:****Conservation****Conservation:** No recent collections from Kurrajong–Richmond area which is the eastern geographical limit (Harden 1992) and possibly extinct there. Conservation status elsewhere unknown.***Citriobatus pauciflorus*****PITTOSPORACEAE****Life history****Growth form:** Rigid, much-branched shrub 1–3 m high with slender spines.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, September–October.**Fruit/seed:** Indehiscent berry 4–10 mm diam., May–November.**Dispersal, establishment & growth:** Fleshy fruit vertebrate-adapted for dispersal (Westoby et al. 1990).**Fire response:****Interaction with other organisms:** Food plant of butterfly larvae *Paralucia aurifera* which is also associated with ant's nests at the base of the plant (Common & Waterhouse 1981).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ?ST CWS SWP; Qld.**Distribution Sydney area:****Select locations:** CC: Wyong, Eastwood, Peakhurst, Royal NP, Grose Vale, Albion Park, Razorback, Mount Keira, Minnamurra, Cobbity. CT: Robertson.**Habitat****Habitat:** Forest, creekbanks.**Altitude:** 0–700 m**Annual rainfall:** 700–1600 mm**Typical local abundance:****Vegetation:** Warm temperate rainforest e.g. with *Doryphora sassafras*, *Acmena smithii*; dry rainforest e.g. with *Cassine*; gully rainforest e.g. with *Ceratopetalum apetalum*, *Backhousia myrtifolia*, *Callicoma serratifolia*; moist open-forest e.g. with *Eucalyptus pilularis*, *Syncarpia glomulifera*.**Substrate:** Clay soils on shales or basalt, well-drained.**Exposure:****Conservation****Conservation:** Vulnerable in Western Sydney (James et al. 1999).

Hymenosporum flavum**PITOSPORACEAE**

Native Frangipani

Life history

Growth form: Tall shrub or small tree, rarely to 20 m high; leaves sometimes clustered and more or less whorled, 8–16 cm long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Fragrant, conspicuous, cream to yellow or reddish, partly tubular flowers, October–November.

Fruit/seed: Dry, roundish, thick-valved capsule 20–35 mm long, with numerous flat, winged seeds to 8 mm wide. Fruit mature December–April; 140 000 seeds per kilogram (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, wind-dispersed. Seed may be stored for 12–18 months at room temperature or even longer at -2°C; germination is rapid (Floyd 1989).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC NT CT CWS; Qld, N.G.

Distribution Sydney area:

Select locations: CC: Mt Yengo, Calga, Wheeny Creek, Grose Vale.

Habitat

Habitat: In or near rainforest.

Altitude: 0–700 m

Annual rainfall: 900–1400 mm

Typical local abundance: Frequent.

Vegetation: Rainforest margins; moist open-forest e.g. with *Eucalyptus tereticornis*, *E. saligna*, *Syncarpia glomulifera*.

Substrate: Clay soil on shale, basalt, sandy soils with basalt influence, medium to high nutrients.

Exposure:

Conservation

Conservation: Southern geographical limit is Grose Vale. Vulnerable in Western Sydney (James et al. 1999). Sometimes cultivated as an ornamental.

Pittosporum revolutum**PITTOSPORACEAE****Life history**

Growth form: Shrub to 3 m high; leaves alternate or clustered at the end of branches, the lower surface usually with rusty hairs.

Vegetative spread: May root-sucker vigorously to form clumps 2-3 m across.

Longevity:

Primary juvenile period:

Flowers: Tubular, yellow, September–October. Flowers visited by Honeybee *Apis mellifera* (fed on nectar) and native bee (P. Kubiak pers. comm.).

Fruit/seed: Yellow-orange capsule 12–20 mm long, thick-walled, warty, with numerous red-brown seeds.

Dispersal, establishment & growth: Diaspore: seeds, both vertebrate and ant-adapted for dispersal (Westoby et al. 1990), probably bird-dispersed.

Fire response: Stems killed and regenerate from basal sprouts. Flowering less than 2 years after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.); secondary juvenile period 3 years (Bradley 1972).

Interaction with other organisms: Host plant of Cerambycid beetle *Coptopterus thoracicus* (Hawkeswood 1993). Birds eat green fruit (L. Parkinson pers. comm.).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Glen Davis, Bilpin, Pittwater, Roseville, Eastwood, Hurstville, Cronulla, Douglas Park, Razorback, Cobbity, Shellharbour, Kangaroo Valley, Nowra. CT: Mt Victoria.

Habitat

Habitat:

Altitude: 0–1000 m

Annual rainfall: 800–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Rainforest e.g. with *Acmena smithii*, *Streblus brunonianus*; moist open-forest e.g. with *Syncarpia glomulifera*, *Angophora costata*; dry open-forest e.g. with *Eucalyptus maculata*, *E. eugenioides*, *E. fibrosa*, *E. punctata*, *E. crebra*.

Substrate: Clay soils on basalt, Narrabeen Shale, Wianamatta Shale, medium to high nutrients.

Exposure:

Conservation

Conservation: Widespread and probably adequately conserved.

Pittosporum undulatum**PITOSPORACEAE**

Native Daphne, Sweet Pittosporum

Life history

Growth form: Tall shrub or tree generally 5–10 m high, conspicuous in August–September when new foliage opens and is brilliant green against the darker green of the old leaves (Fuller & Badans 1980).

Vegetative spread: No.

Longevity: 30–40 years.

Primary juvenile period: 6–8 years.

Flowers: White to cream, August–October peak September. Honeybees probably the main diurnal pollinators (P. Kubiak pers. comm.).

Fruit/seed: Light orange to yellow-brown capsule 10–14 mm long, with numerous sticky, red-brown–orange seeds. Mature summer–autumn (L. Parkinson pers. comm.), January–February (Fuller 1980); 770 fruits and 90 000 seeds per kilogram (Floyd 1989).

Dispersal, establishment & growth: Diaspore: seed, both vertebrate and ant-adapted for dispersal (Westoby et al. 1990). Bird-dispersed (Currawongs, Indian Mynas). Pioneer species. Germination follows disturbance or possibly fire, though may establish in areas unburnt for at least 20 years (at Mosman). Young seedlings conspicuous in deep decomposing leaf litter, or under adults. Germination of fresh seed begins after 48 days with final germination of 23% after 50 days (Floyd 1989).

Fire response: Generally killed though may resprout after low intensity fire. Re-establish from bird-introduced seed. Indicator of areas not frequently burnt.

Interaction with other organisms: Fruit eaten by Grey-headed Flying Fox *Pteropus poliocephalus* (Eby 1995). Fruit reported from pellets of Currawongs (Buchanan 1989a). Foodplant of Red Whiskered Bulbul (Barker & Vestjens 1989,1990), Crimson Rosella and Silvereye (Floyd 1989). Female longicorn beetle *Strongylurus thoracicus* deposits eggs in bark of branch which usually dries out and breaks at the point weakened by the boring of the larvae; pupation usually occurs further into the trunk or lower branches, adults emerging in December (Hawkeswood 1987). Attacked by sap sucking insects, white and pink wax type (Hadlington & Johnston 1977). Host plant of Cerambycid beetle *Coptopterus thoracicus* (Hawkeswood 1993). Leaves, especially new shoots, eaten by caterpillars of *Lamprolina* sp. (J. Howell pers. comm.). Larvae of two small miner flies *Phytobia* species (Agromyzidae) form galls on leaves and stems (Hering 1962). Bark contains a dye (Floyd 1989).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast and mountains.

Select locations: CC: Howes Valley, Calga, Bilpin, Glen Davis, Barrenjoey, Dee Why, Mosman, Denistone, Campbelltown, Wollongong, Albion Park, Jamberoo, Bomaderry. CT: Mt Wilson, Katoomba, Rylstone, Oberon, Mt Werong, Blackheath, Jenolan Caves.

Habitat

Habitat: Moist forest and sheltered gullies.

Altitude: 0–1000 m **Annual rainfall:** 900–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Rainforest e.g. with *Doryphora sassafras* and vine scrub; moist open-forest e.g. with *Eucalyptus pilularis*–*E. paniculata*–*E. saligna* (North Shore High Forest of Benson & Howell 1990); *E. quadrangulata*–*Syncarpia glomulifera*–*E. smithii*–*E. fastigata* (in Illawarra).

Substrate: On clay or shale-derived soil, granite, alluvium, basalt; young plants also found on dry sandstone particularly at infrequently burnt urban bushland reserves.

Exposure: Sheltered, mid-shade to light shade.

Conservation

Conservation: Widespread species occurring naturally in Sydney area in moist forest but spreading in urban bushland in absence of fires and increase in bird-dispersers; often dominating unburnt urban bushland edges. Becoming a weed in natural situations, outside its natural range e.g. at Wilsons promontory (Vic.) as a result of dispersal by exotic birds.

Rhytidosporum procumbens

PITTOSPORACEAE

Life history

Growth form: Dwarf shrub sometimes almost prostrate, with slender rootstock.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, often with mauve on outside, September–November.

Fruit/seed: Thin leathery capsule 5–8 mm wide, September–January.

Dispersal, establishment & growth:

Fire response: One plant resprouted and flowered in less than 10 months after high intensity fire (1/94) at Narrabeen, but most plants appeared to be seedlings at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms: Butterflies probably feed on nectar (P. Kubiak pers. comm.).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Hornsby, Rookwood, Bargo, Appin, Nowra. CT: Capertee, Clarence, Katoomba, Wentworth Falls, Bathurst, Jenolan SF, Hill Top, Robertson, Wingello.

Habitat

Habitat:

Altitude: 0–1100 m **Annual rainfall:** 700–1600 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest e.g. with *Eucalyptus sieberi*, *E. radiata*, *E. pauciflora* or woodland e.g. with *Eucalyptus crebra*, *E. tenella*, *E. mannifera*; heath e.g. with *Allocasuarina nana*; scrub e.g. with *Melaleuca nodosa*, *Kunzea ambigua*.

Substrate: Sandy soils on sandstone, granite, metamorphics, sandy clay soils on shale, often with ironstone gravels, low nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Rhytidosporum prostratum

PITTOSPORACEAE

Life history

Growth form: Dwarf shrub with swollen rootstock and prostrate or trailing stems.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White with pale mauve outside, December–January.

Fruit/seed: Capsule 3–4 mm long,

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: SC CT ST.

Distribution Sydney area:

Select locations: CT: Barren Grounds, Carrington Falls.

Habitat

Habitat:

Altitude: 600–1000 m **Annual rainfall:** 1400–1600 mm

Typical local abundance:

Vegetation: Woodland and wet heath

Substrate: Peaty soil on sandstone, low nutrients.

Exposure:

Conservation

Conservation: Carrington Falls is northern geographical limit. Reported from Barren Grounds Nature Reserve.

***Plantago coronopus* subsp. *commutata* ***

PLANTAGINACEAE

Buck's-horn Plantain

Life history

Growth form: Perennial or annual herb, with a persistent taproot and basal leaves; stout flower scapes to 45 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, compressed, in spikes, September–December.

Fruit/seed: Egg-shaped capsule 2–3 mm long, usually with 5 seeds, 0.4 mm diam.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S & E Mediterranean region.

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

Distribution Sydney area: Inner Sydney.

Select locations: CC: Carlton (1897), Kogarah (1899), Cooks River (1909), Rose Bay (1899).

Habitat

Habitat: Disturbed sites, maritime environments.

Altitude: 0–50 m

Annual rainfall: 1000–1200 mm

Typical local abundance:

Vegetation:

Substrate: Reported from detritus mounds in saltmarsh on Cooks River (1909). Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Minor coastal weed reported from Sydney area in 1909.

***Plantago coronopus* subsp. *coronopus* ***

PLANTAGINACEAE

Buck's-horn Plantain

Life history

Growth form: Perennial or annual herb, with a persistent taproot and basal leaves; slender flower scapes to 45 cm high.

