

Ecology of Sydney plant species

Part 2: Dicotyledon families Asteraceae to Buddlejaceae

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Abstract

Benson, Doug and McDougall, Lyn (National Herbarium of New South Wales, Royal Botanic Gardens Sydney, Australia 2000) 1994. Ecology of Sydney plant species: Part 2: Dicotyledon families Asteraceae to Buddlejaceae. Cunninghamia 3(4) 789-995. Ecological data in tabular form is provided on 355 plant species, 187 native and 168 exotics, mostly naturalised, occurring in the Sydney region, defined by the Central Coast and Central Tablelands botanical subdivisions of New South Wales (approximately bounded by Lake Macquarie, Orange, Crookwell and Nowra). Families are Asteraceae, Avicenniaceae, Balsaminaceae, Basellaceae, Baueraceae, Berberidaceae, Bignoniaceae, Boraginaceae, Brassicaceae, Buddlejaceae.

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

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

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

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

Conservation: Conservation status.

Introduction

The *Ecology of Sydney Plant Species* aims to provide ecological information on native and naturalised Sydney plants. Particular emphasis has been given to data that is relevant for ecologists and natural area managers, for people involved in bush regeneration, land rehabilitation and landscape design, for researchers in many fields and for a wide range of people who are interested in bushland and native plants. Species-specific information is also relevant to environmental impact assessment and to studies involving changes in drainage, water movement, wind exposure, nutrient conditions and fire regimes on plant species and plant communities. Information included covers growth form, flowering and fruiting times, longevity and maturity periods; pollination and seed dispersal data, distribution, habitat and

plant community, as well as responses to fire and disturbance where available, and is largely complementary to the descriptive texts in taxonomic handbooks such as the *Flora of New South Wales* (Harden 1990–93).

Part 2 of the *Ecology of Sydney Plant Species* covers Dicotyledon families alphabetically from Asteraceae to Buddlejaceae. Families covered are Asteraceae, Avicenniaceae, Balsaminaceae, Basellaceae, Baueraceae, Berberidaceae, Bignoniaceae, Boraginaceae, Brassicaceae, Buddlejaceae. A total of 355 plant species are included, 187 native and 168 exotics, mostly naturalised. Species for which we have good ecological data include *Avicennia marina*, *Raphanus raphanistrum*, *Cirsium vulgare*, *Chrysanthemoides monilifera*, *Chondrilla juncea* and *Xanthium spinosum*. For the majority of species, the presentation of our current knowledge shows many, often alarming, gaps in the information available. It is hoped that making the situation better known will stimulate much-needed and wide ranging research into the ecology of many more of these species.

Methods

Part 2 follows the format used in *Part 1 — Ferns, fern allies, cycads, conifers and Dicotyledon families Acanthaceae to Asclepiadaceae* (Benson & McDougall 1993). The Sydney region is defined as the Central Coast and Central Tablelands botanical subdivisions (i.e. approximately bounded by Lake Macquarie, Orange, Crookwell and Nowra) (Figure 1). This is the area broadly covered by *Flora of the Sydney Region* (Carolin & Tindale 1993), with the exception that the Hunter Valley is not included here since it lies within the North Coast and Central Western Slopes subdivisions.

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

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

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

Information categories

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

Botanical nomenclature

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

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

Life history

Growth form: Brief description.

Source: *Flora of New South Wales*.

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

Source: *Flora* descriptions, Herbarium specimens, field observations.

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

Source: Literature, authors' assessment from field observations.

Primary juvenile period: time taken from germination to produce first fruits or spores (Gill [1975] uses the term for the period from germination to flowering but

the period to fruit maturity is more significant ecologically). Secondary juvenile period is the time taken for an individual to recover to produce fruit after major damage e.g. from fire, but applicable only if the species regularly resprouts.

Source: Literature, field observations.

Reproduction: For Angiosperms, Reproduction separated into:

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

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

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

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

Source: Literature, field observations.

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

Source: Field observations, literature.

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

Source: Mainly literature.

Distribution

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

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

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

Source: National Herbarium of New South Wales.

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

Source: Herbarium specimen records.

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

Source: Herbarium specimen records.

Habitat

Specific data refers to Sydney area unless stated otherwise.

Habitat: Brief generalised description.

Source: Herbarium specimen records, field observations.

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

Source: Herbarium specimen records.

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

Source: Bureau of Meteorology (1975, 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 (e.g. basalt soils)/fertile/infertile/very infertile (e.g. sands).

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

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

Source: Herbarium specimen records, field observations, literature.

Exposure:

Exposure scale: Exposed/indifferent/sheltered.

Shading scale: Deep shade/mid shade/light shade/no shade.

Source: Herbarium specimen records, field observations, literature.

Conservation

Conservation: National significance listing (Briggs & Leigh 1988), regional significance and adequacy of conservation within Sydney area where available.

Source: Herbarium records, field observations, literature.

General comments on Part 2

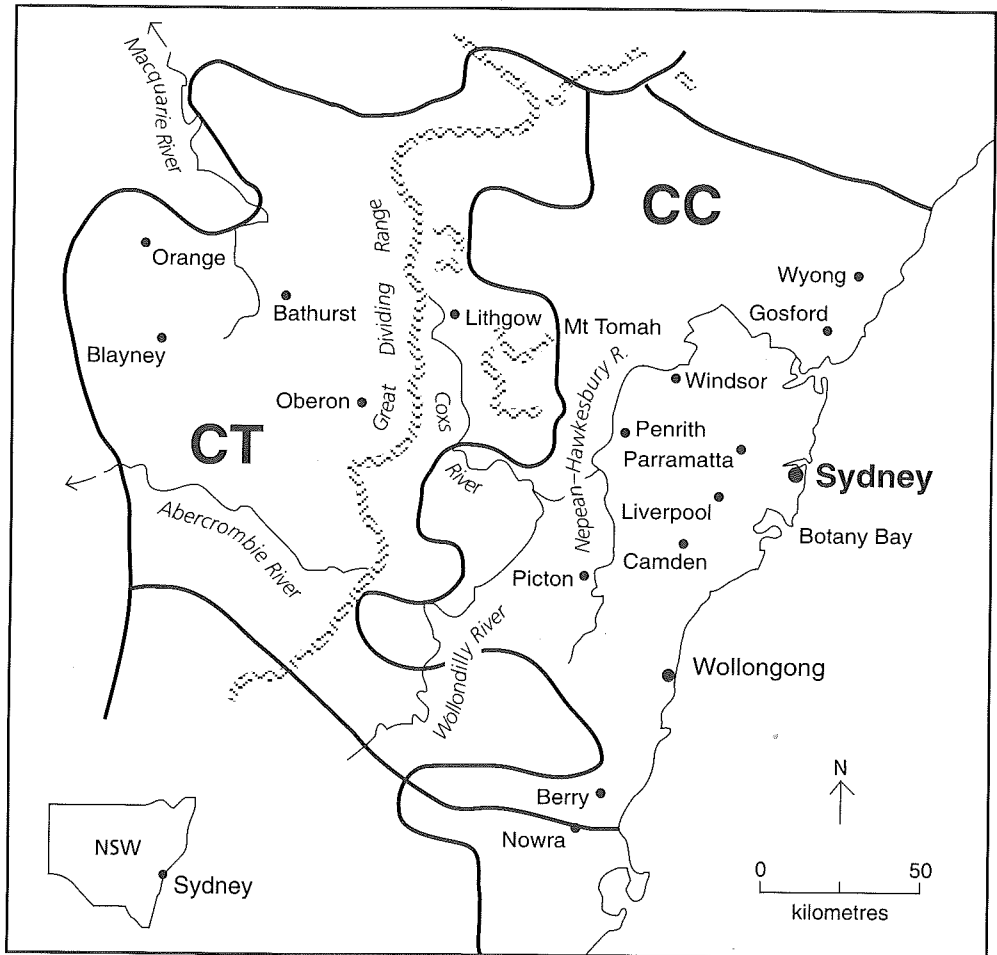
The majority of this part covers the family Asteraceae. There are 270 species of Asteraceae, 41% of which are exotic. Some of these are major agricultural weeds and it is these weed species, e.g. *Cirsium vulgare*, *Chondrilla juncea*, that are the best known ecologically. There has been virtually no serious ecological study of any of the native species. A few endangered species, e.g. *Olearia cordata*, have been the subject of Recovery Plans, but these are only based on general survey work with little intensive follow-up. Many of the Asteraceae are relatively inconspicuous or uncommon and

tend to be overlooked. Little appears to be known on many of the shrubby Asteraceae, although many are well represented in the Sydney area in a range of habitats from rainforest to heath. Of the 51 NSW species of *Olearia*, 23 occur in the Sydney area, as well as 15 out of 45 *Brachycome* species and 9 out of 14 *Vittadinia* species. These species do not have conspicuous fire responses like Proteaceae and Myrtaceae, although this itself may be a valid reason for studying them. Many may be short-lived and important in colonising disturbed sites and may have potential for land rehabilitation projects. Yet we have little data in regard to dispersal, growth rates or colonising behaviour, pollination vectors and propagule dispersal mechanisms.

Similar comments apply to the other families in this Part. Longevity of species, apart from annuals, is rarely noted. Data on fire responses are available for common, conspicuous species but not for the smaller, less obvious species. The conservation status of many species is unknown. Collections from the early 1900s suggest that many Asteraceae appear to have been widespread in the Sydney area but are now much more restricted. Because they are not conspicuous their disappearance has not been noted, but species like *Cassinia uncata*, *Cassinia longifolia* and *Ozothamnus adnatus*, previously recorded in the Sydney suburban area, have not survived well in urban bush reserves, either because of more mobile populations or because they required the higher-nutrient soils that were subsequently cleared. For the many exotic weed species other than those of concern to agriculture, we have only limited knowledge of their current distributions and little idea of whether they are stable or becoming potential problems. Quite a number of species have only been recorded since the 1960s and may be spreading e.g. *Acanthospermum australe*, *Leontodon taraxicoides* subsp. *taraxicoides*, *Senecio pterophorus* and *Baccharis halimifolia*. For other exotic species there is virtually no data from local sources — some of these are based on only one or a few old records and may now be extinct in the region e.g. *Ambrosia artemisiifolia*.

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The Sydney region

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

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Dicotyledon families Asteraceae to Buddlejaceae

Acanthospermum australe *

ASTERACEAE

Life history

Growth form: Prostrate herb with stems to 60 cm long and opposite leaves.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, summer.**Fruit/seed:** Achene 7–9 mm long with prickles, mature December–March.**Dispersal, establishment & growth:** Diaspore: fruit, probably mammal-dispersed, ? human.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to America.**Botanical subregions:** NC CC.**Distribution Sydney area:** Coastal, mainly eastern suburbs of Sydney.**Select locations:** Malabar (1967), Little Bay, Matraville, La Perouse, Garie Beach (1987).

Habitat

Habitat: Roadsides and lawns.**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** With other roadside weeds e.g. *Oenothera indecora*. Ground stratum.**Substrate:** Sandy, infertile soils. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:**

Conservation

Conservation: Recently recorded weed that may be spreading along coast.*Achillea distans* subsp. *tanacetifolia* *

ASTERACEAE

Tansyleaf Milfoil

Life history

Growth form: Herb to 120 cm high, with rhizome.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Whitish, pink or red with yellow disc, spring–summer.**Fruit/seed:** Achene 1.5–2.5 mm long, no pappus.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Exotic, native to Europe. Introduced as an ornamental and may occur as a garden escape.**Botanical subregions:** CC SC NT ST; Qld, NT.**Distribution Sydney area:** Only record Leichhardt.**Select locations:** Leichhardt (1941).

Habitat

Habitat:**Altitude:** 0–100 m **Annual rainfall:** 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Rare, only 1 record, probably not naturalised in the area.

***Achillea millefolium* ***

ASTERACEAE

Yarrow

Life history**Growth form:** Stoloniferous herb 10–100 cm high.**Vegetative spread:** Regrows from rhizome fragments (Field & Kannangara 1987).**Longevity:** Perennial.**Primary juvenile period:****Flowers:** White–pink, disc yellow, November–April.**Fruit/seed:** Achene to 3 mm long, no pappus. Seeds small 160 µg (Field & Kannangara 1987).**Dispersal, establishment & growth:** Wind-dispersed (Carr et al. 1992). Eight month old stand produced 243,000 seeds per m²; requires light for germination — seed at or near the soil surface germinates rapidly; seed viability increases with soil depth — estimated survival of seed buried at 32 cm is 17 years (Field & Kannangara 1987).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NC SC NT CT ST SWS; Vic.**Distribution Sydney area:** Upper Blue Mountains and west of the area.**Select locations:** Mt Wilson (1896), Katoomba, Lett River, Lithgow, Orange, Milthorpe.**Habitat****Habitat:** Roadside weed.**Altitude:** above 800 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Ground stratum.**Substrate:** Basalt soil, very fertile. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:****Conservation****Conservation:** Roadside weed.***Actites megalocarpa* (Sonchus megalocarpus)**

ASTERACEAE

Dune Thistle

Life history**Growth form:** Fleshy herb to 40 cm high, responds to sand accumulation by vertical growth.**Vegetative spread:** Forms large clumps by creeping rhizome.**Longevity:** Indefinite.**Primary juvenile period:** 1 year (Clarke 1989).**Flowers:** Yellow, sometimes pale purple towards the base, September–May.**Fruit/seed:** Achene 4–8 mm long with pappus of bristles 7–13 mm long, matures September–May.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed, vegetative multiplication absent; seedlings sun-tolerant, wind-tolerant; adults wind-tolerant, drought-tolerant (Clarke 1989). Adults tolerant of salinity, secondary sand coloniser.**Fire response:** Unlikely to be burnt.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:****Select locations:** North Avoca, Wamberal, Palm Beach, Narrabeen, Manly, Bondi, Lady Robinson's Beach (1887), Cronulla, Shoalhaven Heads.**Habitat****Habitat:** Coastal sand dunes and cliffs, on the incipient foredune and the foredune.**Altitude:** 0–20 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.