Vegetative spread:

Longevity: Less than ?5 years.

Primary juvenile period:

Flowers: Small, compressed, in spikes, September–December.

Fruit/seed: Egg-shaped capsule 2–3 mm long, usually with 5 seeds, 0.4 mm diam.

Dispersal, establishment & growth: Dispersed in mud on cars (Wace 1977).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Europe and W Asia.

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

Distribution Sydney area: Mainly coast.

Select locations: CC: Narrabeen, Sailors Bay, Putney, Coogee, Queenscliff Lagoon, Bronte Beach, La Perouse, Kogarah. CT: Orange (1978).

Habitat

Habitat: Coastal headlands, seacliffs, dredge spoil.

Altitude: 0–1000 m

Annual rainfall: 800–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassland on headlands e.g. with *Isolepis nodosa*, *Samolus repens*, *Stenotaphrum secundatum*.

Substrate: Sandy soil on sandstone, low nutrients.

Exposure:

Conservation

Conservation: Minor coastal weed. Only one record for Central Tablelands — Orange, in lawn (1978).

Plantago debilis**PLANTAGINACEAE****Life history**

Growth form: Perennial or annual hairy herb with persistent taproot.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, tubular, green or white or purplish, at any time of year, peak March.

Fruit/seed: Capsule 1.5–3 mm long, with up to 5 seeds, 1 mm long, mature March–May.

Dispersal, establishment & growth:

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., N.T., S.A., W.A.

Distribution Sydney area: Widespread.

Select locations: CC: Avoca, Patonga Creek, Hornsby, Galston, Bayview, Homebush, Duck River, Kogarah, Ingleburn, Bundeena, Campbelltown, Mt Kembla, Albion Park. CT: Winburndale, Mt Wilson, Wentworth Falls, Kanangra, Abercrombie Caves, Wombeyan Caves.

Habitat

Habitat: Forest.

Altitude: 0–1100 m

Annual rainfall: 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Rainforest e.g. with *Ceratopetalum apetalum*, *Doryphora sassafras*, *Acacia melanoxylon*; moist open-forest e.g. with *Eucalyptus fastigata*, *D. radiata*, *E. deanii*, *Syncarpia glomulifera*; open-forest e.g. with *Eucalyptus amplifolia*, *E. eugenioides*, *E. melliodora*, *Angophora floribunda*; coastal scrub e.g. with *Leptospermum laevigatum*, *Westringia fruticosa*.

Substrate: Clay soils on basalt, shale, alluvium, high–medium nutrients.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Plantago drummondii**PLANTAGINACEAE****Life history**

Growth form: Annual or short-lived, hairy, perennial herb with basal leaves and a persistent taproot.

Vegetative spread:

Longevity: Less than 25 years.

Primary juvenile period:

Flowers: In a spike, mainly May–October. Generally regarded as wind-pollinated, though insects are also visitors and may be responsible for some pollination (B. Briggs pers. comm.).

Fruit/seed: Capsule 3–5 mm long, with up to 5 seeds, 2–2.7 mm long.

Dispersal, establishment & growth: *Plantago* species, especially *P. drummondii* have a layer of mucilage around the seeds (dry when shed), this may assist dispersal or may facilitate germination/establishment (B. Briggs pers. comm.).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Orange.

Select locations: CT: Nashdale (1980), only record.

Habitat

Habitat: Temporarily moist sites.

Altitude: 600 m **Annual rainfall:** 800 mm

Typical local abundance: Occasional.

Vegetation: Grassland; shrubland

Substrate: Basalt soil.

Exposure:

Conservation

Conservation: Mainly found in Western Plains. One record for Sydney area at Nashdale near Orange.

Plantago gaudichaudii**PLANTAGINACEAE****Life history**

Growth form: Perennial herb with a long thick fleshy taproot; secondary roots thick and sometimes giving rise to new plants (Briggs, Carolin & Pulley 1977), leaves 3-veined with brownish hairs in the leaf axil; flower scapes about as long as the leaves.

Vegetative spread: No (McIntyre et al. 1995), but see comment above.

Longevity:

Primary juvenile period:

Flowers: Small, tubular, green, white, or purplish, mainly September–April.

Fruit/seed: Egg-shaped capsule 2.5–4 mm long, with up to 5 seeds, 2.2 mm long, mature October–April.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly western Sydney.

Select locations: CC: Marayong, Doonside, Penrith, Bringelly, Liverpool, Campbelltown, Ingleburn. CT: BenBullen, Moss Vale, Wombeyan Caves.

Habitat

Habitat: Cemeteries, woodland remnants, along creeks.

Altitude: 0–1000 m **Annual rainfall:** 700–900 mm

Typical local abundance: Frequent.

Vegetation: Grassland and woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*, *Melaleuca decora*, *Themeda australis*; riparian woodland e.g. with *Casuarina glauca*.

Substrate: Clay soil on Wianamatta Shale, alluvium, medium nutrients.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Plantago hispida**PLANTAGINACEAE****Life history**

Growth form: Perennial herb with a persistent, often stout taproot.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, tubular, green, white, or purplish, mainly October–March.

Fruit/seed: Capsule 2.5–3.5 mm long, with up to 5 seeds, 1–1.5 mm long, mature February–April.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coastal sites and Tablelands.

Select locations: CC: Narrabeen, Long Reef, Kurnell, Jibbon Head, Five Islands, Shellharbour, Kiama. CT: Winburndale NR, Boyd Plateau, Abercrombie Caves, Mullions Range, Mt Bindo, Wingello.

Habitat

Habitat: Exposed headlands; shallow soil in crevices of rock exposures (B. Briggs pers. comm.).

Altitude: 0–1200 m **Annual rainfall:** 900–1600 mm

Typical local abundance: Frequent–occasional.

Vegetation: Coastal grassland e.g. with *Lomandra longifolia*, *Westringia fruticosa*; Montane Forest e.g. with *Eucalyptus pauciflora*, *E. dalrympleana*.

Substrate: Shallow soils and rock crevices often exposed to seaspray drift, on basalt, shale, sandstone on coast. On granite, metamorphics, basalt on Tablelands, medium–high nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

***Plantago lanceolata* ***

PLANTAGINACEAE

Lamb's Tongues, Plantain, Ribgrass

Life history**Growth form:** Annual or biennial hairy herb, with a persistent taproot.**Vegetative spread:** No (McIntyre et al. 1995).**Longevity:** 1–2 years.**Primary juvenile period:** 1 year.**Flowers:** Small, in spikes, mainly September–April. Honeybees and native bees may be pollinators (P. Kubiak pers. comm.).**Fruit/seed:** Capsule 3–4 mm long, with 1–2 seeds, 2.5–3 mm long.**Dispersal, establishment & growth:** No particular morphology for dispersal (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977).**Fire response:** Resprouted after high intensity fire (1/94) at Lane Cove; secondary juvenile period 10 months (P. Kubiak pers. comm.).**Interaction with other organisms:** Seed eaten by Galah *Cacatua roseicapilla*, roots eaten by Sulphur-crested Cockatoo *Cacatua galerita* (Lepschi 1993). Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990). Host to larvae of moths *Scopula rubraria* and *Xanthorhoe vicissata* (Common 1990) and butterfly *Junonia villida calybe* (Common & Waterhouse 1981). Known to cause seasonal allergic rhinitis in humans (Bass 1987).**Distribution****Status/origin:** Exotic, native to Europe, N and C Asia.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS SWP; LHI, Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** CC: Wisemans Ferry, Hornsby, Pennant Hills, Lane Cove, Parramatta, Campbelltown, Ingleburn, Illawarra Lake, Berry. CT: Burradoo, Bowenfels, Bathurst, Jenolan Caves, Fitzroy Falls.**Habitat****Habitat:** Disturbed sites, pastures, gardens, roadsides, lawns.**Altitude:** 0–1000 m **Annual rainfall:** 600–1400 mm**Typical local abundance:** Frequent.**Vegetation:** Grassland e.g. with *Themeda australis*; wetland margins, pastures, lawn.**Substrate:** Sandy to clay soils on sandstones, shale, basalt, alluvium, low–high nutrients. Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Full sun to light shade.**Conservation****Conservation:** Common weed of frequently disturbed sites, unlikely to invade undisturbed bush.***Plantago major* ***

PLANTAGINACEAE

Large Plantain

Life history**Growth form:** Short-lived perennial herb, with a mostly adventitious root system; leaves basal, flower scapes to 40 cm high.**Vegetative spread:****Longevity:** Less than 75 years.**Primary juvenile period:****Flowers:** Small, October–March.**Fruit/seed:** Roundish capsule 5–6 mm long, with up to 16 seeds. Seeds 2 mm long, weight 0.16 mg, germination 99% within 30 days (Shipley & Parent 1991), mature November–April.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** American Indians used the whole plant for tea, and for poultices (Murphy 1990).

Distribution

Status/origin: Exotic, native to Europe, N & C Asia. Reported by Robert Brown to be introduced to Sydney by 1804 (Maiden 1909).

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

Distribution Sydney area: Coastal and western Sydney.

Select locations: CC: N. Richmond, Hornsby, Royal Botanic Gardens (1892, 1901), Woolloomooloo Bay, Bronte Beach, Arncliffe, Macquarie Fields, Picton, Bulli Pass, Wollongong, Albion Park. CT: Lithgow.

Habitat

Habitat: Creekbanks, seepage lines, headlands.

Altitude: 0–200 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent to occasional.

Vegetation: Rainforest margins, coastal seepage areas e.g. with *Baumea juncea*, *Triglochin striata*, *Lobelia alata*, *Empodisma minus*.

Substrate: Moist sandy or gravelly alluvial soils, seepage areas on sandstone cliffs.

Exposure: Mid-shade.

Conservation

Conservation: Minor weed of disturbed sites.

Plantago myosuroides* subsp. *myosuroides* **PLANTAGINACEAE****Life history**

Growth form: Annual herb, with a persistent taproot and basal leaves; flower scapes 5–20 cm high.

Vegetative spread: No.

Longevity: Less than 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Small, in spikes, October–December.

Fruit/seed: Roundish capsule 2.5 mm long, with 3 seeds, 1–2 mm long, mature October–November.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America (Ecuador to Argentina).

Botanical subregions: NC CC SC; Qld.

Distribution Sydney area: Western Sydney.

Select locations: CC: Port Jackson (1884), Marayong, Doonside, Liverpool, Casula, Glenfield, Camden.

Habitat

Habitat: Roadside and woodland remnants.

Altitude: 0–200 m **Annual rainfall:** 700–1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassland and grass verges; woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*; scrub e.g. with *Melaleuca decora*, *M. nodosa*, *M. erubescens*, *Eucalyptus parramattensis*.

Substrate: Clay soil on Wianamatta Shale, medium nutrients.

Exposure: Full sun.

Conservation

Conservation: Minor weed of disturbed sites.

Plantago turrifera**PLANTAGINACEAE****Life history**

Growth form: Annual herb, with a persistent taproot; leaves basal, flower scapes to 20 cm long.

Vegetative spread: No.

Longevity: Less than 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Small, mainly August–February.

Fruit/seed: Roundish capsule 3–4 mm long, with up to 5 seeds, 1.2–1.8 mm long.

Dispersal, establishment & growth:

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native to Australia, but naturalised in the Blue Mountains and Sydney area.

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

Distribution Sydney area:

Select locations: CC: Flemington Saleyards (1969). CT: Blue Mountains (1887), only records.

Habitat

Habitat: Moist sites.

Altitude: **Annual rainfall:** 1000 mm

Typical local abundance:

Vegetation: Grassland, forest, woodland.

Substrate: Temporarily moist open sites.

Exposure:

Conservation

Conservation: Widespread on drier inland areas, and probably introduced to Sydney area with stock, though probably not persisting in the Sydney area now.