Vegetation:**Substrate:** Beach sand dunes, infertile, tolerant of underdeveloped soils.**Exposure:** Exposed to salt-laden sea breezes, full sun.**Conservation****Conservation:** Most herbarium records are pre-1950. Possibly now less common than previously due to loss of habitat.***Adenostemma lavenia* var. *lavenia*****ASTERACEAE**

Sticky Daisy

Life history**Growth form:** Semi-prostrate or erect herb 0.3–1 m high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, spring–early summer.**Fruit/seed:** Achene 2–4 mm long, with pappus of bristles 1 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC; Qld, N.T., Asia.**Distribution Sydney area:** Chiefly north from Bulahdelah, with an old record from Botany Bay (Harden 1992).**Select locations:** No CC specimens in Herbarium.**Habitat****Habitat:** Damp, shaded places (Harden 1992).**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Botany Bay southern limit, but now probably extinct in area.***Ageratina adenophora* *****ASTERACEAE**

Crofton Weed

Life history**Growth form:** Herb, with purplish, woody stems 1–2 m high from underground crown; short, thick rootstock has carrot-like odour when broken (Parsons & Cuthbertson 1992).**Vegetative spread:** Colonies increase in size when layering occurs; spread also occurs when pieces of root with portion of the crown attached take root (Parsons & Cuthbertson 1992).**Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, spring, September–November.**Fruit/seed:** Achene 1–2 mm long with pappus of hairs 3–4 mm long. 'Seeds' light (25,000 seeds/gm); mature plant can produce 10,000–100,000 seeds per year (Dyason 1986).**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed both locally and long distance. Also water-dispersed (M. Clarke pers. comm.). Dispersed in mud sticking to humans, animals, machinery and in agricultural produce, seeds germinate in light December–September, peak (more than 80% of viable seeds) in February and March; seedlings establish rapidly and if damaged are able to regenerate from the crown within 8 weeks of germination (Parsons & Cuthbertson 1992). Seedlings shade-tolerant, may be frost-sensitive. Coloniser.**Fire response:** Stems killed, resprouts at ground level. Resprouted from base and flowered

within 33 weeks after high-intensity fire (1/1994) at Lane Cove and Narrabeen (P. Kubiak pers. comm.)

Interaction with other organisms: Suspected of poisoning but seedlings palatable to stock; biological controls (insect and fungus) have been introduced but are not highly effective (Dyason 1986). Unpalatable to cattle but horses eat it readily, and die; sheep or goats can eat it without harm if other pasture is available. Biological control effective using a combination of organisms (Parsons & Cuthbertson 1992). Current experimental work with fungus *Phaeoramularia* species at Royal Botanic Gardens (Wang Fang pers. comm. 1994).

Distribution

Status/origin: Naturalised exotic, native to C. America. Introduced to Sydney c. 1875 from England where it had been grown as a 'stove ornamental', first collected as a garden escape in 1904 (Parsons & Cuthbertson 1992). Story from Lismore: Mayor Crofton on his deathbed said words to the effect of 'it wasn't me who introduced the plant, it was my next door neighbour' (M. Clarke pers. comm.).

Botanical subregions: NC CC; Qld, S.A.

Distribution Sydney area: Coastal, current southern limit Kiama.

Select locations: Morisset, Mooney Creek, Cheltenham, Lane Cove River (1918), Willoughby, Eastwood, Kurnell, Liverpool, Wollongong, Minnamurra Falls, Springwood.

Habitat

Habitat: Moist sites, disturbed areas, roadsides, creeklines. Steeply sloping, frost-free land (Parsons & Cuthbertson 1992).

Altitude: 0–400 m **Annual rainfall:** above 800 mm

Typical local abundance: Dominant.

Vegetation: Open areas—woodland and forest. Ground stratum.

Substrate: Sandstone and shale soils, fertile–infertile. Watertable permanently high—mostly high, moisture supply continuous–intermittent, fresh.

Exposure: Sheltered situations; mid–light shade. High growth-rate of seedlings in full sun, can tolerate considerable shade but die in full shade (Parsons & Cuthbertson 1992). Full sun if moisture available (M. Clarke pers. comm.).

Conservation

Conservation: Present in the Sydney area for more than 30 years and has spread rapidly there since the 1970s (Dyason 1986), Crofton weed control usually depends on correcting the drainage problem that allowed the weed to establish (McLoughlin & Rawling 1990). Major weed of moist sites in bushland. Declared noxious weed in many shires.

Ageratina riparia *

Mist Flower

ASTERACEAE

Life history

Growth form: Herb 0.3–1 m high, stems purplish, erect, or decumbent, often with adventitious roots.

Vegetative spread: Stems in contact with soil form new plants by rooting from nodes (L.McD.). Colonies increase in size and density by layering, forming a mat of interwoven stems (Parsons & Cuthbertson 1992).

Longevity: Indefinite.

Primary juvenile period:

Flowers: White, August–November.

Fruit/seed: Achene 1–2 mm long, with pappus of hairs 3–4 mm long, mature September–December. Mature plants produce 10,000–100,000 seeds per year (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fruit. Wind-dispersed, both locally and long distances. Water-dispersed, in mud by humans and animals, and dispersed as stem fragments; seed germinates immediately, but only in light, best at temperatures of 25° C–15° C (Parsons & Cuthbertson 1992).

Fire response: Resprouted from base after high-intensity fire (1/1994) at Lane Cove, flowering within 34 weeks (P. Kubiak pers. comm.) Stems killed, resprouts at ground level (R. Buchanan pers. comm.).

Interaction with other organisms: May be toxic to stock; leachates from leaves and plant litter have an allelopathic effect on other plants (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to Central America; garden escape. Growing in Royal Botanic Gardens Sydney 1895 (Parsons & Cuthbertson 1992).

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coastal, north from Berry.

Select locations: Gosford, Galston Gorge, Pennant Hills, Northbridge, Sydney (1906), Bellevue Hill, Royal NP, Albion Park, Macquarie Pass (P. Kodela pers. comm.), Jamberoo, Foxground.

Habitat

Habitat: Disturbed gullies and creek banks.

Altitude: 0–200 m **Annual rainfall:** above 1200 mm

Typical local abundance: Dominant–frequent.

Vegetation: Ground stratum. In or near rainforest, along creeks.

Substrate: Creeks and gullies in sand and amongst rocks, sandstone. Soil fertile–infertile. Watertable mostly high, moisture supply continuous, fresh.

Exposure: Sheltered. Shade deep–mid. Seedling very shade-tolerant (R. Buchanan pers. comm.).

Conservation

Conservation: A declared noxious weed in many shires, invading bushland along creeklines.

Ageratum houstonianum* **ASTERACEAE****Life history**

Growth form: Erect or decumbent herb 0.3–1 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Blue–mauve, most of the year.

Fruit/seed: Achene, 2 mm long, with pappus of awned scales 2–3 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Mexico; widespread in Central America. Garden escape, rarely naturalised.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coastal Sydney.

Select locations: Palm Beach (1961), Narrabeen Lake, Glenfield.

Habitat

Habitat: Roadside, paddocks, creek bank.

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

Typical local abundance: Rare.

Vegetation: Weedy sites.

Substrate: Probably clay soils.

Exposure:

Conservation

Conservation: Rarely naturalised in bushland.

Ambrosia artemisiifolia* **ASTERACEAE**

Annual Ragweed

Life history

Growth form: Shallow-rooted herb to 2 m high.

Vegetative spread: No.

Longevity: Annual.

Primary juvenile period: Less than 1 year.

Flowers: Summer–autumn. Wind-pollinated (Ciba-Geigy 1968–).

Fruit/seed: Nut-like involucre, achene retained inside, one per fruit. Seed may remain viable in soil for 40 years or more in U.S.A. (Payne 1970).

Dispersal, establishment & growth: Dispersed by wind, water, animals and humans (with red clover seed from US); germinates in spring; tends to occur in masses (Ciba-Geigy 1968-). Considerable variability in progeny enhances survival of this species (Payne 1970).

Fire response: ? Resprouted — one plant flowering within 13 weeks of high-intensity fire (1/1994) at Narrabeen (P. Kubiak pers. comm.)

Interaction with other organisms: Known to cause hay fever and severe allergic conjunctivitis in humans, potential to cause asthma (Bass & Wrigley 1984). Potential to cause asthma in humans (Bass 1987). Cattle eating it develop sore mouths (Hurst 1942).

Distribution

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

Botanical subregions: NC CC; Qld, S.A.

Distribution Sydney area: Only Sydney record, Cremorne (1948).

Select locations: Cremorne (1948)

Habitat

Habitat: Roadsides, wasteland and cultivation.

Altitude: 0–50 m **Annual rainfall:** > 1200 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Weed of wasteland and cultivated areas north of Sydney, no recent records for Sydney area.

Ambrosia psilostachya *

ASTERACEAE

Perennial Ragweed

Life history

Growth form: Erect, stout herb to 2 m high, with rhizomes to almost 1 m deep; leaves aromatic.

Vegetative spread: Spread by creeping rhizomes and through cultivation — stimulation of new growth from damaged plant and pieces of rhizome (Parsons 1973). Often forms extensive colonies.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Cream or green, late spring–summer (Parsons 1973).

Fruit/seed: Nut-like involucre with short spines, achene retained inside, one per fruit.

Dispersal, establishment & growth: Diaspore: fruit, animal-dispersed over long distance due to spines on fruit; seeds germinate in autumn, plants develop rapidly in winter and spring developing extensive perennial roots and rhizomes, flowers late spring, aerial growth dies off in summer, new growth from buds on rhizomes in autumn; seeds can survive in soil for several years (Parsons 1973).

Fire response: Probably resprouts.

Interaction with other organisms: Pollen causes hay fever and severe allergic conjunctivitis in humans (Bass & Wrigley 1984). Not grazed by stock (Parsons 1973).

Distribution

Status/origin: Naturalised exotic, native to America. First recorded in Australia at Tomingley in NSW, 1924 (Parsons 1973).

Botanical subregions: NC CC NT CT NWS CWS SWS NWP SWP; Qld, Vic.

Distribution Sydney area: Mainly northern suburbs of Sydney.

Select locations: Lisarow, Mona Vale, Dee Why, Frenchs Forest, Willoughby, Mosman (1934), Earlwood, Orange.

Habitat

Habitat: Roadside, paddock.

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

Typical local abundance: Uncommon–prolific.

Vegetation: Roadside and wasteland weeds.

Substrate: Sandy soil, damp sites, banks, possibly disturbed soil.

Exposure:

Conservation

Conservation: Declared noxious weed in some shires.

***Ambrosia tenuifolia* *** (*Ambrosia confertifolia*)

ASTERACEAE

Lacy Ragweed

Life history

Growth form: Erect, aromatic herb to 75 cm high with long runner roots.

Vegetative spread: Spreads by long, underground, runner-like roots (Cunningham et al. 1981).

Longevity: Indefinite.

Primary juvenile period:

Flowers: Light green, December–April. Male flowerheads numerous, female heads single or few together (Cunningham et al. 1981).

Fruit/seed: Nut-like involucre with minute black achenes retained inside.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: May cause hay fever and severe allergic conjunctivitis in humans (Bass & Wrigley 1984).

Distribution

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

Botanical subregions: NC CC CT NWS CWS SWP NFWP; Vic., S.A., W.A.

Distribution Sydney area: Suburban areas.

Select locations: Wondabyne, Neutral Bay, Mascot, Ashfield (1932), Clyde, Granville, Albion Park, Moss Vale.

Habitat

Habitat: Railway lines, disturbed areas.

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

Typical local abundance: Common.

Vegetation: Weedy vegetation including, e.g. *Cortaderia selloana*, *Phragmites*.

Substrate: Sandy soil.

Exposure:

Conservation

Conservation: Declared noxious weed in some shires.

Ammobium alatum

ASTERACEAE

Life history

Growth form: Herb 60–100 cm high.

Vegetative spread:

Longevity: Perennial or facultative annual.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, November–March.

Fruit/seed: Achene 3–4 mm long, with pappus a membranous cup 0.5 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Suspected of causing string-halt in horses and death of stock (Hurst 1942).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly cooler parts of the area.

Select locations: Kanimbla Valley, Mandurama, Orange, Bowral, Moss Vale, Mittagong (1938).

<p>Habitat: Grassland and woodland, roadsides. Altitude: above 500 m Annual rainfall: above 800 mm Typical local abundance: Occasional–frequent. Vegetation: Grassland and woodland, roadsides,, e.g. with <i>Acacia mearnsii</i>. Substrate: Exposure: Full sun.</p>	Habitat
Conservation:	Conservation

***Anthemis arvensis* ***

ASTERACEAE

Corn Chamomile

Life history

Growth form: Herb to 60 cm high.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** White, disc yellow, December–February. Insect and self-pollinated (Ciba-Geigy 1968–).**Fruit/seed:** Achene 1.5–2.5 mm long, pappus an irregular rim, mature February.**Dispersal, establishment & growth:** Probably wind-dispersed (is ligule persistent for long enough to aid dispersal?) Dispersed by wind, water, animals and humans (with white clover seeds); germinates in spring and autumn; moderate to vigorous user of nutrients and competitor for space (Ciba-Geigy 1968–).**Fire response:** Probably killed.**Interaction with other organisms:** Used in folk medicine for wound-healing and as a vermifuge (Ciba-Geigy 1968–).

Distribution

Status/origin: Naturalised exotic, native to S Europe. World-wide in temperate zones, companion since early Stone Age, now strongly regressing (Ciba-Geigy 1968–).**Botanical subregions:** NC NT CT; Vic., Tas., S.A.**Distribution Sydney area:** Taralga area.**Select locations:** Wombeyan Caves (1921), Richlands (1962).

Habitat

Habitat: Fields.**Altitude:** 800 m **Annual rainfall:** 800 mm**Typical local abundance:** Frequent.**Vegetation:** Grassy sites.**Substrate:** Nitrogenous soils, moist situations, indicator of acidity (Ciba-Geigy 1968–).**Exposure:**

Conservation

Conservation: Localised exotic, rarely recorded.***Anthemis cotula* ***

ASTERACEAE

Stinking Mayweed

Life history

Growth form: Herb to 60 cm high with foetid scent.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, disc white–cream November–April.**Fruit/seed:** Achene 1.5 mm long, no pappus.**Dispersal, establishment & growth:** Dispersed by water, animals and humans (Ciba-Geigy 1968–).**Fire response:****Interaction with other organisms:** 'rather a trouble on cultivated land but good food for

horses and cattle when ripening' (James Walsh 1904 — Herbarium note). Thought to taint milk (Herbarium note).

Distribution

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

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

Distribution Sydney area: Coast and Bathurst–Orange.

Select locations: Ourimbah, Turramurra, Royal Botanic Gardens (1902), Flemington, Jamberoo, Jenolan Caves, Bathurst, Orange (1907).

Habitat

Habitat: Saleyards, paddocks.

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

Typical local abundance: Occasional–frequent.

Vegetation: Grasslands, cultivated land.

Substrate: Agricultural soils. Nitrogenous soil, clay indicator (Ciba-Geigy 1968–).

Exposure:

Conservation

Conservation: Weed of cultivated areas.

***Arctium lappa* ***
ASTERACEAE

Greater Burdock

Life history

Growth form: Herb 1–1.5 m high.

Vegetative spread:

Longevity: 2 years.

Primary juvenile period:

Flowers: Purplish-red, summer–autumn.

Fruit/seed: Achene 6–7 mm long, with pappus 1–3.5 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: CT; Qld, Vic., N.Z.

Distribution Sydney area: Carcoar.

Select locations: 3 miles from Orange (1968) (only record).

Habitat

Habitat: Roadside.

Altitude: 700 m **Annual rainfall:** 700 mm

Typical local abundance:

Vegetation: Roadside vegetation.

Substrate: Shaley soil.

Exposure:

Conservation

Conservation: Only record indicates 'isolated infestation of a few square yards'.

***Arctium minus* ***
ASTERACEAE

Common Burdock

Life history

Growth form: Herb 0.5–1.5 m high.

Vegetative spread:

Longevity: 2 years.

Primary juvenile period:

Flowers: Pink or purplish, summer–autumn.

Fruit/seed: Achene 5–7 mm long, with pappus 1–3.5 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

<p>Status/origin: Naturalised exotic, native to Europe. Botanical subregions: NC CT NWP SWP; Tas. Distribution Sydney area: Orange area (Harden 1992). Select locations: No specimens for Sydney area.</p>	Distribution
<p>Habitat: Roadsides and disturbed sites. Altitude: 800 m Annual rainfall: 1000 mm Typical local abundance: Vegetation: Substrate: Exposure:</p>	Habitat
<p>Conservation: Localised weed of disturbed sites.</p>	Conservation

***Arctotheca calendula* *** (Cryptostemma calendula)

ASTERACEAE

Cape Weed, Cape Dandelion

Life history**Growth form:** Herb to 30 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pale yellow, greenish or purple, September–November.**Fruit/seed:** Achene 2 mm long with pappus of short scales.**Dispersal, establishment & growth:** Diaspore: fruit. Wind-dispersed (Carr et al. 1992).**Fire response:**

Interaction with other organisms: Known to cause allergy in humans where density is high (Bass 1987). Foodplant of butterfly caterpillar *Vanessa kershawii* (Coupar & Coupar 1992). Seeds eaten by Brown Songlark *Cinclorhamphus cruralis* (Barker & Vestjens 1989, 1990). Flowers eaten by Galah *Cacatua roseicapilla*, roots eaten by Sulphur-crested Cockatoo *Cacatua galerita*; flowers, seed, leaf midrib eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993).

Distribution**Status/origin:** Naturalised exotic, native to S Africa.**Botanical subregions:** NC CC SC CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Coast, western Blue Mountains, Southern Highlands (P. Kodela pers. comm.).**Select locations:** Gosford, Cheltenham, Brighton-le-sands, Cooks River (1912), Coogee, Cabramatta, Casula, Jenolan Caves (1899), Orange, Robertson (P. Kodela pers. comm.).**Habitat****Habitat:** Lawns, pastures and cultivated areas.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Pasture, lawn, edges of bushland.**Substrate:** Beach sand, roadside gravel. Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Exposed, full sun.**Conservation****Conservation:** Unlikely to invade bushland.***Arctotheca populifolia* *** (*Arctotheca nivea*)

ASTERACEAE

Beach Daisy

Life history**Growth form:** Semi-succulent herb to 30 cm high, with spreading growth.**Vegetative spread:****Longevity:** Perennial.

Primary juvenile period:**Flowers:** Yellow, most of the year.**Fruit/seed:** Achene 5 mm long, covered with greyish wool, pappus of minute scales.**Dispersal, establishment & growth:** Diaspore: fruit, blown across ground or floats on water (buoyant for a few days). Possibly wind-dispersed (Carr et al. 1992). Seeds not dormant, high germination rate when fresh (and easily propagated (Heyligers 1983)).

Primary coloniser species of upper beach and mobile dunes. Drought-tolerant.

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S Africa, first collected in W.A., 1930.**Botanical subregions:** NC CC SC; Vic., S.A., W.A.**Distribution Sydney area:** Coastline, first reported near Newcastle in 1930s (Nelson Bay 1937) and spread south to Brou Lake by 1981 (Heyligers 1983).**Select locations:** The Entrance (1946), Marley Beach (1971).**Habitat****Habitat:** Unstable littoral habitats, sandy hollows between dunes.**Altitude:** 0–20 m **Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Pioneer of beach sand on front dunes with *Spinifex sericeus*.**Substrate:** Beach sand dunes, calcareous and siliceous sand, infertile.**Exposure:** Exposed to salt spray, full sun, tolerant of sand blast.**Conservation****Conservation:** Suggested for beach stabilisation by Heyligers (1983) as it does not show any tendency to spread beyond the habitats to which it is confined in Africa (i.e. upper beach and mobile dunes) or compete with young native shrubs on the dunes.***Arctotis stoechadifolia* *****ASTERACEAE**

White Arctotis

Life history**Growth form:** Spreading herb to 35 cm high.**Vegetative spread:** Forms mats.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Ray florets white above, mauve below, with a dark band at the base, disc purple-black, August–October.**Fruit/seed:** Achene 3–4 mm long, with pappus of scales 3–4 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S Africa.**Botanical subregions:** NC CC CWS; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Northern Illawarra coast.**Select locations:** Thirroul (1946), Austinmer (1966).**Habitat****Habitat:** Weed of roadsides, beach margins.**Altitude:** 0–50 m **Annual rainfall:** above 1400 mm**Typical local abundance:** Isolated clumps.**Vegetation:** Beach margins.**Substrate:** Sandy soils, infertile.**Exposure:****Conservation****Conservation:** Garden escape unlikely to be spreading generally, though possibly spreading locally.

Arrhenechthites mixta

ASTERACEAE

Purple Fireweed

Life history**Growth form:** Herb to 90 cm high.**Vegetative spread:** No.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, December–March.**Fruit/seed:** Achene 5–7 mm long with pappus of white bristles 10–15 mm long, mature December–March.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST; Vic.**Distribution Sydney area:** Blue Mountains.**Select locations:** Clarence, Blackheath, Mt Victoria, Mt Wilson, Jenolan Caves, Hilltop, Wingello.**Habitat****Habitat:** Mostly in gullies.**Altitude:** 700–1200 m**Annual rainfall:** above 900 mm**Typical local abundance:** Occasional.**Vegetation:** Eucalypt woodland, ground stratum.**Substrate:** Sandstone–shale, infertile soil. Watertable mostly low, moisture supply intermittent, fresh.**Exposure:** Sheltered.**Conservation****Conservation:** Conservation status unknown.***Artemisia verlotiorum* ***

ASTERACEAE

Chinese Wormwood, Mugwort

Life history**Growth form:** Herb to 1 m, dying back to rootstock annually.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** February–March. Wind and self-pollinated (Ciba-Geigy 1968–).**Fruit/seed:** Achene, 1–1.5 mm long, no pappus, mature May.**Dispersal, establishment & growth:** Diaspore: seed. Water and wind-dispersed (Carr et al. 1992). Germinates in light; moderate–vigorous competitor for space and user of nutrients (Ciba-Geigy 1968–).**Fire response:****Interaction with other organisms:** Formerly used as a medicine, condiment, and for rites; unpleasant scent deters domestic animals; pollen causes hay-fever (Ciba-Geigy 1968–).**Distribution****Status/origin:** Naturalised exotic, native of SW China.**Botanical subregions:** NC CC SC NT CT ST CWS SWS SWP; Qld, Vic.**Distribution Sydney area:** Coast and upper Blue Mountains.**Select locations:** Manly, Vaucluse, Dundas (1911), Beecroft, Katoomba, Lithgow, Wallerawang (1937), Moss Vale.**Habitat****Habitat:** Disturbed areas, often in moist sites.**Altitude:** 0–1100 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Mid stratum.

Substrate: Shale and sandstone soils, fertile–infertile.

Exposure:

Conservation

Conservation: Naturalised exotic, apparently posing little problem.

***Aster novi-belgii* ***

ASTERACEAE

Michaelmas Daisy

Life history

Growth form: Herb 0.2–1.4 m high, with long rhizomes.

Vegetative spread: Spreads by creeping root system.

Longevity: Indefinite.

Primary juvenile period:

Flowers: Purplish-blue, January–March.

Fruit/seed: Achene with pappus of bristles.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to N America, garden escape.

Botanical subregions: CC CT.

Distribution Sydney area: Sydney suburbs and upper Blue Mountains.

Select locations: Northbridge (1965), Katoomba (1979), Portland (1982).

Habitat

Habitat: Moist swamps, gullies and on roadsides.

Altitude: 0–1000 m

Annual rainfall: above 1000 mm

Typical local abundance: Occasional.

Vegetation:

Substrate: Sandy soils from sandstone, infertile, moist sites.

Exposure:

Conservation

Conservation: Occasional garden escape, naturalised near habitation.

***Aster subulatus* ***

ASTERACEAE

Wild Aster, Bushy Starwort

Life history

Growth form: Herb 0.3–1.8 m high.

Vegetative spread: No.

Longevity: Annual, biennial or short-lived perennial.

Primary juvenile period: 1 year.

Flowers: White, pink or blue, at any time throughout the year.

Fruit/seed: Achene, 1.5–2 mm long, with pappus of bristles.

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

Fire response:

Interaction with other organisms:

Distribution

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

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

Distribution Sydney area: Widespread.

Select locations: Dural, Epping, Sandringham (1902), Kurnell, Milperra, Richmond, Camden, Warrimoo, Wolgan Valley, Kowmung River, Bowral.

Habitat

Habitat: Riverbanks, swamp edges and roadside drains.

Altitude: 0–800 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional–frequent.

Vegetation: Swamp edges, e.g. with *Ludwigia peploides*, *Paspalum distichum*.

Substrate: Seasonally wet, poorly drained or damp areas on sand, sandstone, shale and alluvium. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Minor weed though may be important in wetland sites.

Baccharis halimifolia* **ASTERACEAE**

Groundsel Bush

Life history

Growth form: Shrub 1–6 m high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellowish, December–May.

Fruit/seed: Achene 1–1.7 mm long with pappus of numerous hair-like bristles.

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

Fire response:

Interaction with other organisms: Regarded as poisonous to sheep, suspected of poisoning other stock (Hurst 1942).

Distribution

Status/origin: Naturalised exotic, native to eastern N America.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Illawarra coast.

Select locations: Wollongong (1982), Shellharbour (1984).

Habitat

Habitat: Near the sea, also in swampy areas, low-lying pasture and disturbed sites.

Altitude: 0–50 m

Annual rainfall: above 1200 mm

Typical local abundance: Occasional.

Vegetation: Often behind mangroves, or low-lying pasture.

Substrate: Sands, infertile.

Exposure: ? full sun.

Conservation

Conservation: Recently recorded for Sydney area, declared noxious weed in some shires.

Bidens pilosa* **ASTERACEAE**

Cobblers Pegs, Pitch-forks

Life history

Growth form: Woody herb to 1.5 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: 18 weeks (P. Kubiak pers. comm.).

Flowers: Usually white, throughout the year but mainly March–May.

Fruit/seed: Achene with pappus of barbed awns, mature at any time but mainly March–May. Single plant can produce 3000–6000 seeds, 80 % still capable of germination after 3–5 years stored in soil (M. Clarke pers. comm.). An indeterminate number capable of germination after more than 30 years (R. Buchanan pers. comm.).

Dispersal, establishment & growth: Diaspore: fruit, animal-dispersed (e.g. on human clothing).

Fire response: Probably killed, vigorous recruitment from seed after high-intensity fire (1/1994) at Narrabeen; most likely from soil-stored seed (M. Clarke pers. comm.). Mature fruit within 18 weeks of high-intensity fire (1/1994) at Narrabeen and Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S America. Used medicinally, in Asia, New Guinea, and Polynesia (Cambie & Ash 1994).

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

Distribution Sydney area: Mainly coastal.

Select locations: Gosford, Palm Beach, Wahroonga, Belrose & Cherrybrook (P. Kodala pers. comm.), Port Jackson (1886), La Perouse, Cabarita, Wollongong, Albion Park, Grose Vale, Ingleburn, Razorback.

Habitat

Habitat: Disturbed sites, roadsides.

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

Typical local abundance: Frequent.

Vegetation: With other weeds of frequently disturbed sites.

Substrate: Clay soils from Wianamatta Shale, sandstones, alluvium, fill etc., any substrate (R. Buchanan pers. comm.), no special requirements for nutrient, moisture etc. (M. Clarke pers. comm.).

Exposure: Light shade–full sun.

Conservation

Conservation: Common weed, in recently or frequently disturbed sites.

***Bidens subalternans* ***
ASTERACEAE

Greater Beggar's Ticks

Life history

Growth form: Woody herb to 1.6 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, March–April.

Fruit/seed: Barbed achene, with pappus of barbed awns, mature February–June.

Dispersal, establishment & growth: Diaspore: fruit, animal-dispersed, e.g. on clothing.

Fire response: Probably killed; flowering within 12 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.)

Interaction with other organisms:

Distribution

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

Botanical subregions: NC CC NWS CWS NWP SWP; Qld.

Distribution Sydney area: Mainly Western Sydney.

Select locations: Lindfield (1951), Parramatta, Cattai Creek, Emu Plains, Casula, Camden, Menangle, Albion Park.

Habitat

Habitat: Disturbed sites — along railway lines, wasteland, roadsides.

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

Typical local abundance: Common.

Vegetation: With other weeds, e.g. *Bidens pilosa*, *Sida rhombifolia*.

Substrate: Sandy soils, consolidated sand dune, infertile.

Exposure:

Conservation

Conservation:

***Bidens tripartita* ***
ASTERACEAE

Burr Marigold

Life history

Growth form: Woody herb to 1 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, March–May.

Fruit/seed: Barbed achene, 4–8 mm long, with pappus of barbed awns 2–4 mm long, mature March–May.

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

Fire response: Probably killed; flowering and fruiting within 15 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

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

Distribution Sydney area: Mainly coastal.

Select locations: Centennial Park, Macquarie Pass, Bellawongarah, (1904), Cambewarra, Bowral, Wingecarribee Swamp (P. Kodela pers. comm.).

Habitat

Habitat: Swampy ground, damp pasture (P. Kodela pers. comm.).

Altitude: 0–700 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent.

Vegetation: Margin of swamps.

Substrate: Moist sites, poorly-drained.

Exposure:

Conservation

Conservation:

Brachycome aculeata
ASTERACEAE

Hill Daisy

Life history

Growth form: Herb to 60 cm high. Populations vary in shape of leaves and branching of inflorescence.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: White–mauve, September–May.

Fruit/seed: Achene, flattened, 3–4 mm long, with pappus a small tuft of bristles 0.3 mm long.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms: Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mostly Bathurst to Taralga, early records from Sydney area.

Select locations: Palm Beach (1916), Parramatta (von Mueller), Richmond (1913), Richlands, Black Range, Jenolan Caves, Jenolan SE, Bathurst, Wombeyan Caves, Mittagong, Barbers Creek (1899). (Some material on loan.)

Habitat

Habitat: Roadside.

Altitude: 0–1000 m

Annual rainfall: above 600 mm

Typical local abundance:

Vegetation: Grassland, ground stratum.

Substrate: Well drained to dry sites.

Exposure:

Conservation

Conservation: Conservation status unknown.