Plantago varia**PLANTAGINACEAE**

Variable Plantain

Life history

Growth form: Perennial hairy herb, with a persistent, often stout taproot; leaves basal, flower scapes 8–20 cm long.

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

Longevity:

Primary juvenile period:

Flowers: Small, mainly August–March.

Fruit/seed: Roundish capsule 3–4 mm long, with up to 5 seeds, 1.5–1.8 mm long.

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

Fire response:

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

Distribution

Status/origin: Native.

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

Distribution Sydney area: Western Sydney and Tablelands.

Select locations: CC: Richmond, Windsor, Camden, Yerranderie, Appin. CT: Mt Coricudgy, Mt Canobolas, Mullions Range, Hartley, Mittagong, Wombeyan Caves.

Habitat

Habitat: Grassland, forest.

Altitude: 0–1300 m **Annual rainfall:** 700–1000 mm

Typical local abundance: Frequent.

Vegetation: Open-forest e.g. with *Eucalyptus fastigata*, *E. piperita*, *E. radiata*, *E. blaxlandii*; woodland e.g. with *Eucalyptus macrorhyncha*, *E. bridgesiana*, *E. viminalis*.

Substrate: Clay soils on shale, basalt, limestone, alluvium, medium to high nutrients.

Exposure: Full sun to light shade.

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999), but widespread and common on Tablelands and adequately conserved there (B. Briggs pers. comm.).

Limonium australe**PLUMBAGINACEAE**

Native Sea Lavender

Life history**Growth form:** Perennial herb to 40 cm high, with basal leaves and flowering stems.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow, tubular, November–February.**Fruit/seed:** Small capsule, with persistent calyx.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC; Qld, Vic., Tas.**Distribution Sydney area:** Minnamurra.**Select locations:** CC: Minnamurra River, Blow-hole Kiama**Habitat****Habitat:** Saltmarshes.**Altitude:** 0–20 m**Annual rainfall:** 1200–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Saltmarsh e.g. with *Sarcocornia quinquevenia*, *Sporobolus virginicus*.**Substrate:** Estuarine alluvium with periodic tidal inundation.**Exposure:** Full sun.**Conservation****Conservation:** Rare, conservation status unknown.***Collomia grandiflora* *****POLEMONIACEAE****Life history****Growth form:** Erect annual herb to 1 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pink**Fruit/seed:** Capsule 5 mm long, with 2 seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America.**Botanical subregions:** NT CT ST CWS SWS; Tas.**Distribution Sydney area:****Select locations:****Habitat****Habitat:****Altitude:****Annual rainfall:****Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Weed of disturbed areas. Widespread but not common.

Navarretia squarrosa* **POLEMONIACEAE**

Californian Stinkweed

Life history**Growth form:** Erect annual hairy herb to 60 cm high, with a strong odour.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pale lilac to blue, summer.**Fruit/seed:** Capsule with numerous seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America.**Botanical subregions:** NT CT ST CWS SWS; Tas.**Distribution Sydney area:****Select locations:** CT: Kelso, Orange.**Habitat****Habitat:** Garbage dump.**Altitude:** 700–800 m**Annual rainfall:** 600–900 mm**Typical local abundance:** Occasional.**Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Occasionally naturalised on wasteland or cultivated land.***Comesperma defoliatum*****POLYGALACEAE****Life history****Growth form:** Slender shrub to 60 cm high, with numerous leafless stems arising from a woody base.**Vegetative spread:****Longevity:** 25–60 years (D. Keith pers. comm.).**Primary juvenile period:** Primary juvenile period more than 1 year (D. Keith pers. comm.).**Flowers:** Blue or purplish-blue, November–February.**Fruit/seed:** Compressed wedge-shaped capsule 7–11 mm long; seeds with tufts of hairs, January–February.**Dispersal, establishment & growth:** Recruitment mainly after fire (D. Keith pers. comm.).**Fire response:** Resprouts, secondary juvenile period 1 year (D. Keith pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT; Qld, Vic., Tas.**Distribution Sydney area:****Select locations:** CC: Berowra Creek, Narrabeen, Cabramatta, Maddens Plains. CT: Rylstone, Blackheath, Wentworth Falls, Leura, Hill Top.**Habitat****Habitat:** Wet sandy heath, swamps, watercourses.**Altitude:** 0–1000 m**Annual rainfall:** 900–1400 mm**Typical local abundance:** Rare.**Vegetation:** Wet heath, swamp margins.**Substrate:** Sandy soil over sandstone, low nutrients.**Exposure:****Conservation****Conservation:** Relatively uncommon, conservation status unknown.

Comesperma ericinum**POLYGALACEAE****Life history**

Growth form: Shrub 1–1.5 m high, with reddish stems. This taxon is variable in leaf shape and is sometimes divided into several species or informal variants.

Vegetative spread:

Longevity:

Primary juvenile period: Less than 2 years (P. Kubiak pers. comm.).

Flowers: Purple, lilac-pink or white, at any time of year but mainly September–December.

Probably pollinated by Honeybee and native bees (P. Kubiak pers. comm.).

Fruit/seed: Compressed wedge-shaped capsule 7–8 mm long; seeds with tufts of hairs, November–February.

Dispersal, establishment & growth:

Fire response: Probably killed after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area:

Select locations: CC: Morisset, Putty, Calga, Hornsby, Cheltenham, Frenchs Forest, Kogarah, Long Bay, Loftus, Bargo, Glenbrook, Springwood. CT: Rylstone, Capertee, Orange, Lithgow, Clarence, Blackheath, Trunkey, Hill Top, Robertson.

Habitat

Habitat: Ridges, plateaus.

Altitude: 0–1100 m

Annual rainfall: 900–1600 mm

Typical local abundance: Occasional.

Vegetation: Heath and scrub e.g. with *Angophora hispida*, *Allocasuarina littoralis*; woodland e.g. with *Corymbia eximia*, *Angophora costata*, *Eucalyptus radiata*, *E. mannifera*.

Substrate: Sandy soils or sandy soils with clay influence, low nutrients.

Exposure: Light shade to full sun.

Conservation

Conservation: Probably adequately conserved.

Comesperma retusum**POLYGALACEAE****Life history**

Growth form: Shrub to 1.5 m high, with pinkish, warty stems.

Vegetative spread:

Longevity: 25–60 years (D. Keith pers. comm.).

Primary juvenile period: Primary juvenile period more than 6 years (D. Keith pers. comm.).

Flowers: Purple or lilac-pink, October–December.

Fruit/seed: Compressed wedge-shaped capsule 9–12 mm long; seeds with tufts of hairs.

Dispersal, establishment & growth: Recruitment mainly after fire (D. Keith pers. comm.).

Fire response: Resprouts, secondary juvenile period 5 years (D. Keith pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly Tablelands.

Select locations: CC: Centennial Park. CT: Mt Victoria, Wentworth Falls, Boyd Plateau swamps (Kodala et al. 1996), Mt Werong, Wingecarribee Swamp, Wingello.

Habitat

Habitat: Permanently wet places more than 600 m altitude, but occasionally coastal swamps.

Altitude: 0–1000 m **Annual rainfall:** 1000–1600 mm

Typical local abundance: Frequent.

Vegetation: Montane peatland, sedgeland e.g. with *Leptospermum obovatum*, *Lepyrodia anarthria*, *Carex*.

Substrate: Peat, low nutrients, permanently moist.

Exposure:

Conservation

Conservation: Vulnerable. Extinct in Central Coast — last recorded 1895. Last recorded in Blue Mountains in 1965. Recorded from Wingecarribee Swamp in 1992.

Comesperma sphaerocarpum**POLYGALACEAE****Life history**

Growth form: Straggling shrub to 20 cm high, with more or less leafless stems and woody taproot.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Bright purplish-blue, October–April.

Fruit/seed: Compressed wedge-shaped capsule 4 mm long; seeds with tufts of hairs.

Dispersal, establishment & growth: Food body ant-adapted for dispersal (Westoby et al. 1990).

Fire response: Resprouts from base after high intensity fire (1/1994 at West Head and Mona Vale) (L.McD.); secondary juvenile period less than 5 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS.

Distribution Sydney area: Widespread.

Select locations: CC: Boorai Ridge, Wisemans Ferry, Vineyard, Londonderry, Hornsby, Coasters Retreat, Casula, Agnes Banks, Douglas Park, Avon Dam. CT: Mt Banks, Katoomba, Wingello.

Habitat**Habitat:****Altitude:** 0–1000 m **Annual rainfall:** 700–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Woodland e.g. with *Eucalyptus sclerophylla*, *Angophora bakeri*, *Eucalyptus parramattensis*, *E. sideroxylon*, *E. punctata*, *E. fibrosa*; heath and mallee e.g. with *Eucalyptus stricta*.**Substrate:** Sandy soil on sandstone, Tertiary alluvial sediments, alluvial sand, low nutrients.**Exposure:** Light shade to full sun.**Conservation****Conservation:** Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.***Comesperma volubile*****POLYGALACEAE****Life history****Growth form:** Climber with stems 1–2 m long, more or less leafless or sparsely leaved.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Purplish-blue, blue-mauve, or white, August–October. Probably pollinated by honeybees (P. Kubiak pers. comm.).**Fruit/seed:** Compressed wedge-shaped capsule 10–15 mm long; seeds with tufts of hairs.**Dispersal, establishment & growth:** Wind-dispersed (Westoby et al. 1990).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST; Qld, Vic., Tas.**Distribution Sydney area:****Select locations:** CC: Mt Warrawolong, Patonga Creek, Cowan, Hornsby, Belrose, Kentlyn, Narrabeen, Frenchs Forest, Oatley, Springwood. CT: Glen Davis, Mt Wilson, Katoomba, Jenolan Caves, Yerranderie, Mt Colong, Hill Top, Barbers Creek.**Habitat****Habitat:****Altitude:** 0–1000 m **Annual rainfall:** 800–1400 mm**Typical local abundance:** Occasional.**Vegetation:** Moist open-forest; open-forest e.g. with *Eucalyptus globoidea*, *Corymbia gummifera*, *Eucalyptus piperita*; heath e.g. with *Banksia ericifolia*.**Substrate:** Sandy soil on sandstone, low nutrients.**Exposure:** Light shade.**Conservation****Conservation:** Conservation status unknown.

Muraltia heisteria* **POLYGALACEAE****Life history**

Growth form: Stiff shrub to 1 m high, foliage with a tufted appearance, leaves clustered along stems.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Purple to pinkish-mauve or white, August–October.

Fruit/seed: Compressed capsule 5 mm long, with horn-like appendages.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Africa. Introduced as ornamental.

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

Distribution Sydney area: Coastal eastern suburbs of Sydney.

Select locations: CC: Bronte Beach (1886, 1976), Bondi (1898).

Habitat

Habitat:

Altitude: 0–50 m

Annual rainfall: 1200–1400 mm

Typical local abundance: Rare.

Vegetation: Coastal scrub e.g. with *Leptospermum laevigata*, *Acacia sophorae*, *Lomandra longifolia*.

Substrate: Sandy soil.

Exposure:

Conservation

Conservation: Cultivated and occasionally naturalised in coastal eastern suburbs of Sydney. Appears to be locally naturalised by 1900 but has not spread since.

Polygala japonica**POLYGALACEAE****Life history**

Growth form: Perennial herb 10–20 cm high.

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

Longevity:

Primary juvenile period:

Flowers: Mauve–purple, mainly October–March.

Fruit/seed: Capsule 4 mm long.

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

Fire response: Possibly resprouts.

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly western Sydney.

Select locations: CC: Pitt Town, Bass Hill, Narellan, Camden, The Oaks. CT: Lithgow.

Habitat

Habitat: Grassland and grassy understorey of forest and woodland.

Altitude: 0–1000 m

Annual rainfall: 700–1100 mm

Typical local abundance: Rare–occasional.

Vegetation: Grassy understorey e.g. with *Themeda australis*, *Bothriochloa*, *Glycine*, *Desmodium*; woodland e.g. with *Eucalyptus tereticornis*, *E. crebra*.

Substrate: Clay soils on shale, medium nutrients.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

***Polygala myrtifolia* ***

POLYGALACEAE

Life history

Growth form: Erect shrub 1–2.5 m high, with dense foliage.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Purple to pale lilac, throughout the year, peak September–November.

Fruit/seed: Roundish capsule 8–10 mm diam.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Africa. Introduced as ornamental.

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

Distribution Sydney area: Coastal.

Select locations: CC: Galston, Bayview, Dalrymple Hay NR, Beecroft, Mosman, Rose Bay, Kogarah, Oatley, Casula, Wollongong.

Habitat

Habitat: Hillsides, harbour foreshores.

Altitude: 0–50 m **Annual rainfall:** 800–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Edges of woodland e.g. with *Angophora costata*; open-forest e.g. with *Eucalyptus saligna*, *E. pilularis*; also estuarine sites.

Substrate: Clay soils on shale, alluvium, medium nutrients.

Exposure:

Conservation

Conservation: Often cultivated as an ornamental. Minor weed on margins of urban bushland.

***Polygala paniculata* ***

POLYGALACEAE

Life history

Growth form: Erect, much-branched perennial herb 10–50 cm high, woody at base.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White or rose-pink to purple, July.

Fruit/seed: Capsule 2 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to tropical America.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Warragamba Dam area.

Select locations: CC: Warragamba (1989).

Habitat

Habitat: Creek.

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

Typical local abundance: Frequent.

Vegetation: Riparian scrub with *Leptospermum polygalifolium*.

Substrate: Sandy alluvium, low nutrients.

Exposure:

Conservation

Conservation: Locally naturalised at Warragamba, capacity to spread unknown.

Polygala virgata* **POLYGALACEAE****Life history**

Growth form: Slender shrub to 3 m high.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Purple–Lilac, March–November, peak October.

Fruit/seed: Capsule 10 mm long, mature July.

Dispersal, establishment & growth: Diaspore: seed. Prolific seeder and germinator (Anon 1991).

Fire response: Killed by high intensity fire (1/94) at Lane Cove; secondary juvenile period less than 3 years (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Africa.

Botanical subregions: NC CC.

Distribution Sydney area: Coastal, Myall Lakes to Dapto.

Select locations: CC: Morrisset, Pymble (1904), Middle Harbour (1888), Kurnell (1908, 1969, 1984), Heathcote (1976), Camden (1945), Dapto.

Habitat

Habitat: Disturbed areas.

Altitude: 0–200 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent.

Vegetation: Sedge swamp, woodland e.g. with *Imperata cylindrica*, *Baumea*, *Juncus*; roadside e.g. with *Chloris gayana*, *Bothriochloa macra*, *Medicago sativa*.

Substrate: Dune sand, sandstone, Wianamatta Shale. Soil low to medium nutrients. Water table mostly low, moisture supply intermittent, fresh.

Exposure: Light shade to full sun.

Conservation

Conservation: Potentially weedy species common in disturbed areas along railway line near Heathcote and probably spreading. Southern recorded geographical limit is Dapto (1996).

Acetosa sagittata* **POLYGONACEAE**

Rambling Dock, Turkey Rhubarb

Life history

Growth form: Perennial climber, with stems usually more than 100 cm long, often with purplish ribs, and large potato-like tubers and rhizomes.

Vegetative spread: Spread by rhizomes up to 5 metres.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Small cream, unisexual, clustered in panicle-like inflorescences, December.

Fruit/seed: Triangular nut, with papery valves straw-coloured at maturity, sometimes tinged with pink or purple, January–October.

Dispersal, establishment & growth: Diaspore: nut, dispersed by wind, water and gravity; tubers spread by soil movement or dumping of garden refuse. Seed has some dormancy, with germination for at least 2 years after removal of parent plant (M. Clarke pers. comm.).

Fire response: Resprouts from tubers. Secondary juvenile period less than 8 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.). Germinates and colonises after fire (M. Clarke pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S Africa. Introduced as ornamental.

Botanical subregions: NC CC SC NT; Qld, Vic., Tas., W.A.

Distribution Sydney area: Coastal.

Select locations: CC: Terrigal, Chatswood, Balgowlah, Rockdale (1903), La Perouse, Liverpool, Bulli (1899), Austinmer, Otford.

Habitat

Habitat: Damp, disturbed areas, roadsides, riverbanks.

Altitude: 0–200 m **Annual rainfall:** 900–1600 mm

Typical local abundance: Frequent.

Vegetation: Disturbed sites.

Substrate: Clay soils on shale, sandy soil on sandstone and sand, medium to low nutrients, poorly drained sites.

Exposure: Light shade to full sun.

Conservation

Conservation: A widespread weed of urban bushland that is difficult to eradicate because of its persistent root system and abundant seeding.

Acetosa vesicaria* **POLYGONACEAE**

Bladder Dock, Rosy Dock

Life history

Growth form: Erect tufted annual herb with stout, succulent stems 20–100 cm high.

Vegetative spread:

Longevity: Less than 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Deep pink, unisexual, clustered in panicle-like inflorescences.

Fruit/seed: Triangular nut 1–2 mm long, with pink or purplish papery valves, September.

Dispersal, establishment & growth: Diaspore: nut, dispersed by wind, water and gravity.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to N Africa–Pakistan.

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

Distribution Sydney area: Localised.

Select locations: CC: Concord (1966).

Habitat

Habitat: Rubbish tip.

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

Typical local abundance:

Vegetation:

Substrate:

Exposure: Full sun.

Conservation

Conservation: Locally naturalised at Concord 1966–86.

Acetosella vulgaris *

POLYGONACEAE

Sorrel, Sheep Sorrel

Life history

Growth form: Slender, erect herb 10–50 cm high, with rosette of leaves and flowering stems. Horizontal rhizomatous rooting habit (Archer & Auld 1982). Horizontal roots often mistaken for rhizomes (Holm et al. 1997).

Vegetative spread: Spreads by extensive underground root system forming loose rosettes (Auld & Medd 1987, Holm et al. 1997).

Longevity:

Primary juvenile period: Probably 10 months (P. Kubiak pers. comm.).

Flowers: Small, rusty red, male and female flowers usually on different plants, flowers at any time, peak October–November.

Fruit/seed: Triangular nut with numerous seeds, 1–1.5 mm long, October–December.

Dispersal, establishment & growth: Diaspore: seed, no special morphology for dispersal (McIntyre et al. 1995), a root fragment 1 cm long is sufficient for propagation (Holm et al. 1997). Dispersed in mud on cars (Wace 1977), vegetative survival from rhizome fragments cut by cultivation; 20% of seed can remain viable in soil for more than 10 years (Keys & Duncan 1989). Seed is carried by birds — 15% passes through intestinal tract of chickens without injury; germination of fresh seed 3–4 weeks, but all seeds germinate in 8 days following 4 months of dry storage; 3% seeds viable after soil storage 25 years (Holm et al. 1997); germination is increased by fluctuating temperature and is more likely in autumn and spring (Keys & Duncan 1989). Increased spread in heavily grazed areas as other forage is consumed (Holm et al. 1997). Dry summers followed by plentiful autumn rains favour recruitment.

Fire response:

Interaction with other organisms: Foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990). Unpalatable to stock animals (Holm et al. 1997). Leaves poisonous to stock (Harden 1990). Known to cause allergy in humans where density is high (Bass 1987).

Distribution

Status/origin: Exotic, probably native to Europe.

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: CC: Beecroft, Centennial Park, Homebush, Leumeah, Menangle, Thirlmere. CT: Bathurst (1907), Junction Reefs, Blackheath, Mt Werong, Hill Top, Robertson, Bundanoon.

Habitat

Habitat: Disturbed areas, roadsides, grassland, riverbanks.

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

Typical local abundance: Frequent.

Vegetation: Pastures, disturbed sites.

Substrate: Sandy soils on sandstone, granites, sand dunes, low nutrients. Very tolerant of drought and low nutrient, acid soils (Keys & Duncan 1989, Holm et al. 1997).

Exposure: Full sun.

Conservation

Conservation: A competitive perennial weed of crops and pastures, but not invasive of bushland. Difficult to control because of its vigorous vegetative reproduction (Archer & Auld 1982), maximum herbicide control best 2–6 weeks after autumn rain (Keys & Duncan 1989).

Emex australis* **POLYGONACEAE**

Spiny Emex, Three-cornered Jacks, Doublegee.

Life history

Growth form: Vigorous herb with hollow, prostrate stems to 75 cm long, which may be erect where supported by surrounding plants (Gilbey 1987, Gilbey et al. 1998). Deep fleshy taproot (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Inconspicuous male and female flowers separate, on same plant, October–December.

Fruit/seed: Hard, woody, triangular nut with 3 sharp spines, with one seed, mature September–December; up to 1100 seeds have been recorded on individual plants (Parsons & Cuthbertson 1992). Can produce 120–1100 seeds per plant, reducing with increasing plant density (Gilbey et al. 1998).

Dispersal, establishment & growth: Diaspore: fruit, dispersed by attachment of spines to shoes, tyres, feet of animals, contamination of fodder, and by water. Most recruitment and seed production occurs during the first growing season following introduction; burial of seed promotes germination; seed populations comprise 3 components enabling spread of colonising effort over a number of seasons: annual cyclic dormancy, non-dormancy and continuous dormancy (Panetta & Randal 1994) but this is apparently determined by environmental conditions (Panetta & Randal 1993). Seed germinates at any time of year when moisture is available, forming a rosette from which long trailing stems are produced (Parsons & Cuthbertson 1992). Plants die off as moisture decreases in summer. Seed remains viable in soil 4–5 years (Markham 1985).

Fire response: Killed.

Interaction with other organisms: Birds eat seeds; seed found in seabird rookeries (Gilbey et al. 1998). Rodents destroy many seeds (Parsons & Cuthbertson 1992). Out-competed by other weeds *Trifolium subterranean* and *Hordeum glaucum* (Panetta & Randall 1994). Spiny fruit can cause lameness in animals (Harden 1990), sheep develop blackleg from infected wounds of feet, and in badly affected areas working dogs are fitted with leather boots (Markham 1985).

Distribution

Status/origin: Native of Mediterranean region.

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

Distribution Sydney area: Widespread.

Select locations: CC: Yarramalong, Maroubra, La Perouse, Parramatta, Emu Plains (1894), Campbelltown, Menangle Park.

Habitat

Habitat: Pastures, gardens.

Altitude: 0–200 m

Annual rainfall: 700–1400 mm

Typical local abundance: Occasional.

Vegetation: Pastures.

Substrate: Sandy and loamy soil, medium nutrients.

Exposure: Full sun.

Conservation

Conservation: Serious weed of pasture and cultivation, but not invasive of bushland. Difficult to eradicate; persistence due to its well developed seed dormancy (Gilbey 1987). Control by burning of seeding plants, with follow-up killing of seedlings for a number of years, and use of herbicides (Parsons & Cuthbertson 1992).

Muehlenbeckia costata**POLYGONACEAE****Life history**

Growth form: Scrambler with decumbent stems; flowering stems erect to 50 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Fleshy.

Fruit/seed: Shiny, black roundish nut 2–3 mm long

Dispersal, establishment & growth:

Fire response: Usually seen for a short time after fire — a ‘fire weed’ (K. Wilson pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NT CT; Qld.

Distribution Sydney area: Lithgow.

Select locations: CT: Lithgow.

Habitat

Habitat: Rocky sites at high altitudes.