Brachycome angustifolia* var. *angustifolia

ASTERACEAE

Life history**Growth form:** Stoloniferous, ascending herb to 35 cm high; leaves entire.**Vegetative spread:** Stoloniferous.**Longevity:** Indefinite, stolons up to 10 cm long forming new plants; vegetative production of new plants may allow continued replacement as old plants die.**Primary juvenile period:****Flowers:** Pink, blue or mauve, November–March.**Fruit/seed:** Achene, flattened 2 mm long, pappus 0.4 mm long.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:** Possibly resprouts from stolons. Flowering within 11 weeks and fruiting within 16 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST NWS; Vic., Tas., S.A.**Distribution Sydney area:** Coast and western Sydney, Blue Mountains.**Select locations:** Warnervale, Gordon, Ermington, Duck River, Cronulla, Appin, Douglas Park, Llandillo, Lidsdale, Katoomba, Kowmung River, Bowral. (Some material on loan.)**Habitat****Habitat:****Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** Moist–dry eucalypt open-forest. Ground stratum.**Substrate:** Clay soils from shales, also sandstone. Fertile soil. Watertable mostly low, moisture supply intermittent, fresh.**Exposure:** Sheltered.**Conservation****Conservation:** Conserved in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.***Brachycome angustifolia* var. *heterophylla***

ASTERACEAE

Life history**Growth form:** Stoloniferous, ascending herb to 35 cm high, leaves pinnatisect to deeply toothed.**Vegetative spread:** Stoloniferous.**Longevity:** Indefinite.**Primary juvenile period:****Flowers:** Pink, blue or mauve, November–March.**Fruit/seed:** Achene, flattened, 2 mm long, pappus of bristles, 0.4 mm long.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS; Vic.**Distribution Sydney area:** Mainly western Blue Mountains and southern Highlands.**Select locations:** North of Windsor, Toongabbie (1859), El Dorado, Mt Costigan, Abercrombie Caves, Stingray Swamp, Wingecarribee Swamp, Joadja. (Some material on loan.)**Habitat****Habitat:** Eucalypt open-forest.**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm**Typical local abundance:****Vegetation:** Eucalypt open-forest.**Substrate:** Possibly associated with swampy soils.**Exposure:****Conservation****Conservation:** Conservation status unknown.

Brachycome decipiens

ASTERACEAE

Field Daisy

Life history

Growth form: Herb to 20 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Pale blue, September–November.**Fruit/seed:** Achene 3 mm long, with minute pappus.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.**Botanical subregions:** CT ST; Vic., Tas.**Distribution Sydney area:** Chiefly south from Braidwood area (Harden 1992).**Select locations:** Jenolan Caves (1899). (Some material on loan.)

Habitat

Habitat:**Altitude:** 800 m**Annual rainfall:** 1000 mm**Typical local abundance:****Vegetation:** Subalpine and montane woodland and swamps (Harden 1992).**Substrate:****Exposure:**

Conservation

Conservation: Conservation status unknown.***Brachycome diversifolia* var. *dissecta***

ASTERACEAE

Large-headed Daisy

Life history

Growth form: Herb to 45 cm high; leaves 2-pinnatisect.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White–mauve, June–December.**Fruit/seed:** Achene 2–3 mm long, with pappus of hairs 0.5 mm long, mature February.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NT CT NWS NWP; Qld.**Distribution Sydney area:** Western Blue Mountains.**Select locations:** Rylstone (1938), Katoomba (1932). (Some material on loan.)

Habitat

Habitat: Rocky outcrops.**Altitude:** 700–1000 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:** Ground stratum.**Substrate:** Soil pockets in depressions of rocky outcrops.**Exposure:**

Conservation

Conservation: Southern limit Katoomba; possibly rare. Conservation status unknown.

Brachycome diversifolia* var. *diversifolia

ASTERACEAE

Large-headed Daisy

Life history**Growth form:** Herb to 45 cm high; leaves 1-pinnatisect.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White-mauve, November-April.**Fruit/seed:** Achene 2-3 mm long, with pappus of hairs 0.5 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NT CT ST SWS; Tas., S.A.**Distribution Sydney area:** Western Blue Mountains.**Select locations:** Capertee, Zig Zag, Blackheath, Mt Victoria, Sunny Corner. (Some material on loan.)**Habitat****Habitat:** Damp rocky areas.**Altitude:** 700-1000 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:** Ground stratum.**Substrate:** Sandy soil — damp rocky areas.**Exposure:****Conservation****Conservation:** Conservation status unknown.***Brachycome formosa***

ASTERACEAE

Pilliga Posy

Life history**Growth form:** Rhizomatous herb to 15 cm high. Chromosome number $n = 9$ (Short 1988).**Vegetative spread:** Possibly.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Pink, September-November.**Fruit/seed:** Achene 2-3 mm long, wing narrow, with slightly inflated, pappus 0.2 mm long.

Observations of low seed set in cultivated specimens suggests self-incompatibility (Short 1988).

Dispersal, establishment & growth: Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT NWS CWS.**Distribution Sydney area:** Bathurst area.**Select locations:** Bathurst-Grattai Rd (1953), high mountains near Mudgee (1872) (Short 1988). (Some material on loan.)**Habitat****Habitat:** In grass along roadside, on sandstone ridges (Short 1988).**Altitude:****Annual rainfall:****Typical local abundance:****Vegetation:** Dry eucalypt open-forest and woodland with sparse shrub understorey. Under *Angophora floribunda* (Short 1988).**Substrate:****Exposure:****Conservation****Conservation:** Rare, conservation status unknown.

Brachycome graminea

ASTERACEAE

Life history

Growth form: Stoloniferous herb to 70 cm high.**Vegetative spread:** Stoloniferous.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Blue-violet, December-February.**Fruit/seed:** Achene 2 mm long, no pappus.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC NT CT ST; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Western Blue Mountains, also Razorback.**Select locations:** Razorback, Blackheath, Newnes Junction, Capertee, Gardiners Gap, Bathurst, Blayney. (Some material on loan.)

Habitat

Habitat: Swampy ground.**Altitude:** 0-1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Eucalypt woodland, shrub swamps.**Substrate:** Swampy ground on shale and sandstone. Soil fertile-infertile, watertable mostly high, non-saline.**Exposure:** No shade.

Conservation

Conservation: Conservation status unknown.***Brachycome heterodonta* var. *heterodonta***

ASTERACEAE

Life history

Growth form: Erect herb to 50 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White or bluish, September-December.**Fruit/seed:** Achene, flattened 3-4 mm long, pappus 0.7 mm long.**Dispersal, establishment & growth:** Diaspore: fruit. Short distance wind-dispersed, probably also dispersed by water.**Fire response:** Probably reshoots from rhizome.**Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., S.A.**Distribution Sydney area:****Select locations:** Bathurst to Sofala (1910). (Some material on loan.)

Habitat

Habitat:**Altitude:****Annual rainfall:****Typical local abundance:****Vegetation:** Ground stratum.**Substrate:****Exposure:**

Conservation

Conservation: Conservation status unknown.

Brachycome microcarpa

ASTERACEAE

Life history**Growth form:** Herb to 58 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White or bluish, September–February.**Fruit/seed:** Achene 1–2 mm long with glandular hairs, pappus of white bristles 0.1 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC NT CT NWS; Qld.**Distribution Sydney area:****Select locations:** Littleton (1893), Abercrombie Caves (1951). (Specimens on loan.)**Habitat****Habitat:****Altitude:** 600–1000 m**Annual rainfall:** 900 mm**Typical local abundance:****Vegetation:** Open-forest.**Substrate:** Well-drained sites.**Exposure:****Conservation****Conservation:** Conservation status unknown.***Brachycome multifida* var. *dilatata***

ASTERACEAE

Cut-leaved Daisy

Life history**Growth form:** Herb to 45 cm high (leaf segments broad-linear).**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Mauve, pink or white, March–October.**Fruit/seed:** Achene 2 mm long, pappus of spreading bristles 0.1 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC; Vic.**Distribution Sydney area:** Wisemans Ferry.**Select locations:** Wisemans Ferry (1908). (Some material on loan.)**Habitat****Habitat:** Sclerophyll forest.**Altitude:** 0–200 m**Annual rainfall:** 800 mm**Typical local abundance:****Vegetation:** Sclerophyll forest. Ground stratum.**Substrate:****Exposure:****Conservation****Conservation:** Conservation status unknown.

Brachycome multifida* var. *multifida

ASTERACEAE

Cut-leaved Daisy

Life history

Growth form: Herb to 45 cm high.**Vegetative spread:** Sprawling stems capable of layering (L.McD.)**Longevity:** Annual.**Primary juvenile period:** Less than 1 year.**Flowers:** Mauve, pink or white, September–June.**Fruit/seed:** Achene 2 mm long, with pappus of spreading bristles 0.1 mm long.**Dispersal, establishment & growth:** [Easily grown from cuttings (L.McD.)**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC NT CT NWS CWS NWP SWP SFWP; Qld, Vic.**Distribution Sydney area:** Western Sydney, Minnamurra, Bathurst.**Select locations:** Maroota, WInsdor, Minnamurra Falls, Bathurst, Mt Wiagdon. (Some material on loan.)

Habitat

Habitat:**Altitude:** 0–1000 m**Annual rainfall:** above 700 m**Typical local abundance:** Frequent.**Vegetation:** Sclerophyll forest or grassland (e.g. with *Eucalyptus piperita* at Maroota).
Ground stratum.**Substrate:** Yellow clay, infertile soil.**Exposure:**

Conservation

Conservation: Conservation status unknown.***Brachycome procumbens***

ASTERACEAE

Life history

Growth form: Stoloniferous, ascending herb to 35 cm high.**Vegetative spread:** Stoloniferous.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** September–March.**Fruit/seed:** Achene 2.5 mm long, pappus 0.2 mm long.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC NT CT NWS CWS; Qld.**Distribution Sydney area:** Ben Bullen SF.**Select locations:** Ben Bullen SF. (Some material on loan.)

Habitat

Habitat:**Altitude:** 800 m**Annual rainfall:** 800 mm**Typical local abundance:****Vegetation:** Open-forest, e.g. with *Eucalyptus dives* and grassy understorey.**Substrate:** Clay loam. Infertile soil. Watertable mostly low, moisture supply intermittent, fresh.**Exposure:**

Conservation

Conservation: Conservation status unknown.

Brachycome ptychocarpa

ASTERACEAE

Life history

Growth form: Glabrous herb 5–10 cm high. Some plants from the CT differ in being stoloniferous perennial herbs and could represent a new, closely related taxon.

Vegetative spread: No, (some plants from CT are stoloniferous).

Longevity: Annual, (some plants from CT are perennial).

Primary juvenile period:

Flowers: Pink, October–April.

Fruit/seed: Achene 2 mm long, with broad wings and pappus of bristles 0.2 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NT CT ST CWS; Vic.

Distribution Sydney area: Bathurst–Orange

Select locations: Kandos, Wattle Flat, Meadow Flat, Glenroy, Springside, Mt Canobolas, Carcoar. (Some material on loan.)

Habitat

Habitat:

Altitude: 700–1400 m **Annual rainfall:** 600–900 mm

Typical local abundance: Occasional.

Vegetation: Woodland,, e.g. with *Eucalyptus pulverulenta* ground stratum.

Substrate: Moist ground, granite. Infertile soil.

Exposure:

Conservation

Conservation: Conservation status unknown.

Brachycome rigidula

ASTERACEAE

Life history

Growth form: Herb to 36 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Blue, October–February.

Fruit/seed: Achene 2–3 mm long, winged; pappus of hairs 0.2 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Western fringe of the Blue Mountains.

Select locations: Mt Walker. (Some material on loan.)

Habitat

Habitat:

Altitude: **Annual rainfall:**

Typical local abundance:

Vegetation: Woodland with *Eucalyptus rossii*, *E. mannifera*, *E. dives*.

Substrate: Well-drained sites, among rocks — quartzites, siltstones.

Exposure:

Conservation

Conservation: Conservation status unknown.

Brachycome scapigera

ASTERACEAE

Life history

Growth form: Erect, glabrous herb to 40 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White or mauve, November–March.**Fruit/seed:** Achene 2–3 mm long, flattened, pappus minute (0.1 mm long).**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.**Botanical subregions:** SC NT CT ST NWS CWS; Qld, Vic.**Distribution Sydney area:** Southern highlands.**Select locations:** Jenolan Caves (1899), Wingello (1899), Wingecarribee Swamp (1969). (Some material on loan.)

Habitat

Habitat: Moist sites.**Altitude:** 600–1000 m**Annual rainfall:** 800–1000 mm**Typical local abundance:****Vegetation:** Ground stratum, sclerophyll forest subalpine communities (Burbidge & Gray 1976).**Substrate:** Moist sites, probably low nutrient sandy sites.**Exposure:**

Conservation

Conservation: Conservation status unknown.***Brachycome spathulata*** (*Brachycome scapiformis*)

ASTERACEAE

Life history

Growth form: Erect, tufted herb to 60 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Pale blue–mauve, rarely white, October.**Fruit/seed:** Achene 1–3 mm long, pappus has membranous wings and a tuft of bristles 0.2–0.8 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.**Botanical subregions:** SC NT ST CT CWS SWS; Vic., Tas.**Distribution Sydney area:** Bathurst–Orange, Shoalhaven Heads.**Select locations:** Hartley Vale, Mullions Range, Gurnang SF, Wombeyan Caves, Berrima, Shoalhaven Heads. (Some material on loan.)

Habitat

Habitat: Open areas.**Altitude:** 0–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Eucalypt woodland, e.g. *Eucalyptus macrorhyncha*. Ground stratum.**Substrate:** Heavy red and brown clay soils; quartzitic soils.**Exposure:**

Conservation

Conservation: Conservation status unknown.

Brachycome stuartii

ASTERACEAE

Life history

Growth form: Erect, tufted herb to 25 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, mauve or pale blue, April–November.**Fruit/seed:** Achene 1–2 mm long with pappus of bristles 0.1 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC NT CT NWS; Qld.**Distribution Sydney area:** North from Bathurst.**Select locations:** Trunkey (1918). (Some specimens on loan.)

Habitat

Habitat: Swampy ground.**Altitude:****Annual rainfall:****Typical local abundance:** Frequent.**Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Conservation status unknown.***Bracteantha bracteata*** (*Helichrysum bracteatum*)

ASTERACEAE

Golden Everlasting

Life history

Growth form: Herb to 1 m high with shallow root system. A variable complex that requires investigation (Harden 1992).**Vegetative spread:** No.**Longevity:** Short. Usually annual.**Primary juvenile period:****Flowers:** Yellow or straw-coloured flowers, June–March, peak January.**Fruit/seed:** Achene 1 mm long, with pappus of bristles 4 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed. Seedling recruitment fire or disturbance related.**Fire response:** Probably killed.**Interaction with other organisms:** Host to Root Knot Nematode *Meloidogyne incognita*, causes irregular swellings and galls on roots resulting in stunting and/or death of plant (Jones & Elliot 1986).

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP

SFWP; Qld, Vic., Tas., N.T., S.A., W.A.

Distribution Sydney area: Coast, Upper Blue Mountains and Southern Highlands.**Select locations:** Ingleburn, Waterfall, Mt Keira, Berry, Mt Tomah, Rylstone, Jensens Swamp, Wombeyan Caves, Wingecarribee Swamp (P. Kodela pers. comm.), The Gib, Wingello.