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

Typical local abundance:

Vegetation:

Substrate:

Exposure: Full sun.

Conservation

Conservation: One old dubious record for Lithgow, not refound despite searches. Southern geographical limit (K. Wilson pers. comm.).

Muehlenbeckia gracillima**POLYGONACEAE****Life history**

Growth form: Slender climber, with stems to 2 m long arising from a carrot-like rootstock and arrowhead-shaped leaves (Jones & Gray 1988).

Vegetative spread: Some stems rooting at nodes.

Longevity:

Primary juvenile period:

Flowers: At any time of year.

Fruit/seed: Nut 2.5 mm long, black, November–April.

Dispersal, establishment & growth: Diaspore: fruit, possibly bird-dispersed at maturity.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; Qld.

Distribution Sydney area: Coastal ranges.

Select locations: CC: Dora Creek, Colo River, Mooney Mooney Creek, Maroota, Longneck Lagoon, Ermington, Waterfall, Douglas Park, Mt Keira, Lake Illawarra, Barren Grounds, Berry.

Habitat

Habitat: Riverbanks.

Altitude: 0–500 m **Annual rainfall:** 700–1600 mm

Typical local abundance: Occasional.

Vegetation: Moist open-forest e.g. with *Eucalyptus deanei*, *Acacia elata*; riparian e.g. with *Acmena smithii*, *Rapanea howittiana*, *Smilax australis*, *Stellaria flaccida*.

Substrate: Basalt, shale, sandy alluvial fertile soils. Water table mostly low, moisture supply intermittent, fresh.

Exposure: Light shade.

Conservation

Conservation: Conservation status unknown.

Muehlenbeckia rhyticarya**POLYGONACEAE****Life history**

Growth form: Erect or decumbent low shrub to 1.5 m high, with red-brown stems.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Greenish yellow, July–October.

Fruit/seed: Black triangular nut 3–5 mm long

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area:

Select locations: CC: Nortons Basin, Erskine Creek, Thirlmere. CT: Mt Darcy, Kanangra, Jenolan Caves, Yerranderie, Mt Jellere.

Habitat

Habitat: Moist situations in forest and on rocky slopes.

Altitude: 0–1000 m **Annual rainfall:** 900–1000 mm

Typical local abundance: Occasional.

Vegetation: Woodland e.g. with *Corymbia eximia*, *Eucalyptus punctata*.

Substrate: Sandy soils on sandstone, quartzite, slate.

Exposure:

Conservation

Conservation: Conservation status unknown.

Persicaria capitata* **POLYGONACEAE**

Japanese Knotweed

Life history

Growth form: Prostrate herb, with wiry knotted stems; ovate leaves with pink to red bands or blotches and short scattered hairs.

Vegetative spread: Prostrate stems root at nodes.

Longevity:

Primary juvenile period:

Flowers: Pink, April–October.

Fruit/seed: Dark brown to black triangular nut, April–December.

Dispersal, establishment & growth: Vegetative dispersal as dumped garden refuse.

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove, flowering in less than 6 months (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Asia. Introduced as ornamental.

Botanical subregions: NC CC.

Distribution Sydney area: Mainly suburban areas.

Select locations: CC: Baulkham Hills, Beecroft, Garigal NP (L.McD.), Northbridge (1958), Balgowlah, Royal NP, Woodford, Avon Dam.

Habitat

Habitat: Disturbed creek banks, wet soaks, roadside embankments.

Altitude: 0–500 m **Annual rainfall:** 1000–1400 mm

Typical local abundance: Frequent.

Vegetation: Weeds of disturbance.

Substrate: Sandy soils, alluvium.

Exposure: Medium shade to full sun.

Conservation

Conservation: Garden plant occasionally naturalised in urban bushland near drainage lines.

Persicaria decipiens

POLYGONACEAE

Slender Knotweed

Life history

Growth form: Decumbent to ascending plant to 30 cm high. Upright when smaller but tends to sprawl as it grows higher; the elongated tapering leaves usually have a bold red to purple mark around the centre (Romanowski 1998).

Vegetative spread: Some spread from rooting at nodes. Resprouts after flooding.

Longevity: Probably 1–3 years depending on conditions.

Primary juvenile period:

Flowers: Pink, arranged in narrow spikes, November–June, peak February. Probably pollinated by honeybees, native bees, flies, wasps and small butterflies (P. Kubiak pers. comm.).

Fruit/seed: Nut, 1 mm long, Nov–June, peak March.

Dispersal, establishment & growth: Seeds dispersed as fruit matures. Appears to be a perennial colonising species that disperses readily but seldom dominates. Dies back in winter or during drought.

Fire response: Probably resprouts. Flowering in 5 months after high intensity fire (1/94) at Lane Cove and Narrabeen (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST NWS SWP; Qld, Vic., Tas., N.T., S.A., W.A., N.I., N.Z., Eur, Afr & SW Asia.

Distribution Sydney area: Coast, western Sydney and Moss Vale area.

Select locations: CC: Wyong, North Richmond, Dee Why, Lane Cove, La Perouse, East Hills, Regentville, Campbelltown, Bulli, Albion Park. CT: Moss Vale.

Habitat

Habitat: Creeks and wet places.

Altitude: 0–700 m **Annual rainfall:** 700–1600 mm

Typical local abundance: Frequent–occasional.

Vegetation: Herbland e.g. with other *Persicaria* species and *Paspalum distichum*.

Substrate: Wide range of sites, sandy alluvial soils to clay flats, low-medium nutrients. Water table mostly high, moisture supply continuous, some sites with saline influence.

Exposure: Mid shade to full sun.

Conservation

Conservation: Conservation status unknown.

Persicaria elatior

POLYGONACEAE

Life history

Growth form: Erect herb to 90 cm.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Dark pink, January–February (limited data).

Fruit/seed: Nut lenticular 2–2.5 mm long, mature February–April (limited data). Dispersed at maturity.

Dispersal, establishment & growth: Diaspore: nut.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; Qld.

Distribution Sydney area: Robertson, Picton Lakes.

Select locations: CC: Robertson, Picton Lakes (only 2 records).

Habitat

Habitat: Riverbank, edge of lake after disturbance.

Altitude: 0–500 m

Annual rainfall: 900–1600 mm

Typical local abundance: Frequent.

Vegetation: Riparian herbland e.g. with *Pseudonaphthium luteoalbum*, *Persicaria hydropiper*.

Substrate: Sandy, alluvial soil, medium nutrients. Water table mostly high, moisture supply intermittent, fresh.

Exposure:

Conservation

Conservation: Rare, listed under schedule II, NSW Threatened Species Conservation Act 1995, coded 3V on national rare species list (Briggs & Leigh 1996).

Persicaria hydropiper**POLYGONACEAE**

Water Pepper

Life history

Growth form: Erect or ascending herb. Grows to 1 m high, with elongated, tapering leaves similar to *P. decipiens*, but unmarked (Romanowski 1998). Leaves and stems taste acrid or peppery (Holm et al. 1997).

Vegetative spread: Generally not, though stems in contact with soil can root at nodes (Holm et al. 1997).

Longevity: Short-lived, 1–2 years. By May, plants reddish brown autumnal colour in sunny area, dead plants in shaded area. Only exceptions were seedlings at Reedy Lagoon which were still green and flowering obviously about 3–4 months old. This species may be biennial (D. Benson)

Primary juvenile period: 3 months.

Flowers: White to greenish tinged with pink, December–May, peak March.

Fruit/seed: Nut, January–April, peak March. Dispersed at maturity.

Dispersal, establishment & growth: Diaspore: nut, probably water or bird-dispersed. Most likely species to colonise low lying sites. Short-term dormancy, germinates in autumn in wet ground and a flush of growth occurs with warmer weather, plants grow to 1 m tall and can flower in 3–4 months, die back in winter but may resprout in spring after mild conditions (Howell et al. 1995). Seeds reported viable after 50 years buried in soil (Holm et al. 1997).

Fire response:

Interaction with other organisms: Extensive leaf damage by leaf-eating beetles observed in April 1992 (Cattai DHB). Foodplant of Black Swan *Cygnus atratus*, Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Wyong, Cattai, Epping, Doonside, Coxs River, Wollongong, Berry. CT: Rydal, Mullion Creek, Belubula River, Wingecarribee Swamp, Bowral.

Habitat

Habitat: Riverbands and creeks, semi-aquatic.

Altitude: 0–1100 m

Annual rainfall: 700–1600 mm

Typical local abundance: Frequent–occasional.

Vegetation: Herbland with other *Persicaria* species e.g. *P. lapathifolia*.

Substrate: Sandy alluvial flats and banks, medium nutrients. Water table permanently high to mostly high, moisture supply intermittent, fresh. Often in acid soils (Holm et al. 1997).

Exposure: Sheltered, light shade to full sun. Possibly more shade tolerant than other *Persicaria* species, tolerates flooding.

Conservation

Conservation: Conservation status unknown.

Persicaria lapathifolia**POLYGONACEAE**

Pale Knotweed

Life history

Growth form: Erect or ascending plant 0.5 to 2 m high. ? Annual or short-lived perennial. The hollow stems are swollen above each node (Holm et al. 1997).

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

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Pink, usually pendulous, in densely packed spikes (Romanowski 1998), October–April, peak February–March. Self-pollinated or insect pollinated (Holm et al. 1997).

Fruit/seed: Nut, 2 mm long, mature November–April, peak February–March. One plant can produce more than 19 000 seeds when growing without competition (Holm et al. 1997). Seed weight 1.24 mg, germination 11% within 30 days (Shipley & Parent 1991).

Dispersal, establishment & growth: No particular morphology for dispersal (McIntyre et al. 1995). Seed dispersed as fruit matures. Germination rate of 63% maintained after storage in water for 60 months (Holm et al. 1997). Recruits from seed and resprouts after flooding, growing vigorously in summer/Autumn. Growth rate quick, growing up to 2 m in a month. Coloniser of open sites.

Fire response: Probably resprouts. Fruiting in 5 months after high intensity fire (1/94) at Narrabeen (P. Kubiak pers. comm.).

Interaction with other organisms: Seed eaten by Plumed Whistling Duck *Dendrocygna eytoni* (Barker & Vestjens 1989). Foodplant of Black Swan *Cygnus atratus*, Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989,1990). Flowers visited by native bees possibly feeding on nectar (P. Kubiak pers. comm.).

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., Eurasia, Afr.

Distribution Sydney area: Western Sydney, Coxs, Wollondilly and Shoalhaven Rivers.

Select locations: CC: Wisemans Ferry, Yarramundi, Toongabbie, Burwood, Doonside, Woollooware Bay, Thirlmere, Albion Park, Coomonderry Swamp. CT: Lowther, Kowmung River, Bungonia.

Habitat

Habitat: Alluvial river flats and swampy creeks.

Altitude: 0–800 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Herbland with *Juncus usitatus* and other *Persicaria* species.

Substrate: Alluvial sand and gravel, fertile soil. Water table mostly high, moisture supply continuous, fresh.

Exposure: Full sun.

Conservation

Conservation: Conservation status unknown.

Persicaria maculosa* **POLYGONACEAE**

Redshank, Jesus Plant

Life history

Growth form: Herb 40–60 cm high, often with a woody rootstock, leaves often with purplish blotches and hairy veins and margins.

Vegetative spread:

Longevity: 1 year (Holm et al. 1997).

Primary juvenile period: Flowering 6 weeks after germination (Holm et al. 1997).

Flowers: Pink to whitish, March. Very little nectar produced; almost exclusively self-pollinated (Holm et al. 1997).

Fruit/seed: Nut 2 mm long. One plant may produce more than 4 000 seeds; seed weight 1.65–3.91 mg (Holm et al. 1997).

Dispersal, establishment & growth: Diaspore: seed, water-dispersed. Germination of seed buried in soil 30 years, 9%, but none viable after 40 years (Holm et al. 1997).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Europe.