Habitat

Habitat: Various habitats, forest to swamplands or disturbed sites, e.g. roadsides.**Altitude:** 0–1200 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Open-forest, e.g. with *Eucalyptus pilularis* or shrubby swampland with *Restio australis*, *Empodisma minus*.**Substrate:** Soils from basalt, shale, limestone, rarely sandstone, fertile–very fertile. Also in

peat (P. Kodela pers. comm.). Watertable mostly high, moisture supply intermittent, fresh.

Exposure: Sheltered situations; light-no shade.

Conservation

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

Bracteantha viscosa (*Helichrysum viscosum*)**ASTERACEAE**

Sticky Everlasting

Life history

Growth form: Herb to 1 m

Vegetative spread:

Longevity: Usually annual.

Primary juvenile period: Less than 1 year.

Flowers: November-May, peak November.

Fruit/seed: Achene 2 mm long, with pappus of golden bristles; mature February (limited data).

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

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly western Blue Mountains.

Select locations: Liverpool, Lithgow, Bathurst-Sofala, Mullion Range, Hill Top, The Gib.

Habitat

Habitat: Rock crevices on dry slopes.

Altitude: 0-1200 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent.

Vegetation: Woodland, e.g. with *Stypandra glauca*.

Substrate: Rock crevices on dry slopes, volcanic rocks. Soil fertile. Watertable permanently low, moisture supply intermittent, fresh.

Exposure: Exposed situations.

Conservation

Conservation: Possibly rare, conservation status unknown.

Calendula arvensis***ASTERACEAE**

Field Marigold

Life history

Growth form: Herb 5-40 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Orange-yellow, November.

Fruit/seed: Achene 1-1.5 mm long, with spines to 5 mm long, no pappus, mature November-January.

Dispersal, establishment & growth: Diaspore: fruit, probably animal-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Mediterranean region.

Botanical subregions: CC NT CT CWS NWP SWP SFWP; Qld, Vic., Tas., S.A.

Distribution Sydney area: Western Sydney, Orange.

Select locations: Smithfield (1919), Seven Hills (1920), South Orange (1975).

Habitat

Habitat: Weed of orchards.

Altitude: 0-1000 m

Annual rainfall: 800-1000 mm

Typical local abundance:

Vegetation: Orchards.

Substrate:

Exposure:

Conservation

Conservation: Uncommon weed.

***Calendula officinalis* ***

ASTERACEAE

Life history

Growth form: Herb 15–50 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, May–Dec.

Fruit/seed: Achene 2.5 mm long, no pappus (150 seeds per gram).

Dispersal, establishment & growth: Diaspore: achene, no dormancy.

Fire response: Probably killed.

Interaction with other organisms: Susceptible to Calendula Rust (Rowell 1970).

Distribution

Status/origin: Naturalised exotic, native to Mediterranean. Introduced as a garden plant.

Botanical subregions: CT ?SC NWS; Tas., S.A.

Distribution Sydney area: Orange.

Select locations: Orange (1936, 1983).

Habitat

Habitat: Roadside, orchards.

Altitude: 600–1000 m

Annual rainfall: 1000 mm

Typical local abundance: Frequent.

Vegetation: Roadside, orchards.

Substrate:

Exposure:

Conservation

Conservation: Garden escapes in Orange area; possibly naturalised in Nowra area.

***Calendula palaestina* ***

ASTERACEAE

Palestine Marigold

Life history

Growth form: Herb 20–40 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Light yellow, spring.

Fruit/seed: Achene 2.5–4 mm long, no pappus.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Mediterranean region.

Botanical subregions: CT SWP.

Distribution Sydney area: CT (Harden 1992).

Select locations: No herbarium records.

Habitat

Habitat: Moist sites.

Altitude:

Annual rainfall:

Typical local abundance:

Vegetation:

Substrate:**Exposure:****Conservation:** Rarely naturalised (Harden 1992).**Conservation*****Calocephalus citreus***

ASTERACEAE

Lemon Beauty-heads

Life history**Growth form:** Herb, erect from tufted base, 15–60 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Bright golden yellow, late spring–autumn (Harden 1992).**Fruit/seed:** Achene 0.7–0.9 mm long, with pappus of bristles.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC NT CT ST CWS SWS SWP; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Probably in western part of the area.**Select locations:** Specimens unavailable.**Habitat****Habitat:****Altitude:****Annual rainfall:****Typical local abundance:** Rarely abundant (Harden 1992).**Vegetation:** Grassland or woodland (Harden 1992).**Substrate:** Clay or loam soils (Harden 1992). Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Status unknown.***Calomeria amaranthoides* (Humea elegans)**

ASTERACEAE

Incense Plant

Life history**Growth form:** Quick-growing herb to 2 m high, with woolly stem and sticky, aromatic leaves.**Vegetative spread:** No.**Longevity:** 2 years**Primary juvenile period:****Flowers:** December–April, insect-pollinated?**Fruit/seed:** Achene, no pappus, mature March–April.**Dispersal, establishment & growth:** Diaspore: fruit, ? limited local dispersal, water-dispersed? Growth rate quick. Coloniser.**Fire response:** Probably killed, recruitment from ? soil-stored seed, grows vigorously after fire.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT; Vic.**Distribution Sydney area:** Blue Mountains, Hawkesbury River (rare).**Select locations:** Rhodes (1888), Penshurst (1894), Loftus, Minto, Douglas Park, Mt Keira, Burragorang Valley, Berambing, Mt Tomah, Mt Wilson, Wingello.**Habitat****Habitat:** River flats, creekbanks, gullies, roadsides.

Altitude: 0–800 m **Annual rainfall:** above 800 mm
Typical local abundance: Frequent–occasional.
Vegetation: Rainforest or margins, e.g. with *Doryphora–Ceratopetalum*. Moist eucalypt forest, e.g. with *Eucalyptus fastigata*, *E. blaxlandii*, *E. cypellocarpa*.
Substrate: Sandy alluvial soils, sandstone, shale and basalt, fertile–very fertile, well-drained.

Exposure: Light–mid shade

Conservation

Conservation: Probably poorly conserved. Vulnerable in Western Sydney (Benson & McDougall 1991). Status elsewhere unknown.

Calotis cuneifolia

ASTERACEAE

Purple Burr-daisy

Life history

Growth form: Erect, sometimes prostrate, herb to 60 cm high.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: White or lilac, August–May, peak September–October.

Fruit/seed: Achene, flattened, 1–2 mm long, surmounted by 2 erect barbed spines 1–4 mm long, forming a burr. Mature October–May.

Dispersal, establishment & growth: Diaspore: fruit, animal-dispersed. In western NSW, growth commences from seed or recommences from old plants in autumn and provided soil moisture is available plants grow well into summer (Cunningham et al. 1981).

Fire response: Probably killed.

Interaction with other organisms: Grazed by stock (Cunningham et al. 1981).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Western Sydney, Blue Mountains.

Select locations: Hornsby, Rookwood, Chester Hill, Marsden Park, Berkshire Park, St Marys, Nortons Basin, Lapstone, Warrimoo, Blackheath, Clarence.

Habitat

Habitat: Woodland.

Altitude: 0–1300 m **Annual rainfall:** 600–1200 mm

Typical local abundance: Occasional–frequent.

Vegetation: Eucalypt woodland with *Melaleuca nodosa* understory or *Melaleuca* scrub.

Substrate: Clay soils from Wianamatta Shale, also Tertiary alluvium and occasionally on sandstone, moderate fertility. Watertable mostly low.

Exposure:

Conservation

Conservation: Inadequate, most habitat is under threat.

Calotis dentex

ASTERACEAE

White Daisy Burr

Life history

Growth form: Hairy herb to 80 cm high.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: White, conspicuous, November–April.

Fruit/seed: Achene 2 mm long, with barbed awns 4–6 mm long, forming a burr. Matures December–April.

Dispersal, establishment & growth: Diaspore: fruit, probably animal-dispersed.

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT CT NWS; Qld.**Distribution Sydney area:** Mainly along Nepean (sporadically from Bargo–Richmond) and Georges River (Glenfield, East Hills) with some outlying populations.**Select locations:** Howes Valley, Richmond, Ingleburn, Homebush, Glenfield, Picton, Bargo, Yerranderie, Fitzroy Falls, Albion Park, Meryla.**Habitat****Habitat:** Creek banks, lower hillslopes.**Altitude:** 0–600 m**Annual rainfall:** 600–1400 mm**Typical local abundance:** Occasional–frequent.**Vegetation:** Forests and grassy woodlands,, e.g. with dense *Bursaria* thicket.**Substrate:** Loamy soils, moderate to high fertility alluvium or adjacent hill sides on sandstone and shale, possibly needs good soils for initial establishment and growth.**Exposure:** Mid–light shade.**Conservation****Conservation:** Inadequately conserved, now rare in Sydney area. Vulnerable in Western Sydney (Benson & McDougall 1991). Meryla — southern limit.***Calotis glandulosa*****ASTERACEAE****Life history****Growth form:** Herb to 30 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White–blue, December–February.**Fruit/seed:** Achene 1–2 mm long, with barbed awns 1–5 mm long, forming burr.**Dispersal, establishment & growth:** Diaspore: fruit, probably animal dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** SC CT ST CWS.**Distribution Sydney area:** Only record is Duckmaloi (1935).**Select locations:** Duckmaloi (1935).**Habitat****Habitat:****Altitude:** 1100 m**Annual rainfall:** 900 mm**Typical local abundance:** Very rare.**Vegetation:** Grasslands and open-forest.**Substrate:****Exposure:****Conservation****Conservation:** Rare.***Calotis hispidula*****ASTERACEAE**

Bogan Flea

Life history**Growth form:** Prostrate or ascending herb with small yellow flowers, to 25 cm high, sometimes forming a dense mat.**Vegetative spread:** No.**Longevity:** Annual.**Primary juvenile period:**

Flowers: Yellow, August (October).

Fruit/seed: Achene 1–2 mm long, with barbed awns 1.5–2.5 mm long, forming burr. Mature August–October.

Dispersal, establishment & growth: Diaspore: fruit, animal-dispersed (e.g. clothing, wool). In western NSW, a cool season annual, mainly growing on floodplains after floodwaters have receded, or following heavy winter rains (Cunningham et al. 1981).

Fire response:

Interaction with other organisms: Palatable to stock during early growth.

Distribution

Status/origin: Native.

Botanical subregions: NC CC NWS CWS SWS NWP SWP NFWP SFWP; mainland States.

Distribution Sydney area: Western Sydney.

Select locations: Cowan (1921), Parramatta (1887), Flemington, Richmond (1910), Blacktown (1910), Bringelly (1912).

Habitat

Habitat: Dry situations. Recorded beside railways, saleyards, in lawns.

Altitude: 0–200 m **Annual rainfall:** 600–1100 mm

Typical local abundance: Occasional.

Vegetation: Grasslands, open-forests, roadsides.

Substrate: Probably well drained clay soils. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: A rare species, not conserved.

Calotis lappulacea

ASTERACEAE

Yellow Burr-daisy

Life history

Growth form: Much-branched, hairy herb to 50 cm high with yellow flowers.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, throughout the year.

Fruit/seed: Achene 1–1.5 mm long, with barbed awns forming burr with bristles, developed soon after flowering.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Southern Cumberland Plain and lower Blue Mountains.

Select locations: Howes Valley, Epping, Richmond, Bankstown, Glenfield, Bringelly, Camden, Lapstone, Silverdale, Jenolan River, Abercrombie Caves, Goodmans Ford.

Habitat

Habitat:

Altitude: 0–500 m **Annual rainfall:** above 600 mm

Typical local abundance: Occasional–frequent.

Vegetation: Grassy woodland, e.g. with *Eucalyptus moluccana*, *E. melliodora*, *E. albens*.

Substrate: Heavy clay soils from Wianamatta Shale or Devonian Lambie Group. Fertile soil. Watertable permanently low, moisture supply intermittent, fresh.

Exposure: No shade–light shade.

Conservation

Conservation: Inadequately conserved, becoming rare in Sydney area. Vulnerable in Western Sydney (Benson & McDougall 1991). 60 % (24/38) Herbarium specimens collected pre. 1960.

Calotis scabiosifolia* var. *integrifolia

ASTERACEAE

Rough Burr-daisy

Life history**Growth form:** Hairy herb to 40 cm high.**Vegetative spread:** Spreads by stolons.**Longevity:** Indefinite.**Primary juvenile period:****Flowers:** White–mauve, October–February.**Fruit/seed:** Achene, flattened, 3–4 mm long with 5–6 rigid spines 1–4 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, animal-dispersed. In western NSW plants dry off during summer, but may persist in favourable situations (Cunningham et al. 1891).**Fire response:****Interaction with other organisms:** Grazed by stock.**Distribution****Status/origin:** Native.**Botanical subregions:** CT ST SWS SWP; Vic.**Distribution Sydney area:** Bathurst–Orange, Wingello.**Select locations:** Known only from old specimens, Wallerawang (1899), Wingello (1913), Orange (1907).**Habitat****Habitat:****Altitude:** 600–1100 m**Annual rainfall:** 900–1200 mm**Typical local abundance:****Vegetation:** Open woodland and grassland.**Substrate:** Probably clay soils.**Exposure:****Conservation****Conservation:** Possibly locally extinct, only known from old records.***Calotis scapigera***

ASTERACEAE

Tufted Burr-daisy

Life history**Growth form:** Herb to 35 cm high.**Vegetative spread:** Spreads by stolons to form clumps, sometimes 1 m or more across.**Longevity:** Indefinite.**Primary juvenile period:****Flowers:** White–lavender, throughout the year.**Fruit/seed:** Achene, flattened, about 2 mm long with 4–6 rigid spreading spines 1–4 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, animal-dispersed. In western NSW growth occurs at most times of year, but plants may die back during summer–autumn (Cunningham 1981).**Fire response:****Interaction with other organisms:** Grazed by stock.**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT NWS CWS SWS NWP SWP; Qld, Vic., S.A.**Distribution Sydney area:** Only known from Concord, possibly chance introduction by stock [West Maitland (1908) outside area].**Select locations:** Concord (W. Woolls probably 1860s).**Habitat****Habitat:****Altitude:** 0–50 m**Annual rainfall:** 1000 mm**Typical local abundance:****Vegetation:****Substrate:** Heavy soils, moist places.**Exposure:****Conservation****Conservation:** Locally extinct.

***Carduus nutans* subsp. *nutans* ***

ASTERACEAE

Nodding Thistle

Life history

Growth form: Herb to 70 cm high with rosettes that often exceed 1 m, and a strong, fleshy taproot (Medd 1984).

Vegetative spread: No, but plants can re-grow from old rootstock (Medd 1984).

Longevity: 2 years. Interference with normal development, e.g. grazing or spraying, causes the plant to behave as a short-lived perennial (Doing et al. 1969).

Primary juvenile period: 1–2 years depending on emergence relative to winter (Medd 1984).

Flowers: Mauve–red, spring–autumn, but regrowth from old rootstock can flower in winter (Medd 1984). Cold temperatures required to initiate flowering (Doing et al. 1969).

Fruit/seed: Achene 4–5 mm long, with pappus of bristles 15–20 mm long. 250–400 fresh, well-developed seeds per. gram (Doing et al. 1969).

Dispersal, establishment & growth: Diaspore: fruit. Short-distance wind-dispersal from parent plant, long-distance dispersal in fodder, movement of vehicles and stock (Medd 1984). Most fresh seeds germinate 14 days after sowing (Doing et al. 1969). Seed germination strongly stimulated by light, suppressed by green pasture cover; short period of innate dormancy in addition to dormancy induced by soil cover allows seed to survive in soil for up to 20 years (Popay 1987). Seedlings emerge in autumn and spring forming rosettes, but require several weeks of low winter temperature to initiate stems for flowering (Medd 1984).

Fire response:

Interaction with other organisms: Aggressive competitor of pastures (Medd 1984).

Thistle-head Weevil *Rhinocyllus conicus* and Seed-head Fly *Urophora solstitialis* recently introduced for biological control, successfully limiting seed production (CSIRO Department of Entomology, no date).

Distribution

Status/origin: Naturalised exotic, native to Europe, Asia, N. Africa. Recorded in eastern Australia in late 1940s (Medd 1984), establishment over present range marked by unusual sequence of wet years 1950–1961 (Doing et al. 1969).

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

Distribution Sydney area: Oberon area.

Select locations: Black Springs (1950, only Herbarium record).

Habitat

Habitat: Cultivated paddocks, sometimes roadsides and riverbanks (Doing et al. 1969).

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

Typical local abundance:

Vegetation: Thistle communities in cultivated pastures, roadside and riverbank vegetation mainly with *Cirsium vulgare*, *Onopordum acanthium*, *Carduus tenuiflorus*, *C. pycnocephalus*, *Silybum marianum* (Doing et al. 1969).

Substrate: Agricultural soils, fertile. Moist climate and basalt soils (Doing et al. 1969).

Exposure:**Conservation**

Conservation: Proclaimed noxious weed in NSW (Medd 1984). Control can be achieved preventing seed germination by maintaining vegetation cover (Popay 1987).

***Carduus pycnocephalus* ***

ASTERACEAE

Slender Thistle

Life history

Growth form: Herb to 80 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Purple-pink, October–November.

Fruit/seed: Achene 4–5 mm long, with pappus of bristles 10–14 mm long, mature November–December.

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

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NC CC SC CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., W.A.**Distribution Sydney area:** Western Sydney and Bathurst area.**Select locations:** Richmond, Liverpool (1909), Mt Annan, Bowral, Bathurst.**Habitat****Habitat:** Pastures, roadsides, wastelands and cultivation.**Altitude:** 0–1000 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Occasional.**Vegetation:****Substrate:** Clay soil from shales, basalt.**Exposure:****Conservation****Conservation:** Weed of pastures roadsides, wastelands and cultivation.***Carduus tenuiflorus* *** (*Carduus pycnocephalus*)**ASTERACEAE**

Winged Slender Thistle

Life history**Growth form:** Herb 50–150 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Purple, October–November.**Fruit/seed:** Achene 4–5 mm long, with pappus of bristles 11–13 mm long.**Dispersal, establishment & growth:** Diaspore: fruit. Animal, water and wind-dispersed (Carr et al. 1992).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** CC SC NT CT ST NWS CWS SWS NWP SWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Bathurst area.**Select locations:** Flemington Saleyards (1968), Tarana (1962).**Habitat****Habitat:** Weed of pastures, roadsides, wasteland and cultivation.**Altitude:** 0–1000 m**Annual rainfall:** 1000 mm**Typical local abundance:** Occasional–frequent.**Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Weed of pastures, roadsides, wasteland and cultivation.***Carthamus lanatus* *****ASTERACEAE**

Saffron Thistle

Life history**Growth form:** Herb to 1 m high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow–cream with dark veins, late spring–early summer.**Fruit/seed:** Achene 5–6 mm long, with pappus of stiff bristles 7–10 mm long.**Dispersal, establishment & growth:** Diaspore: fruit. Animal, water and wind-dispersed (Carr et al. 1992), and as a contaminant in grain, hay and wool. Germinates autumn–early

winter (Parsons 1973). Rosettes form in late spring and erect growth in October. Germinates within 2 years but dormancy can last up to 8 years, most seed that germinates lies in the top 5 cm of soil (Gorham 1986).

Fire response:

Interaction with other organisms: Food plant of Pacific Black Duck *Anas superciliosa*, Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989,1990). Flowers and seed eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).

Distribution

Status/origin: Naturalised exotic, native to Europe, first naturalised in Australia in 1887 (Gorham 1986).

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: Mainly western Sydney.

Select locations: Ashfield, Oakville, Penrith, Casula, Campbelltown, Jamberoo, Barralier, Bathurst (1904).

Habitat

Habitat: Wasteland.

Altitude: 0–1500 m **Annual rainfall:** more than 700 mm

Typical local abundance: Frequent.

Vegetation: Cultivated paddocks.

Substrate: Overgrazed paddocks with poor fertility and poor soil structure resulting from too-frequent cropping. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Its prickly nature restricts stock grazing and reduces carrying capacity. Recognised as weed by Department of Agriculture in 1854 (Gorham 1986). A declared noxious weed in some shires (Harden 1992)

***Carthamus tinctorius* ***

ASTERACEAE

Safflower

Life history

Growth form: Herb to 60 cm high. Erect, woody-stemmed, 60–120 cm high with strong taproot to 2 m deep (Colton 1988).

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Red, orange, yellow, white, winter–summer. Abundant pollen and nectar, attracts bees but the flowers are mostly self-pollinated; individual flowers open for 2–3 days, plants flower 2–3 weeks (Colton 1988).

Fruit/seed: Achene 7–8 mm long, pappus absent or minute, matures December–January. Each flower head can produce up to 100 seeds but more commonly 25–50 (Colton 1988). Sharp spines on leaves and bracts of some forms deter predators, e.g. kangaroos (Colton 1988).

Dispersal, establishment & growth: Diaspore: fruit. Winter–spring growing, no seed dormancy; development influenced by temperature, early growth slow, several weeks in rosette stage (Colton 1988).

Fire response:

Interaction with other organisms: Predators include Cutworm caterpillars, green peach aphids, plum aphids (Colton 1988).

Distribution

Status/origin: Exotic, native to Europe. Cultivated in Australia since 1950s as a dryland crop for its oil-yielding seeds; grown for centuries in China, India, the Near East and N Africa mainly for red dye, carthamin, which was extracted from dried and ground petals; widely used to colour food and clothing (Colton 1988).

Botanical subregions: CC CWS SWS SWP NFWP; Qld, Vic., Tas., W.A.

Distribution Sydney area: Glenfield (1967).

Select locations: Glenfield only record for area.

Habitat: Roadsides, railway line.

Altitude: 0–50 m

Annual rainfall: 800 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Grows best on neutral–alkaline soil, with good drainage, does not tolerate water-logging; tolerates salinity (Colton 1988).

Exposure:

Conservation: Not likely to be naturalised, localised establishment from spilt grain.

Habitat

Conservation

Cassinia aculeata

ASTERACEAE

Dolly Bush

Growth form: Shrub 1–2.5 m high, with rusty hairs on stem.

Vegetative spread: No.

Longevity: Plants up to ? 36 years old (Lion Is) but no re-establishment in absence of fire or disturbance.

Primary juvenile period:

Flowers: November–March.

Fruit/seed: Achene 0.8 mm long, pappus 2 mm long.

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

Fire response: Killed by high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.). No seedlings recorded less than 1 year after fire (Purdie 1977).

Interaction with other organisms: Contact with flowering plant causes dermatitis and eye irritation in humans (Hurst 1942).

Status/origin: Native.

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

Distribution Sydney area: Coast and Mountains.

Select locations: Budgewoi, Woy Woy, Berowra, Como, Menangle, Kurrajong Heights, Woodford, Mt Victoria, Clarence, Kanangra, Hilltop, Bundanoon.

Habitat:

Altitude: 0–1000 m

Annual rainfall: above 1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Sclerophyll forest, woodland and heath.

Substrate: Variable, sandy or gravelly soil from sandstone, shale, basalt, fertile–infertile, well-drained.

Exposure: Mid-shade–full sun.

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

Distribution

Habitat

Conservation

Cassinia arcuata

ASTERACEAE

Sifton Bush, Chinese Shrub

Growth form: Shrub up to 2 m high, with short taproot and numerous stout lateral roots to 30 cm deep (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: Probably 10–20 years.

Primary juvenile period: 2–3 years (Parsons & Cuthbertson 1992).

Flowers: March–April.

Fruit/seed: Achene, 0.8 mm long with pappus of bristles 2 mm long, mature March–April.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Germination in winter. Non-dormant fraction 60–80 % at 1 year old, 0.3 % at 15 years. Coloniser of bare

Life history

sites. Seedlings established on soil surface, and reached 60 mm in height after 3 months. May reach 600 mm in the first year in favourable sites. Seedlings are unpalatable to stock. Plants reach 2 m in height in 5–10 years (Campbell et al. 1990) (McGowen et al. 1990). Drought-resistant.

Fire response: Plants killed, followed by seedling recruitment.

Interaction with other organisms: Unpalatable to stock and may compete with pasture species. 'Chinese Shrub' originates from its use as roofing material by Chinese on the Victorian Goldfields in the 1850s (Parsons 1973).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly west of area, Bathurst–Orange — though early records for Wyong and Homebush suggest that it is indigenous to some coastal areas.

Select locations: Wyong (1900), Marayong, Duck River, Homebush (1894), Wolgan Gap, Bathurst, Ophir, Mullions Range.

Habitat

Habitat: Coloniser of bare sites, in woodland, along roadsides, overgrazed pastures.

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

Typical local abundance: Frequent–occasional.

Vegetation: Eucalyptus woodland, e.g. *Eucalyptus macrorhyncha*, *E. melliodora*, mid-stratum.

Substrate: Low-nutrient soils on sandstone. Acid stony soils, on quartzite, shale; infertile. Watertable permanently low, moisture supply intermittent, fresh. Seedling growth depressed by lime (Campbell et al. 1990). Recorded on saline sites in western NSW (Semple 1993).

Exposure: Exposed–indifferent; light–no shade.

Conservation

Conservation: A native species reported to have expanded as a result of pasture deterioration after the 1982 drought (Campbell et al. 1990). Vulnerable in Western Sydney (Benson & McDougall 1991). A natural coloniser of disturbed sites such as mine dumps.

Cassinia aureonitens

ASTERACEAE

Life history

Growth form: Shrub 2–3 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Cream–yellow, November–March, peak November–December.

Fruit/seed: Achene 0.5 mm long, with pappus of bristles 2 mm long.

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

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC CT.

Distribution Sydney area: Coast and Mountains.

Select locations: Wollombi, Wisemans Ferry, Mooney Mooney Creek, Cheltenham, Cooks River, Kurrajong Heights, Mt Wilson, Yerranderie, Thirlmere, Albion Park.

Habitat

Habitat: Forest and woodland on hillsides and gullies.

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

Typical local abundance: Frequent–occasional.

Vegetation: Mid-stratum, forest and woodland, e.g. with *Eucalyptus sclerophylla*, *E. piperita*, *E. quadrangulata*, with shrubby understorey, rarely in heath.

Substrate: Sandstone, shale, basalt, fertile–infertile. Watertable mostly low, moisture supply intermittent, non-saline.

Exposure: Sheltered sites, mid-shade.

Conservation

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

Cassinia compacta

ASTERACEAE

Life history

Growth form: Woody shrub 2–3 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow, spring–summer.**Fruit/seed:** Achene 0.5 mm long, pappus of bristles 2 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:** Probably killed.**Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC NT CT CWS; Qld.**Distribution Sydney area:** Mainly coast, localised.**Select locations:** Colo Heights, Mt White, Cowan Creek, Lithgow, Fitzroy Falls.

Habitat

Habitat: Steep sheltered slopes.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:****Vegetation:** Mid-stratum, eucalypt forest, edge of rainforest.**Substrate:** Sandstone with shale influence, infertile soil. Watertable mostly low, moisture supply intermittent.**Exposure:** Sheltered sites, mid-shade.

Conservation

Conservation: Uncommon, southern limit Fitzroy Falls.***Cassinia cunninghamii***

ASTERACEAE

Life history

Growth form: Shrub to 1–1.5 m high, stem woolly with greyish-white hairs. Leaves have a spicy liquorice aroma when crushed (P. Hind pers. comm.).**Vegetative spread:** No.**Longevity:****Primary juvenile period:****Flowers:** Yellow, December–February.**Fruit/seed:** Achene, 0.5 mm long, with pappus of bristles 1.5 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed. Can establish from seed in absence of disturbance possibly due to tolerance of shade and drought (Ladd 1988). Medium growth rate.**Fire response:** Killed, established from widely dispersed propagules (Ladd 1988).**Interaction with other organisms:** Seed eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993).

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC CT CWS.**Distribution Sydney area:** Colo River and north-west of area.**Select locations:** Mt Monundilla, Boorai Ridge, Colo Heights, St Albans, Mount Manning, Gaspers Mountain, Newnes Plateau.

Habitat

Habitat: Eucalypt open-forest on sandstone.**Altitude:** 0–1000 m**Annual rainfall:** 700–1000 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Eucalypt open-forest,, e.g. with *Eucalyptus crebra*, *E. punctata*, *E. paniculata* and dry shrubby understorey, e.g. with *Dodonaea triquetra*, *Oxylobium ilicifolium*, *Acacia terminalis*.

Substrate: Sandstone with shale influence. Intolerant of waterlogging.
Exposure:

Conservation

Conservation: Conservation status unknown.

Cassinia denticulata**ASTERACEAE****Life history**

Growth form: Shrub 0.7–2 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pale yellow–white, October–January.

Fruit/seed: Achene, 0.6 mm long, with pappus of bristles 2 mm long.

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

Fire response: Killed by high-intensity fire (1/1994) at Lane Cove, no seedlings seen (P. Kubiak pers. comm.). Flowered in area (at KCNP) burnt 3 years previously.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Coast and Blue Mountains.

Select locations: Bucketty, Berowra, St Ives, Bradleys Head, Woronora River, Bulli Pass, Kurrajong Heights, Blackheath, Newnes SF, Hilltop, Fitzroy Falls.

Habitat

Habitat: Hillsides and gullies.

Altitude: 0–1000 m

Annual rainfall: above 1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Mid-stratum, forest and heath with shrubby understorey, e.g. with *Eucalyptus gummiifera*, *E. piperita*, *E. sieberi*, *E. capitata* or *Angophora costata*.

Substrate: Sandy, infertile soils from sandstone. Watertable mostly low, moisture supply intermittent, non-saline.

Exposure: Sheltered sites.

Conservation

Conservation: Endemic to Sydney area, conservation status unknown.

Cassinia laevis**ASTERACEAE**

Cough Bush

Life history

Growth form: Shrub to 3 m high with white-woolly stems.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, November–January.

Fruit/seed: Achene 0.8 mm long, with pappus of bristles 2 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Currant Mountain.

Select locations: Currant Mountain (1954).

Habitat

Habitat: Upper slopes.