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

Distribution Sydney area:

Select locations: CC: Wingecarribee Reservoir Lookout (1992).

Habitat

Habitat: Weedy sites.

Altitude: 690 m

Annual rainfall: 1600 mm

Typical local abundance: Occasional.

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Reported in RBG nursery in 1987 and thought to have come in peat from Germany. Recent records from weedy sites and grassed parkland. Ability to invade natural habitats unknown.

Persicaria orientalis**POLYGONACEAE**

Princes Feathers

Life history

Growth form: Erect herb 1–2 m high.

Vegetative spread: Probably no vegetative spread.

Longevity: Less than 5 years.

Primary juvenile period:

Flowers: Deep pink, January–May, peak March.

Fruit/seed: Nut 2–3 mm long, dispersed at maturity.

Dispersal, establishment & growth: Probably germinates in drying mud.

Fire response:

Interaction with other organisms: Seed eaten by Plumed Whistling Duck *Dendrocygna eytoni* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NWS CWS SWS NWP SWP; Qld, NT, Asia.

Distribution Sydney area: Western Sydney and Illawarra.

Select locations: CC: Port Jackson (1802), Longneck Lagoon, Windsor, Chipping Norton, Doonside, Campbelltown, Albion Park, Coomonderry Swamp, Cambewarra.

Habitat

Habitat: Edges of swamps.

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation: Herbland e.g. *Juncus usitatus*, *Persicaria hydropiper*, *P. lapathifolium*, *Melaleuca linariifolia*.

Substrate: Floodplain alluvium, medium-nutrient soil. Water table mostly high, moisture supply intermittent, fresh.

Exposure: Full sun.

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Persicaria praetermissa**POLYGONACEAE****Life history**

Growth form: Herb with creeping stems. Often semi-upright to 1 m high; leaves shaped like elongated arrow-heads (Romanowski 1998).

Vegetative spread: Probably to a metre.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Pink, in slender spikes, November– March, peak January.

Fruit/seed: November–March, peak January.

Dispersal, establishment & growth: Seed dispersed at maturity.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST SWS; Vic., Asia.

Distribution Sydney area: Widespread.

Select locations: CC: Wyong Creek, Buralow Swamp, Broadwater Swamp, Annangrove, Hornsby, Menangle, Shoalhaven. CT: , Coxs River, Wingecarribee, Long Swamp (Kodela 1992).

Habitat

Habitat: Creeks, riverbanks and swamps, sometimes disturbed sites.

Altitude: 0–800 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent.

Vegetation: Semi-permanent and seasonal wetland e.g. with *Eleocharis sphacelata*, *Persicaria hydropiper*, *Melaleuca linariifolia*, *Persicaria decipiens*, *P. lapathifolium*. Upland mire (Kodela 1992).

Substrate: Sandy or gravelly alluvium, medium to low nutrient soil, poorly-drained. Water table permanently high–mostly high, moisture supply intermittent, fresh.

Exposure: Indifferent to exposure, light shade to no shade. Perhaps more in open than *P. strigosa*. Possibly some salt tolerance.

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Persicaria prostrata**POLYGONACEAE**

Creeping Knotweed

Life history

Growth form: Decumbent herb, often with woody rootstock.

Vegetative spread: Probably spreads vegetatively.

Longevity:

Primary juvenile period:

Flowers: Green–cream, in spikes, flowerheads more compact than other species (Romanowski 1998), November–April, peak March–April.

Fruit/seed: Nut 1.5–2 mm, mature January–March, dispersed at maturity.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Foodplant of Freckled Duck *Stictonetta nervosa*, Pacific Black Duck *Anas superciliosa* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Wondabyne, Richmond, Casula, Warrimoo, Yanderra, Nowra. CT: Bathurst, Winburndale, Orange, Blayney, Mittagong.

Habitat

Habitat: Stream banks, disturbed riverbanks, roadsides, drains.

Altitude: 0–900 m **Annual rainfall:** 700–1400 mm

Typical local abundance: Frequent–occasional.

Vegetation: Herbland, e.g. with *Geranium retrosum*, *Viola hederacea*, *Persicaria strigosum*, *Cirsium vulgare*.

Substrate: Sandy soil medium nutrients e.g. granite, alluvium, disturbed. Water table mostly high, moisture supply intermittent, fresh.

Exposure: Light shade to full sun.

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Persicaria strigosa**POLYGONACEAE****Life history**

Growth form: Perennial herb with creeping stems.

Vegetative spread: Vegetative spread probably to 2 m.

Longevity: Indefinite.

Primary juvenile period:

Flowers: December–May, peak December.

Fruit/seed: Nut 3 mm long, matures December–March, peak March, dispersed at maturity.

Dispersal, establishment & growth: Diaspore: nut, probably water or bird-dispersed.

Fire response: Probably resprouts. Flowering in 5 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC CT; Qld, Asia, Malesia.

Distribution Sydney area: Widespread.

Select locations: CC: Mangrove Creek, Shane Park, Narrabeen, Mascot, Centennial Park, Menangle, Otford, Kiama. CT: Glanmire, Moss Vale.

Habitat

Habitat: Creek banks and open swampy areas.

Altitude: 0–750 m **Annual rainfall:** above 700 mm

Typical local abundance: Frequent.

Vegetation: Riparian herbland.

Substrate: Sandy to loamy soil, alluvium and dune sand, low nutrients. Water table permanently high–mostly high, poorly drained.

Exposure:

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Persicaria subsessilis

POLYGONACEAE

Hairy Knotweed

Life history**Growth form:** Stout decumbent hairy herb.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** March, June, December (inadequate data).**Fruit/seed:** Nut 2–2.5 mm long.**Dispersal, establishment & growth:** Diaspore: nut.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; Qld, Vic., Tas., W.A., N.G., N Cal.**Distribution Sydney area:** Western Sydney.**Select locations:** CC: Cheltenham, Shane Park, Narellan.**Habitat****Habitat:** Creek banks.**Altitude:** 0–200 m**Annual rainfall:** 800–1100 mm**Typical local abundance:****Vegetation:** Weedy wetland vegetation e.g. *Rumex*, *Ranunculus*, *Juncus*.**Substrate:** Sandy alluvium, medium nutrients.**Exposure:****Conservation****Conservation:** Rare, 3 specimens only in Herbarium collection. Vulnerable in Western Sydney (James et al. 1999).***Polygonum arenastrum* ***

POLYGONACEAE

Wireweed

Life history**Growth form:** Prostrate to decumbent herb, usually mat-forming, stems often rooting at nodes, with stems to 100 cm long.**Vegetative spread:** Decumbent stems rooting.**Longevity:** Possibly annual.**Primary juvenile period:****Flowers:** Pink, March–June.**Fruit/seed:** Brown to dark brown nut 1–2 mm long, March–June.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** Leaves can cause dermatitis; seed can cause enteritis in stock (Harden 1990).**Distribution****Status/origin:** Exotic, native to Europe.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A.**Distribution Sydney area:****Select locations:** CC: Richmond, Wahroonga, Cheltenham, Domain (1902), Burwood, Emu Plains, Glenfield, Nowra. CT: O'Connell, Orange, Bowral, Bathurst, Robertson.**Habitat****Habitat:** Riverbanks, roadsides, footpaths.**Altitude:** 0–1000 m**Annual rainfall:** 700–1400 mm**Typical local abundance:** Frequent.**Vegetation:****Substrate:** Clay soils on shale, sandy alluvium, medium nutrients. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Common weed of disturbed sites.

Polygonum aviculare* **POLYGONACEAE**

Wireweed

Life history**Growth form:** Prostrate to decumbent herb, usually mat-forming, with stems to 100 cm long.**Vegetative spread:** Stems often rooting at nodes.**Longevity:****Primary juvenile period:****Flowers:** White, November–March. Usually self-pollinated (Holm et al. 1997).**Fruit/seed:** Dark brown nut 2–3 mm long, November–May. One plant can produce more than 6000 seeds if competition is light (Holm et al. 1997).**Dispersal, establishment & growth:** No particular morphology for dispersal (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977), dispersed by birds, animals, human activity (Holm et al. 1997).**Fire response:****Interaction with other organisms:** Foodplant of Black Swan *Cygnus atratus*, Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons*, Stubble Quail *Coturnix pectoralis*, and Freckled Duck *Stictonetta nervosa*, seed eaten by Singing Bushlark *Mirafra javanica* (Barker & Vestjens 1989, 1990). Seed eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993). Leaves can cause dermatitis; seed can cause enteritis in stock (Harden 1990).**Distribution****Status/origin:** Exotic.**Botanical subregions:** NC CC SC CT ST NWS CWS SWS NWP SWP SFWP; Qld, Vic., Tas., W.A.**Distribution Sydney area:** Widespread.**Select locations:** CC: Pennant Hills, Blackwattle Bay, Burwood, Arncliffe, Emu Plains, Glenfield, Nowra. CT: Orange, Bathurst, Junction Reefs, Burrawang.**Habitat****Habitat:** Pastures, gardens.**Altitude:** 0–800 m **Annual rainfall:** 600–1400 mm**Typical local abundance:** Frequent.**Vegetation:** Pastures.**Substrate:** Clay soils on shale. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Weed of pastures.

Polygonum patulum**POLYGONACEAE**

Tree Hogweed

Life history**Growth form:** Erect herb 20–100 cm high.**Vegetative spread:** No.**Longevity:****Primary juvenile period:****Flowers:****Fruit/seed:** Shiny brown nut 2–3 mm long, December–January.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to Europe.**Botanical subregions:** CC NT NWS CWS NWP SFWP; Qld, Vic.**Distribution Sydney area:** Parramatta River foreshores.**Select locations:** CC: Gladesville (1976), Ermington (1986).**Habitat****Habitat:****Altitude:** 0–50 m**Annual rainfall:** 1000–1200 mm**Typical local abundance:** Rare.**Vegetation:** Edge of saltmarsh.**Substrate:** Estuarine alluvium.**Exposure:****Conservation****Conservation:** Rare, conservation status unknown.***Polygonum plebeium*****POLYGONACEAE**

Small Knotweed

Life history**Growth form:** Prostrate to decumbent herb, usually mat-forming, with stems to 15 cm long.**Vegetative spread:** Stems often rooting at nodes.**Longevity:****Primary juvenile period:****Flowers:** Pink, white, November–March.**Fruit/seed:** Dark brown to black, smooth and shiny nut 1–2 mm long, March.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC CT NWS CWS NWP SWP NFWP SFWP; Qld, Vic, NT SA, NZ, Malesia, Asia.**Distribution Sydney area:****Select locations:** CC: Wondabyne, Richmond, Dennistone, Liverpool, Campbelltown, Menangle Park. CT: Bathurst.**Habitat****Habitat:** Railway lines, wetland margins.**Altitude:** 0–800 m**Annual rainfall:** 600–1200 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Edges of wetland.**Substrate:** Reported along railway lines, suggesting possible link with basalt used as ballast.**Exposure:****Conservation****Conservation:** Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Reynoutria japonica* **POLYGONACEAE****Life history**

Growth form: Perennial herb 1–2 m high; stems often glaucous or red-brown, numerous and thicket-forming.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Whitish, November.

Fruit/seed: Nut 2–4 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Japan. Introduced as ornamental.

Botanical subregions: CC ?ST SWS.

Distribution Sydney area:

Select locations: CC: Wahroonga (1970–1986).

Habitat

Habitat: Roadside.

Altitude: 0–200 m

Annual rainfall: 1400 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Cultivated in gardens, locally naturalised at one site in Wahroonga 1970–1986.

Reynoutria sachalinensis* **POLYGONACEAE****Life history**

Growth form: Perennial herb 2–4 m high, with greenish, bamboo-like stems forming a dense thicket.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Greenish or yellow, November–December.