Altitude: 600 m **Annual rainfall:** 800 mm
Typical local abundance: Frequent.
Vegetation: Mid-stratum.
Substrate: Sandstone, infertile soil.
Exposure:

Conservation: Conservation status unknown.

Conservation

Cassinia leptocephala* subsp. *leptocephala

ASTERACEAE

Growth form: Large robust woody shrub to 3 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Pale yellow, October–January.

Fruit/seed: Achene 0.6 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native.

Botanical subregions: NC CC NT.

Distribution Sydney area: coast (to coast and Tablelands of N.S.W.).

Select locations: Specimens unavailable.

Distribution

Habitat:

Altitude:

Annual rainfall:

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Habitat

Conservation: Rare, not well known.

Conservation

Cassinia longifolia

ASTERACEAE

Growth form: Aromatic sticky shrub 1.2–2.5 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: March–April.

Fruit/seed: Achene 0.8 mm long, with pappus of bristles 2–3 mm long, mature March–April.

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

Fire response: Seedlings not recorded within 1 year of fire (Purdie 1977).

Interaction with other organisms:

Life history

Status/origin: Native.

Botanical subregions: CC SC CT ST CWS SWS; Vic., Tas.

Distribution Sydney area: Coast, Blue Mountains, Orange.

Select locations: Arncliffe (1893), Peshurst, Royal NP, St Marys, Razorback, Lawson, Mt Tomah, Orange, Mt Canobolas, Cadia, Mt Jellore, Kangaloon (P. Kodala pers. comm.).

Distribution

Habitat:

Habitat

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

Typical local abundance: Occasional–rare.

Vegetation: Mid-stratum, eucalypt woodland, e.g. with *Eucalyptus macrorhyncha*, or open-forest to tall open-forest, e.g. *Eucalyptus cypellocarpa*, *E. fastigata*, *E. radiata* (P. Kodela pers. comm.)

Substrate: Shale, basalt, sandstone with calcareous influence, fertile soils. Watertable permanently low, moisture supply intermittent, non-saline.

Exposure:

Conservation

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

Cassinia quinquefaria

ASTERACEAE

Life history

Growth form: Shrub 1–3 m high, stems olive or yellowish, usually resinous.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: White, January–May, peak April.

Fruit/seed: Achene 0.8 mm long with pappus of bristles 2 mm long, mature March–August.

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

Fire response:

Interaction with other organisms: Tested positive for anti-tumour activity (inhibited sarcoma), no alkaloids (Collins et al. 1990).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mostly western parts of the area.

Select locations: Kogarah (1894), Razorback, Mt Annan, Cambewarra, Mt Victoria, Newnes Junction, Capertee, Sofala, Mullion Range, Hilltop, Berrima, Wombeyan Caves.

Habitat

Habitat: Open sites in eucalypt forest and woodlands.

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

Typical local abundance: Frequent–occasional–rare.

Vegetation: Forests and woodland, e.g. with *Eucalyptus pilularis*, *E. resinifera*, and woodland, e.g. with *Eucalyptus crebra*, *E. tereticornis*.

Substrate: Clay loam on hale, fertile. Intolerant of waterlogging.

Exposure: Open sites.

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), but probably conserved elsewhere.

Cassinia species *D*

ASTERACEAE

Life history

Growth form: Shrub to 2 m high, stems olive or red with soft hairs, leaves sticky (Harden 1992).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: At any time of year but mainly summer–autumn (Harden 1992).

Fruit/seed: Achene 0.8 mm long, with pappus of bristles 2–2.5 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Status/origin: Native. Botanical subregions: NC CC SC CT ST NWS CWS SWS. Distribution Sydney area: Select locations: Specimens unavailable.	Distribution
Habitat: Altitude: Annual rainfall: Typical local abundance: Vegetation: Sclerophyll forest (Harden 1992). Substrate: Stony soils (Harden 1992). Exposure:	Habitat
Conservation: Conservation status unknown.	Conservation

Cassinia trinerva

ASTERACEAE

Growth form: Shrub or tree to 8 m high. Vegetative spread: Longevity: Primary juvenile period: Flowers: Creamy-white, summer–autumn. Fruit/seed: Achene 0.5 mm long, with pappus of bristles 2 mm long. Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Fire response: Probably killed. Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: NC CC SC NT CT ST CWS; Vic., Tas. Distribution Sydney area: Southern Highlands and southwest of area. Select locations: Bulli, Razorback, Burragorang, Robertson (P. Kodela pers. comm.), Kangaroo Valley, Jenolan Caves (1899).	Distribution
Habitat: Moist eucalypt forest, rainforest. Altitude: 0–900 m Annual rainfall: above 700 mm Typical local abundance: Occasional. Vegetation: Mid stratum in moist eucalypt forest and edge of disturbed rainforest, e.g. with <i>Eucalyptus quadrangulata</i> . Mixed cool temperate/warm temperate rainforests, where there are light gaps (P. Kodela pers. comm.) Substrate: Shale and silty soils; basalt (P. Kodela pers. comm.). Exposure: Sheltered sites.	Habitat
Conservation: Conservation status unknown.	Conservation

Cassinia uncata

ASTERACEAE

Sticky Cassinia

Growth form: Sticky shrub 1–3 m high. Vegetative spread: Longevity: Primary juvenile period: Flowers: White–straw-coloured, March. Fruit/seed: Achene 0.6 mm long, with pappus of bristles 2 mm long. Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Fire response: Interaction with other organisms:	Life history
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Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast and north western Sydney.

Select locations: Wamboral, Barrenjoey (L.McD.), Galston, Lindfield, Tempe (1899), Castlereagh SF, Windsor, Maroota.

Habitat

Habitat:

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest, e.g. with *Eucalyptus piperita*, *E. eximia*, *Angophora bakeri* or woodland, e.g. with *Eucalyptus polyanthemos*, *E. macrorhyncha* (Benson & Keith 1990).

Substrate: Sandstone, shale, Tertiary alluvium. Soil fertile–infertile. Watertable permanently low, moisture supply intermittent, non-saline.

Exposure:

Conservation

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

Celmisia longifolia* species complex*ASTERACEAE**

Snow Daisy

Life history

Growth form: Herb with dense-tufted basal stock.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Florets pink or white, February.

Fruit/seed: Achene c. 5 mm long with pappus of barbellate bristles, February.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ST.

Distribution Sydney area: Upper Blue Mountains, mainly Newnes Plateau.

Select locations: Blackheath, Newnes State Forest.

Habitat

Habitat: Swamp and seepage areas, moist cliff faces.

Altitude: 1000–1200 m

Annual rainfall: 1000 mm

Typical local abundance: Frequent.

Vegetation: Newnes Plateau shrub-swamps or less commonly Blue Mountains sedge swamps, e.g. with *Gymnoschoenus sphaerocephalus*, *Baeckea linifolia*, *Grevillea acanthifolia*, *Gleichenia*.

Substrate: Often on margins of poorly-drained, peaty swamps, infertile. Watertable permanently high.

Exposure: Full sun.

Conservation

Conservation: Restricted, probably inadequately conserved. Habitat vulnerable to disturbance.

Centaurea calcitrapa* **ASTERACEAE**

Star Thistle

Life history

Growth form: Erect herb with radical leaves.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Florets pale purple or pink, spring–summer.

Fruit/seed: Achene 3 mm long, no pappus.

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

Fire response:

Interaction with other organisms:

Distribution

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

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

Distribution Sydney area: Widespread but rare.

Select locations: Haberfield (1920), Penrith (1912), Lithgow (1967).

Habitat

Habitat: Wasteland.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent.

Vegetation: Grassland.

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

Exposure:

Conservation

Conservation: A declared noxious weed in many NSW shires (Harden 1992), but rare in Sydney area.

Centaurea melitensis *

ASTERACEAE

Maltese Cockspur, Cockspur Thistle

Life history

Growth form: Herb to 1 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, mainly spring–summer. Very late September–October (Price).

Fruit/seed: Achene 2.5 mm long, pappus of bristles 2.5 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

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

Distribution Sydney area: Widespread.

Select locations: Woy Woy, Penshurst, Cooks River, Richmond, The Oaks, Jenolan Caves, O'Connell, Bullio, Exeter, Wingello (1899).

Habitat

Habitat: Disturbed areas, pastures, roadsides, stock routes and cultivated land.

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance:

Vegetation:

Substrate: Gravel pits, poultry yards.

Exposure:

Conservation

Conservation: Weed of disturbed areas with most Herbarium records collected 1900–1930.

Centaurea solstitialis *

ASTERACEAE

St Barnaby's Thistle

Life history

Growth form: Herb to 1 m high.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, late spring–summer (Parsons 1973).

Fruit/seed: Achene 2.5 mm long — two kinds: one with pappus of bristles to 5 mm long, suitable for wind-dispersal, the other with or without reduced pappus; spread by water and as contaminant of agricultural produce, vehicles, wool, fodder (Parsons 1973).

Dispersal, establishment & growth: Diaspore: fruit, wind, water-dispersed, human-dispersed. Germinates in autumn, remaining a rosette during winter and developing quickly to diameter of 30 cm as temperature rises in spring. Flowering commences in November and continues through summer, 'seeds' formed over long period of 4–5 months (Parsons 1973).

Fire response:

Interaction with other organisms: Spines on flower-heads deter grazing by sheep (Parsons 1973).

Distribution

Status/origin: Naturalised exotic, native to Europe, W Asia.

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

Distribution Sydney area: Widespread but sporadic.

Select locations: Denistone, Flemington Saleyards, Richmond, Bathurst (1904).

Habitat

Habitat: Weed of disturbed sites, pastures and cultivated land.

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

Typical local abundance: Rare.

Vegetation: Pastures and cultivated lands.

Substrate: Pasture soils.

Exposure:

Conservation

Conservation: Naturalised weed, widespread but sporadic, in pastures and cultivated land. Declared noxious in some NSW shires.

Centipeda cunninghamii

ASTERACEAE

Common Sneezeweed

Life history

Growth form: Herb c. 20 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Summer.

Fruit/seed: Achene 2 mm long, no pappus.

Dispersal, establishment & growth: Diaspore: fruit, leaf growth and flowering occurs mainly in the warmer months, with plants remaining semi-dormant in winter (Cunningham et al. 1981).

Fire response:

Interaction with other organisms: Sparingly grazed by stock, possibly strongly aromatic. Odour emitted by plants when crushed deters grazing; powdered leaves are said to act like snuff, hence common name (Cunningham et al. 1981).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast, west of mountains.

Select locations: Pennant Hills, Windsor, Glenfield, Shoalhaven River, Capertee, Rydal (1897), Winburndale, Hilltop.

Habitat

Habitat: Wet places, river flats.

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

Typical local abundance:

Vegetation:**Substrate:** Alluvial soil, damp areas subject to flooding.**Exposure:** Full sun.**Conservation:** Conservation status unknown.**Conservation*****Centipeda minima* var. *minima*****ASTERACEAE**

Spreading Sneeze Weed

Life history**Growth form:** Small aromatic herb.**Vegetative spread:** No.**Longevity:** Short-lived, 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Small yellow flowers, January–February.**Fruit/seed:** Achene 2 mm long, pappus absent, January–April.**Dispersal, establishment & growth:** Diaspore: fruit, possibly water-dispersed. Coloniser.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS SWS NWP SWP NFWP; Qld, Vic., Tas., N.T., S.A., W.A., N.Z., Asia to Afghanistan.**Distribution Sydney area:** Widespread.**Select locations:** Hornsby, Devlins Creek, Glenfield, Elderslie, Cambewarra, Colo River, Yarramundi, Thirlmere Lakes, Coxs River, Berrima.**Habitat****Habitat:** Floodplain wetlands, lagoon edges.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Rare–frequent.**Vegetation:** Herbland, e.g. with *Persicaria lapathifolia*, *Xanthium chinense*.**Substrate:** Mainly clay and alluvium, fertile soil, watertable mostly high.**Exposure:** Full sun.**Conservation****Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991). Status elsewhere unknown.***Chondrilla juncea* *****ASTERACEAE**

Skeleton Weed

Life history**Growth form:** Herb 0.5–1 m high, with long taproot to depth of 3 m (Parsons 1973), purplish radical leaves until stem develops, then almost leafless.**Vegetative spread:** Local spread by cultivation, regrowth from taproot can occur from depth of more than 1 m; cutting of taproot stimulates growth of new rosettes at almost any time of year (Parsons 1973).**Longevity:** Biennial–perennial.**Primary juvenile period:** Less than 1 year, although on poor soils flowering sometimes does not occur in the first year (Parsons 1973).**Flowers:** Yellow, summer (January–April).**Fruit/seed:** Achene 8–10 mm long, with stalked pappus of toothed bristles 6–7 mm long, mature January–April. Seed production is prolific, one plant can produce 15,000 seeds in a season, with up to 90% germination depending on conditions; high summer temperature results in maximum seed production; seed is relatively short-lived, less than 3 years (Parsons 1973).**Dispersal, establishment & growth:** Diaspore: fruit. Animal, water, vegetative, and wind dispersed (Carr et al. 1992). Germinates after autumn rains, rosettes form and grow slowly

over winter while the taproot develops rapidly (more than 1 cm/day), each taproot produces 2–3 rosettes, stem is produced in spring and rosette leaves die leaving the plant almost leafless; seedlings sensitive to competition, particularly for light (Parsons 1973).

Fire response:

Interaction with other organisms: Troublesome weed to wheat-growers, tough wiry stems have prevented harvesting of wheat and forced changes in farming practice; rosettes grazed by sheep (Parsons 1973).

Distribution

Status/origin: Naturalised exotic, native to Europe and W. Asia. First recorded in Australia near Wagga in 1917, probably introduced in vine stocks from southern Europe (Parsons 1973).

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

Distribution Sydney area: Widespread but mainly western part of the area.

Select locations: Emu Plains, Grose River, Albion Park, Goodmans Ford, Menangle Park, Linden, Lithgow, Bathurst, Orange (1935).

Habitat

Habitat: Creekbanks.

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Rare.

Vegetation: Open plant communities (Parsons 1973). On creekbanks with *Sigesbeckia*, *Persicaria*, *Solanum*.

Substrate: Deep, light-textured soils needed for development of long taproot; requires moderate calcium and phosphorous levels; can withstand long periods of drought (Parsons 1973).

Exposure: Exposed, full sun.

Conservation

Conservation: Declared noxious weed in several States and part of NSW. Not invasive of bushland.

Chrysanthemoides monilifera* subsp. *rotundata*

ASTERACEAE

Bitou Bush

Life history

Growth form: Large sprawling shrub to 1.5 m high with extensive tap and lateral root system, more aggressive than *C. subsp. monilifera*, more extensive root system and more difficult to control (Parsons & Cuthbertson).

Vegetative spread: Arching branches root vigorously where they touch the sandy substrate (R. Buchanan pers. comm.), regrows from cut stump (Dellow 1988).

Longevity: About 7–8 years.

Primary juvenile period: Primary juvenile period about 2 years.

Flowers: Yellow, May–July, but intermittent all year.