Fruit/seed: Nut 2–3 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Asia. Introduced as ornamental.

Botanical subregions: CT.

Distribution Sydney area:

Select locations: CT: Penrose.

Habitat

Habitat: Orchard.

Altitude: 700 m

Annual rainfall: 900 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Cultivated in gardens, locally naturalised at Penrose (1949–1956) but did not appear to be spreading.

Rumex brownii

POLYGONACEAE

Swamp Dock

Life history

Growth form: Herb 50–80 cm high, with slender, erect stems and basal leaves. Stems reddish green, sparsely branched, with a short underground stem, and below, a thick often twisted, branched taproot (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: Probably 1–5 years.

Primary juvenile period: Less than 1 year.

Flowers: Greenish red, clustered, August–March.

Fruit/seed: Nut enclosed by valves 2.5–4 mm long, with c. 10 hooked teeth, shed at maturity, November–March. Seed a rusty brown, 3-sided nutlet 1.5 mm long (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fruit, dispersed by adhesion (McIntyre et al. 1995) on clothing, animals etc. Root fragments are capable of regeneration; seed germinates throughout the year when moisture is available, mainly autumn and spring; basal rosette grows in winter, flowering from spring to early summer when aerial growth dies back leaving erect stems laden with hooked fruit; regrowth commences during winter–spring (Parsons & Cuthbertson 1992). Coloniser of disturbed sites, minor weed of gardens and pastures.

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove; secondary juvenile period less than 5 months (P. Kubiak pers. comm.).

Interaction with other organisms: Oxalate accumulation in stems is toxic to animals if large amount is consumed (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly western Sydney.

Select locations: CC: Beecroft, Burwood, Richmond, Penrith, Glenfield, Picton, Gerringong, Kangaroo Valley. CT: Junction Reefs, Orange, Kowmung River.

Habitat

Habitat: Riverflats, open-forest, disturbed sites, gardens.

Altitude: 0–800 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest e.g. with *Eucalyptus crebra*, *E. tereticornis*, *E. moluccana*, *Bursaria spinosa*; grassland e.g. with *Danthonia racemosa*.

Substrate: Clay soils from Wianamatta shale, alluvial soils, medium nutrients, possibly with calcium influence.

Exposure: Full sun.

Conservation

Conservation: Vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

Rumex conglomeratus* **POLYGONACEAE**

Clustered Dock

Life history

Growth form: Glabrous perennial herb 60–150 cm high, with a thick taproot, branching below (Parsons & Cuthbertson 1992).

Vegetative spread:

Longevity:

Primary juvenile period: Less than 1 year at Lane Cove (P. Kubiak pers. comm.).

Flowers: Small, reddish green, in clusters, November–January.

Fruit/seed: Red-brown 3-sided nut enclosed in valves 2–3 mm long, with red-brown 3-sided seed about 1 mm long (Parsons & Cuthbertson 1992). Mature November–January.

Dispersal, establishment & growth: Diaspore: fruit, dispersed by wind, water, animals and humans (Parsons & Cuthbertson 1992), in mud on cars (Wace 1977). Crown and taproot capable of regeneration and spread when fragments are moved in soil; young plants are capable of propagating from buds on crown or upper taproot 30–50 days after germination; seed with variable dormancy so germination is intermittent, with main germination in autumn and spring; seedlings overwinter with a rosette, aerial growth is slow as the taproot develops; flowers are produced in first season if uncrowded or second season in dense stands (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms: Suspected of poisoning sheep in NSW (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Exotic, native to Europe and SW Asia, almost cosmopolitan weed.

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

Distribution Sydney area: Widespread.

Select locations: CC: Wyong Creek, Hornsby, Dennistone, Parramatta, Wallacia, Campbelltown, Bulli (1890), Shellharbour, Jamberoo (1899). CT: Wildes Meadow.

Habitat

Habitat: Moist areas along roadsides, disturbed areas, pastures.

Altitude: 0–660 m **Annual rainfall:** 900–1600 mm

Typical local abundance: Frequent–occasional.

Vegetation: Woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*; riparian scrub e.g. with *Melaleuca linariifolia*, *M. styphelioides*, also saline marsh.

Substrate: Clay soils on shale, basalt, alluvium, medium to high nutrients.

Exposure:

Conservation

Conservation: Weed of cultivation and pasture. Control by use of herbicides or digging out roots at least 20 cm below surface to prevent regeneration; small seedlings can be controlled by cultivation (Parsons & Cuthbertson 1992).

Rumex crispus *

POLYGONACEAE

Curled Dock

Life history

Growth form: Glabrous, perennial herb 30–150 cm high, with a thick underground stem or crown and a long slender taproot often to a depth of 3 m (Parsons & Cuthbertson 1992).

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

Longevity:

Primary juvenile period: 1–2 years.

Flowers: Greenish red in clusters, August–February.

Fruit/seed: Deep reddish-brown 3-sided nut enclosed in valves 3.5–6 mm long, with dark red-brown angular seeds 2 mm long, mature November–March; seeds ripen 16–20 days after flowers open and may be held in seedheads on dead stems for several months (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fruit, dispersed by wind, water, animals and humans (Parsons & Cuthbertson 1992), morphology for wind dispersal (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977). Crown and taproot capable of regeneration and spread when fragments are moved in soil; young plants are capable of propagating from buds on crown or upper taproot 30–50 days after germination (Parsons & Cuthbertson 1992).

Seed with variable dormancy so germination is intermittent, with main germination in autumn and spring; seedlings overwinter with a rosette, aerial growth is slow as the taproot develops; flowers are produced in first season if uncrowded or second season in dense stands (Parsons & Cuthbertson 1992). Coloniser.

Fire response: Resprouted after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms: Known to cause allergy in humans where density is high (Bass 1987).

Distribution

Status/origin: Naturalised exotic, native to Europe & SW Asia.

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:

Select locations: CC: Eastwood, Parramatta, Balgowlah, Centennial Park, Kogarah (1899), Emu Plains, Narellan, Campbelltown, Appin. CT: Orange, Mittagong.

Habitat

Habitat: Creeks, low-lying areas, waste places.

Altitude: 0–1000 m **Annual rainfall:** 700–1200 mm

Typical local abundance: Frequent.

Vegetation: Woodland e.g. with *Eucalyptus moluccana*, *E. tereticornis*.

Substrate: Clay soils on shale, medium nutrients.

Exposure:

Conservation

Conservation: Weed of disturbed sites. Control by use of herbicides or digging out roots at least 20 cm below surface to prevent regeneration; small seedlings can be controlled by cultivation (Parsons & Cuthbertson 1992).

Rumex obtusifolius subsp. **obtusifolius ***

POLYGONACEAE

Broadleaf Dock

Life history

Growth form: Perennial herb 60–100 cm high; hybrids occur with *R. crispus*.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, clustered,

Fruit/seed: 3-sided nut enclosed in valves.

Dispersal, establishment & growth: Diaspore: fruit, dispersed by wind, water, animals and humans (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native of Europe & SW Asia.

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

Distribution Sydney area: Widespread.

Select locations: CC: Yarramundi, Hornsby, Cooks River (1912), Macquarie Pass. CT: Leura, Moss Vale, Robertson, Kangaloon.

Habitat

Habitat: Moist places, riverbanks, roadsides.

Altitude: 0–1000 m **Annual rainfall:** 800–1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Weedy places, pasture.

Substrate: Sandy alluvium, medium nutrients, poorly-drained.

Exposure:

Conservation

Conservation: Weed of moist disturbed sites.

Rumex pulcher* subsp. *pulcher* **POLYGONACEAE**

Fiddle Dock

Life history

Growth form: Erect, glabrous, much branched perennial herb 30–100 cm high, with a thick taproot branching below (Parsons & Cuthbertson 1992).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Small, reddish green in clusters,

Fruit/seed: Red-brown 3-sided nut enclosed in valves 4–6 mm long, with pale red-brown 3-sided seed 1.5 mm long.

Dispersal, establishment & growth: Diaspore: fruit, dispersed by wind, water, animals and humans; crown and taproot capable of regeneration and spread when fragments are moved in soil; young plants are capable of propagating from buds on crown or upper taproot 30–50 days after germination. Seed with variable dormancy so germination is intermittent, with main germination in autumn and spring; seedlings overwinter with a rosette, aerial growth is slow while the taproot develops; flowers are produced in first season if uncrowded or second season in dense stands (Parsons & Cuthbertson 1992).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native of Mediterranean & SW Asia.

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

Distribution Sydney area: Suburban areas.

Select locations: CC: Ashfield, Cooks River (1912), Concord, Kiama (1899), Jamberoo Pass.

Habitat

Habitat: Moist disturbed areas and roadsides.

Altitude: 0–100 m **Annual rainfall:** 1000–1400 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Occasional weed of cultivation, roadsides, disturbed areas. Control by use of herbicides or digging out roots at least 20 cm below surface to prevent regeneration; small seedlings can be controlled by cultivation (Parsons & Cuthbertson 1992).

Rumex tenax

POLYGONACEAE

Shiny Dock

Life history

Growth form: Erect perennial herb 15–50 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Small, clustered**Fruit/seed:** 3-sided nut enclosed by valves 2.5–3.5 mm long.**Dispersal, establishment & growth:** Disperse: fruit.**Fire response:****Interaction with other organisms:** Foodplant of Black Swan *Cygnus atratus* (Barker & Vestjens 1989,1990).

Distribution

Status/origin: Native.**Botanical subregions:** CC ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., S.A., W.A.**Distribution Sydney area:****Select locations:** CC: Kurrajong, Riverstone, Flemington.

Habitat

Habitat: Damp weedy areas.**Altitude:** 0–200 m**Annual rainfall:** 700–1400 mm**Typical local abundance:****Vegetation:****Substrate:** Clay soils on shale, medium nutrients.**Exposure:**

Conservation

Conservation: A native species of drier Western Slopes and Plains that has probably been introduced with stock.**Calandrinia calyprata**

PORTULACACEAE

Life history

Growth form: Procumbent, succulent herb with stems to 20 cm long.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Pale pink.**Fruit/seed:** Capsule 2–3 mm long, with 10–20 dark brown to red-brown seeds.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC CT CWS SWS SWP; ?Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:****Select locations:** CC: Ingleburn. CT: Hill Top.

Habitat

Habitat:**Altitude:** 0–700 m**Annual rainfall:** 900 mm**Typical local abundance:****Vegetation:****Substrate:** Sandy gravelly soils, often associated with granite.**Exposure:**

Conservation

Conservation: Conservation status unknown.

Calandrinia eremaea**PORTULACACEAE****Life history**

Growth form: Decumbent, succulent herb with erect to spreading stems to 20 cm long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, pale pink to purple.

Fruit/seed: Capsule 3–5 mm long, with more than 20 kidney-shaped seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area:

Select locations: CT: Jenolan Caves (1894), Barbers Creek (1900).

Habitat

Habitat:

Altitude: 700–1000 m

Annual rainfall: 900–1100 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Rare, reported from a few old collections. Conservation status unknown.

Calandrinia menziesii* **PORTULACACEAE****Life history**

Growth form: Prostrate to decumbent succulent herb with stems to 25 cm long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Purple.

Fruit/seed: Capsule 7–9 mm long, with numerous black seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to N America.

Botanical subregions: NC CC SC CT ST CWS SWP; VIC, TAS, SA, WA,

Distribution Sydney area:

Select locations: CC: Richmond (1917), Waterfall (1980). CT: Goulburn (1925).

Habitat

Habitat:

Altitude: 0–700 m

Annual rainfall: 700–1400 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Widely naturalised (Harden 1990), though there are only a few old collections.

Calandrinia pickeringii

PORTULACACEAE

Life history

Growth form: Decumbent to ascending succulent herb with flowering stems to 20 cm long.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pale pink, June–October.

Fruit/seed: Capsule about 3 mm long, with numerous dark red-brown to black seeds, April.

Dispersal, establishment & growth:

Fire response: Prolific seedlings in depressions on rock platform, after high-intensity fire at Yeomans Bay 1994 (L.McD.).

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC ST; Qld.

Distribution Sydney area: Sporadic.

Select locations: CC: Yengo NP, East Kurrajong, Shellharbour.

Habitat

Habitat: Rock outcrops, logs.

Altitude: 0–400 m

Annual rainfall: 1000–1200 mm

Typical local abundance: Occasional.

Vegetation: Open-forest e.g. with *Angophora costata*, *Eucalyptus piperita*; salt-tolerant coastal scrub.

Substrate: On sandstone, granite and basalt outcrops.

Exposure: Full sun to light shade.

Conservation

Conservation: Rare, conservation status unknown.

Montia fontana* subsp. *chondrosperma

PORTULACACEAE

Life history

Growth form: Tufted annual herb, with ascending to erect stems to 20 cm long.

Vegetative spread: Sometimes stoloniferous.

Longevity:

Primary juvenile period:

Flowers: White.

Fruit/seed: Capsule 1–2 mm long, with black seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ST SWS; Vic., Tas., S.A., N.Z., Eur, N & S Amer.

Distribution Sydney area: Orange.

Select locations: CT: Orange (1983).

Habitat

Habitat: Watercourses, swamps, bogs, marshes and wet grassland.

Altitude: 800 m

Annual rainfall: 800–1000 mm

Typical local abundance:

Vegetation:

Substrate: Loamy soil on slate, moist.

Exposure:

Conservation

Conservation: Appears to be rare, conservation status unknown.

Neopaxia australasica**PORTULACACEAE****Life history**

Growth form: Semi-aquatic herb with stems to 30 cm long, rooting at nodes. In shallow waters may form a floating mat reaching out over deeper areas; leaves succulent (Romanowski 1998).

Vegetative spread: Stoloniferous, often forming dense mats at higher altitudes.

Longevity:

Primary juvenile period:

Flowers: White or pale pink, September–November.

Fruit/seed: Capsule about 2–3 mm long, with up to 3 shiny, black seeds.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: SC NT CT ST CWS SWS SWP; Vic., Tas., S.A., W.A., N.Z.

Distribution Sydney area: Tablelands.

Select locations: CT: Meadow Flat, Orange, Oberon, Edith, Mt Werong, Wingecarribee Swamp.

Habitat

Habitat: Moist areas including bogs, swamps streams.

Altitude: 680–1000 m **Annual rainfall:** 800–1600 mm

Typical local abundance: Frequent–occasional.

Vegetation: Sedge swamp e.g. with *Juncus*, *Carex*, *Ranunculus*.

Substrate: Peaty or clay soils, permanently moist, sometimes running water.

Exposure:

Conservation

Conservation: Locally restricted and vulnerable, conservation status unknown.

Portulaca oleracea

PORTULACACEAE

Pigweed, Purslane

Life history

Growth form: Annual, sometimes perennial, prostrate to decumbent succulent herb, with reddish stems to 25 cm long and fleshy leaves.

Vegetative spread: Adventitious root development when plants are cut or broken (Gorske 1978).

Longevity: 1–2 years.

Primary juvenile period: Probably (?from seed) fruiting less than 4 months after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).

Flowers: Yellow, in heads, August–March.

Fruit/seed: Capsule 3–6 mm long, with minute black seeds.

Dispersal, establishment & growth: No particular morphology for dispersal (McIntyre et al. 1995). Germination best with soil temperature 20°–30° C (Gorske 1978).

Fire response:

Interaction with other organisms: Seeds eaten by birds, Richard's Pipit *Anthus novaeseelandiae*, foodplant of Stubble Quail *Coturnix pectoralis* (Barker & Vestjens 1989, 1990) and butterfly larvae *Hypolimnas misippus* and *Junonia villida calybe* (Common & Waterhouse 1981). Heavily cropped by rabbits (P. Kubiak pers. comm.).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: CC: Freemans Reach, Berowra, Farm Cove, Kogarah, Flemington Saleyards, Emu Plains, Five Islands. CT: Bathurst.

Habitat

Habitat: Paddocks, cultivated areas.

Altitude: 0–700 m **Annual rainfall:** 600–1200 mm

Typical local abundance: Frequent.

Vegetation:

Substrate: Wide range of soil types (Cunningham et al. 1981), can survive drought (Gorske 1978).

Exposure: Full sun.

Conservation

Conservation: Grows as a weed in disturbed areas, common on cultivated land (Harden 1990).

Talinum paniculatum *

PORTULACACEAE

Life history

Growth form: Erect annual herb or subshrub to 60 cm high, with tuberous roots.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Pink, spring–summer.

Fruit/seed: Capsule 3–5 mm, with numerous shiny black seeds c. 1 mm diam.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to N & S America. Introduced as ornamental.

Botanical subregions: NC CC SC CWS; Qld.

Distribution Sydney area: Sydney suburbs.

Select locations: CC: Cheltenham (1954), Strathfield (1949), Carringbah (1974).

	Habitat
<hr/>	
Habitat: Gardens, rockeries.	
Altitude: 0–250 m	Annual rainfall: 1000–1400 mm
Typical local abundance: Frequent.	
Vegetation:	
Substrate: Clay soil, persisting in crevices between rocks etc.	
Exposure:	
	Conservation
<hr/>	
Conservation: A garden escape, mainly naturalised in suburban areas.	

Anagallis arvensis* **PRIMULACEAE**

Scarlet Pimpernel, Blue Pimpernel

	Life history
<hr/>	
Growth form: Annual or perennial herb, stems creeping to weakly erect, with opposite leaves.	
Vegetative spread: No.	
Longevity: 1–2 years.	
Primary juvenile period:	
Flowers: Red/orange and blue-flowered forms occur. Flowers September–December. Possibly pollinated by hoverflies (Syrphidae) (P. Kubiak pers. comm.).	
Fruit/seed: Capsule, 5-ridged, 3–5 mm diam., October–December.	
Dispersal, establishment & growth: Mechanism for dispersal undefined (McIntyre et al. 1995), dispersed in mud on cars (Wace 1977). Overwinters as soil-stored seedbank.	
Fire response: Probably killed.	
Interaction with other organisms: Shoots apparently eaten by rabbits (P. Kubiak pers. comm.).	

Distribution

Status/origin: Exotic, native to Europe, W Asia, N Africa. Reported by Robert Brown to be introduced to Sydney by 1804 (Maiden 1909).

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

Distribution Sydney area: Widespread.

Select locations: CC: Colo River, Peats Crater, Beecroft, Castle Hill, Ashfield, St Marys, Baderys Creek, Five Islands, Bomaderry. CT: Mt Towinhingy, Medlow Bath, Abercrombie.

	Habitat
<hr/>	
Habitat: Pastures, disturbed sites, creekbanks, gardens.	
Altitude: 0–1000 m	Annual rainfall: 700–1400 mm
Typical local abundance: Frequent–occasional.	
Vegetation: Associated with short-lived weeds of cultivation etc.	
Substrate: Clay soils on shale, basalt, sandy soils on alluvium. Recorded on saline sites in western NSW (Semple 1993).	
Exposure:	
	Conservation
<hr/>	
Conservation: A short-lived weed of disturbed sites.	

Lysimachia vulgaris* var. *davurica

PRIMULACEAE

Yellow Loosestrife

Life history**Growth form:** Erect herb to 80 cm high**Vegetative spread:** Spreads by rhizomes/stolons.**Longevity:****Primary juvenile period:****Flowers:** Yellow, white, red or blue, February.**Fruit/seed:** Capsule, February–March.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT; Japan, NE Asia.**Distribution Sydney area:** Recorded at Wingecarribee Swamp only**Select locations:** CT: Wingecarribee Swamp.**Habitat****Habitat:** Aquatic to drier but well-watered situations (Kodala 1998).**Altitude:** 680 m**Annual rainfall:** 1600 mm**Typical local abundance:** Frequent.**Vegetation:** Sedgeland e.g. with *Carex*, *Phragmites australis*, *Lythrum salicaria*, *Geranium neglectum*, *Lycopus australis*.**Substrate:** Peat to loam and possibly sandy soils, low nutrients, periodically water-logged.**Exposure:** Full sun.**Conservation****Conservation:** Rare, listed as Endangered under Schedule I of the NSW Threatened Species Conservation Act and currently threatened by the recent collapse and drainage of Wingecarribee Swamp, the only known site for this species in Australia.***Samolus repens***

PRIMULACEAE

Creeping Brookweed

Life history**Growth form:** Erect to creeping herb with stems 5–60 cm long. Leaves thick, leathery and less than 1 cm across (Romanowski 1998).**Vegetative spread:** Stoloniferous and rhizomatous.**Longevity:****Primary juvenile period:** Less than 1 year (P. Kubiak pers. comm.).**Flowers:** White or pale pink, September–February, peak November. Probably pollinated mainly by honeybees, flies (P. Kubiak pers. comm.).**Fruit/seed:** Capsule.**Dispersal, establishment & growth:****Fire response:** Possibly killed after high intensity fire (1/94) at Lane Cove (P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; Qld, Vic., Tas., S.A., W.A., N.Z., Pac., S Amer.**Distribution Sydney area:** Coastal.**Select locations:** CC: Avoca, Toukley, Barrenjoey, Narrabeen, Middle Harbour Creek (L.McD.), Bobbin Head, Parramatta, Cooks River, Garie Beach, Austinmer, Shellharbour.

Habitat

Habitat: Waterlogged places (Romanowski 1998), margins of brackish or salty coastal streams, coastal headlands.

Altitude: 0–20 m **Annual rainfall:** 1200–1400 mm

Typical local abundance:

Vegetation: Saltmarsh e.g. with *Juncus kraussii*, *Baumea juncea*, *Sarcocornia quinqueflora*; swamp margins e.g. with *Melaleuca quinquenervia*, *Casuarina glauca*; cliffline vegetation e.g. with *Zoysia pungens*, *Apium prostratum*.

Substrate: Muddy sand, or skeletal sandy soil on sandstone, conglomerate, basalt. Saline soils and waters (Romanowski 1998).

Exposure:

Conservation

Conservation: Conservation status unknown.

Samolus valerandi**PRIMULACEAE**

Common Brookweed, Water Pimpernel

Life history

Growth form: Herb with weakly erect stems 10–30 cm high, stoloniferous. Leaves thin, almost translucent and over 1 cm across (Romanowski 1998).

Vegetative spread: Possibly spread by stolons.

Longevity:

Primary juvenile period:

Flowers: White, October–March, peak March.

Fruit/seed: Capsule.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT ST ; Qld, Vic., S.A., W.A., Eur, N & S Amer, Afr.

Distribution Sydney area: Mainly western Sydney.

Select locations: CC: Colo River, Kellyville, Berkshire Park, Nortons Basin, Warwick Farm, Casula, Douglas Park, Kowmung River. CT: Fremantle, Abercromie.

Habitat

Habitat: Moist, shady creekbanks.

Altitude: 0–800 m **Annual rainfall:** 600–800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Riverine forest e.g. with *Casuarina cunninghamiana*, *Tristaniopsis laurina*, *Angophora floribunda* and ground species such as *Triglochin procera*, *Potamogeton ochratus*, *Lilaeopsis polyantha*, *Sparganium subglobosum*.

Substrate: Sandy to muddy alluvium, medium nutrients.

Exposure:

Conservation

Conservation: Mainly found along creeks in western Sydney and vulnerable to increasing degradation and weed invasion. Listed vulnerable in Western Sydney (James et al. 1999). Conservation status elsewhere unknown.

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