Fruit/seed: Fleshy berry 6–8 mm diam., black when ripe, mature mainly June–August.

Dispersal, establishment & growth: Diaspore: black fleshy 1-seeded fruit, mature in summer, mainly bird-dispersed, also spread in faeces of rabbits, foxes and cattle; ants eat fleshy skins and discard the seeds; spread in contaminated gravel in Victoria; fruit and seeds dispersed by running water; soil-stored seed up to 9500/m²; 60% viability, some dormant for at least 10 years (Parsons & Cuthbertson 1992). Seeds germinate at any time of year but mostly autumn. Most seeds retain viability for at least 2 years with some up to 4 years (Dellow 1988).

Fire response: Mature plants resprout after fire (Dellow 1988). Generally resprouts strongly after fire; dense growth of seedlings can crowd out other plant species (Parsons & Cuthbertson 1992).

Interaction with other organisms: Leaf litter and fruit leachates inhibit the germination and growth of some native plant species; can form dense stands, replacing native species thus destroying habitat of native birds and animals (Parsons & Cuthbertson 1992). Eliminated when grazed or trampled by livestock — is not a problem on agricultural land (Dellow 1988). Flower and fruit production reduced 50% and 70% by introduction of Bitou Tip Moth *Comostolopsis germana* in 1990 (Tanner & Nolan 1993).

Distribution

Status/origin: Naturalised exotic, native of S. Africa. Introduced in mid 19th century, being dispersed in ships' ballast dumped on the Hunter River banks 1908 (Parsons & Cuthbertson 1992).

Botanical subregions: NC CC SC; LHI, Qld.

Distribution Sydney area: Coastal beaches and north of Sydney.

Select locations: Palm Beach, La Perouse, Port Kembla (1965), Shellharbour.

Habitat

Habitat: Sand dunes and forest margins near beaches.

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

Typical local abundance: Frequent–dominant.

Vegetation: Sand dune vegetation, e.g. with *Leptospermum laevigatum*, *Acacia longifolia*, *Correa alba*.

Substrate: Sand dunes and sand-mined areas, infertile, well-drained. Can withstand dry conditions; coloniser of sand dunes where it competes successfully with native species (Dellow 1988).

Exposure: Full sun.

Conservation

Conservation: Used as a secondary stabilising species on sand drift and mined areas in 1946–1968 but use stopped in 1971; poses a threat to native sand dune vegetation and drastically alters habitat for wildlife. Estimated to occur along 60% of the NSW coast including 12 national parks and 9 nature reserves (Parsons & Cuthbertson 1992), does not persist in cultivated areas (Dellow 1988). Selective aerial spraying techniques that do not kill native species are being developed by John Toth, Dept. of Agriculture, Biological and Chemical Research Institute, Rydalmere. Spray in winter, very low rate (M. Clarke pers. comm.).

Chrysanthemoides monilifera* subsp. *monilifera* **ASTERACEAE**

Boneseed

Life history

Growth form: Upright shrub to 3 m high; shallow rooted, no distinct tap root (Parsons 1973).

Vegetative spread: Regrows strongly from cut stumps (Parsons 1973).

Longevity: About 7–8 years.

Primary juvenile period: More than 18 months (Parsons 1973).

Flowers: Yellow, August–December.

Fruit/seed: Fleshy berry 6–8 mm diam., black when ripe; mature in summer (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: black fleshy 1-seeded fruit, mainly bird-dispersed, also spread in faeces of rabbits, foxes and cattle; ants eat fleshy skins and discard the seeds; spread in contaminated gravel in Victoria; fruit and seeds dispersed by running water (Parsons & Cuthbertson 1992). Fruit reported sold as pea-shooter ammunition (Parsons 1973). Seed moved in soil during roadworks (R. Buchanan pers. comm.). Large soil-stored seedbank, up to 2500/m² (Parsons & Cuthbertson 1992). Seeds germinate at any time of year but mostly autumn; most seeds retain viability for at least 2 years and up to 4–5 years (Dellow 1988), viability increased with increased depth of burial (Parsons & Cuthbertson 1992). Seed quickly germinates after mature plants are removed.

Fire response: Killed by high-intensity fire (1/1994) at Lane Cove, seedlings observed (P. Kubiak pers. comm.). Mature plants killed by fire in Victoria with almost complete germination of weathered seed (Dellow 1988).

Interaction with other organisms: Leaf litter and fruit leachates inhibit the germination and growth of some native plant species; can form dense stands, replacing native species and destroying habitat of native birds and animals (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to S Africa. Introduced as an ornamental in 1850s, considered naturalised by 1910 (Parsons & Cuthbertson 1992).

Botanical subregions: CC SC CT NFWP SFWP; Vic., Tas., S.A., W.A.

Distribution Sydney area: Coast, western Sydney.

Select locations: Mt Colah (R. Buchanan pers. comm.), Beecroft, Chatswood, Royal Botanic Gardens (1898), Heathcote, Shellharbour, Macquarie Fields, Wallacia, Woodford.

Habitat

Habitat: Coastal vegetation and cleared land.

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

Typical local abundance: Occasional–frequent.

Vegetation: Woodland, heath and disturbed sites.

Substrate: Sandy infertile soils (Parsons 1973), well-drained.

Exposure: Full sun.

Conservation

Conservation: Successfully competes with native vegetation for light (Parsons 1973).

Chrysocephalum apiculatum* (Helichrysum apiculatum)*ASTERACEAE**

Common Everlasting, Yellow Buttons

Life history

Growth form: Herb to 60 cm high, usually with a woody base.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Bright yellow flowers, at any time of year but mainly spring; peak in October for CC and in April and November for CT.

Fruit/seed: Achene, upper half with bright yellow bristles, March (limited data).

Dispersal, establishment & growth: Optimal germination regime 20°/10°C, germination promoted by light, strong after ripening requirement (dormancy), dormancy broken by high temperature but not cold-stratification or gibberellic acid (Willis and Groves 1991).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread, but not on sandstone areas.

Select locations: Culoul Range, Pennant Hills, Rooty Hill, Rookwood, Badgerys Creek, Mt Annan, Appin, Moss Vale, Lithgow, Winburndale, Orange, Taralga.

Habitat

Habitat: Grassy patches in forests.

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

Typical local abundance: Occasional.

Vegetation: Woodland and open-forest, e.g. with *Eucalyptus tereticornis*, *E. deanei*, *E. mannifera*, *E. radiata*.

Substrate: Clay soils from shales, e.g. Wianamatta Group, fertile. Watertable permanently low, moisture supply intermittent, fresh.

Exposure: No shade.

Conservation

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

Chrysocephalum semipapposum* (Helichrysum semipapposum)*ASTERACEAE**

Clustered Everlasting, Yellow Buttons

Life history

Growth form: Aromatic herb to 60 cm high. Certain forms grade into *H. apiculatum*.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Bright yellow, October–April, peak November.

Fruit/seed: Achene, with barbed bristles, mature March–April.

Dispersal, establishment & growth:

Fire response: Regrowth and suckers from rootstocks and lateral roots, no seedlings recorded less than 1 year after fire (Purdie 1977).

Interaction with other organisms:**Distribution**

Status/origin: Native.

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

Distribution Sydney area: Western and southern Blue Mountains.

Select locations: Mt Kerry, Castle Hill, Hill End, Glanmire, Lithgow, Berrima, Abercrombie, Wombeyan Caves, Kangaroo Valley, Nowra.

Habitat

Habitat: Hills, mountains or isolated rocky rises.

Altitude: 0–1000 m

Annual rainfall: above 900 mm

Typical local abundance: Occasional.

Vegetation: Eucalypt open-forest with herbaceous/grassy understorey. Ground stratum.

Substrate: Clay soils from basalt, shales etc, also limestone. Fertile soil. Watertable permanently low, moisture supply intermittent, fresh.

Exposure: Sheltered situations.

Conservation

Conservation: Rare, only 7/32 specimens collected since 1960, conservation status unknown.

Cichorium intybus* **ASTERACEAE**

Chicory

Life history

Growth form: Rosette herb with stems 30–120 cm high; well-developed tap-root (Lamp & Collet 1989).

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Blue, rarely white, November–April.

Fruit/seed: Achene 2–3 mm long, with minute pappus, mature May.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Has been used as a salad, condiment or vegetable.

Distribution

Status/origin: Naturalised exotic, native to Europe, N Africa, Asia. Cultivated for fodder and as a salad vegetable. Root roasted and ground, used to blend with coffee (Lamp & Collet 1989). Since ancient times, used as a medicine for eye ailments and for blood-purifying (Ciba-Geigy 1968–).

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

Distribution Sydney area: Widespread.

Select locations: Hornsby, Ermington, Parramatta, Richmond, Menangle (1894), Kiama, Bathurst.

Habitat

Habitat: Common roadside and wasteland weed.

Altitude: 0–1000 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent.

Vegetation: Wasteland weeds.

Substrate: Clay soils.

Exposure: Full sun.

Conservation

Conservation: Weed of disturbed sites. Not invasive of bushland.

Cirsium vulgare *

ASTERACEAE

Spear Thistle

Life history

Growth form: Biennial, erect herb to 1.5 m high with radical and cauline leaves; long, well developed taproot (Lamp & Collet 1989). Rosette leaves up to 35 cm long, older leaves deeply lobed and armed with spines, taproot branched, fleshy (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 2 years.

Primary juvenile period: 1–2 years in fertile soil, but in less fertile conditions may be several years (Klinkhamer & De Jong 1993).

Flowers: Pink–purple, October–January. Ample nectar production, honey is light, pale and candies hard; pollen supply useful because it occurs when other sources are deficient in Yellow Box areas (Lamp & Collet 1989).

Fruit/seed: Achene 3–6 mm long, with pappus of feather-like bristles 2–3 cm long, mature October–April. Up to 200 flower heads and 8000 seeds counted on individual plants (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Also animal and water-dispersed (Carr et al. 1992). Seeds germinate in autumn; most germinate rapidly with very little dormancy; seedling survival increased by rainfall but susceptible to flooding of root; rosettes withstand cold conditions but seedlings and young rosettes susceptible to drought (Klinkhamer & De Jong 1993). Extensive root system with fleshy storage develops in winter, rosette continues to grow in spring to 60 cm diam. (if rosettes die off in a dry summer, new rosette develops in autumn or winter), during spring of second year a flowering stem is produced from centre of rosette (Parsons 1973).

Fire response: Possibly resprouted after high-intensity fire (1/1994) at Lane Cove; flower buds within 26 weeks (P. Kubiak pers. comm.). Seedlings recorded less than 1 year after fire (Purdie 1977), probably result of post-fire dispersal into the area. Appears after disturbance, probably soil-stored seed (M. Clarke pers. comm.).

Interaction with other organisms: Seed eaten by Black Swan *Cygnus atratus*, Spotted Quail-thrush *Cincoloma punctatum*, foodplant of Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989, 1990). Flowers and seed eaten by Sulphur-crested cockatoo *Cacatua galerita* (Lepschi 1993). Spiny stems and leaves make it unpalatable to most stock (Klinkhamer & De Jong 1993), reducing the carrying capacity of paddocks; thick patches provide effective refuge for rabbits, fleshy root used to poison rabbits; spiny leaves and bracts transmit virus diseases between animals; biological control using gall fly is being investigated (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to N Africa, Europe and Asia. The subject of noxious weed legislation in the 1850s (Parsons & Cuthbertson 1992).

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

Distribution Sydney area: Widespread, western Sydney, upper Blue Mountains, Southern Highlands (P. Kodela pers. comm.).

Select locations: Wahroonga, Carlingford (M. Clarke pers. comm.), Mosman (1887), Oakville, Silverdale, Mt Annan, Lake Illawarra, Kangaroo Valley, Mt Wilson (1906), Mt Tomah, Capertee.

Habitat

Habitat: Wetland, river edges, wasteland. Abundant on roadsides, common weed of pastures (Lamp & Collet 1989). Disturbed edges (M. Clarke pers. comm.).

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

Typical local abundance: Frequent.

Vegetation: Pastures, remnant native vegetation. Thistle communities, mainly with *Onopordum acanthium*, *Carduus nutans*, *C. tenuiflorus*, *C. pycnocephalus*, *Silybum marianum* (Doing et al. 1969).

Substrate: Clay soils from shales, basalt, fertile–very fertile; soil rich in nutrients (Ciba-Geigy 1968–). Watertable mostly low. Recorded on saline sites in western NSW (Semple 1993). Less common on sand and soils with humus content more than 30% and almost

absent from pure clay soil; wide range of pH, peaks on almost neutral soil, rare on soil less than 4.8–5.0 pH (Klinkhamer & De Jong 1993).

Exposure: 55% full daylight for highest rate of growth and seed production (Klinkhamer & De Jong 1993).

Conservation: Common weed, plentiful throughout the State (Boorman 1921 Herbarium note). Declared noxious weed in some shires of NSW; recognised as weed in Victoria in 1856 (Parsons 1973). **Conservation**

Conyza albida *

ASTERACEAE

Tall Fleabane

Life history

Growth form: Robust, erect herb to 2 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: At any time of year, peak April–June.

Fruit/seed: Achene, ovoid, with pappus of minutely barbed bristles, 3 mm long. Mature at any time of year, peak March–April.

Dispersal, establishment & growth: Diaspore: fruit. Wind-dispersed locally and wide-spread, readily colonising disturbed sites. Water and possibly animal-dispersed (Carr et al. 1992).

Fire response: Killed. Seedlings recorded less than 1 year after fire (Purdie 1977), probably recruiting from wind-blown seed.

Interaction with other organisms: Flowers eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).

Distribution

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

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

Distribution Sydney area: Widespread.

Select locations: Dee Why, Manly, Ashfield (1916), Bondi, Ingleburn, Campbelltown, Windang, Katoomba, Coxs River, Robertson (P. Kodela pers. comm.), Barrengarry.

Habitat

Habitat: Weed of cultivation, pasture and wasteland.

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

Typical local abundance: Frequent.

Vegetation: With other weedy species, or invading undisturbed areas in open sites in woodland.

Substrate: Very fertile–fertile soils on shale, sandstone and metamorphics. Watertable mostly low, moisture supply intermittent, fresh.

Exposure: Light shade–no shade.

Conservation

Conservation: Weed of disturbed sites.

Conyza bilbaoana *

ASTERACEAE

Canadian Fleabane

Life history

Growth form: Robust herb to 2 m high.

Vegetative spread: No.

Longevity: Up to 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, most of the year.

Fruit/seed: Achene with pappus of bristles 2–3 mm long, dispersed at maturity February–April.

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

Fire response: Probably killed.

Interaction with other organisms:

Distribution

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

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

Distribution Sydney area: Mainly upper Blue Mountains and Bathurst area.

Select locations: Morisset (1899), Como (1899), Clarence, Jenolan Caves (1899), Wallerawang, Cudgegong, Yetholme, Hilltop.

Habitat

Habitat: Roadsides and disturbed land.

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

Typical local abundance: Frequent.

Vegetation: With other wasteland weeds.

Substrate:

Exposure:

Conservation

Conservation: Weed of roadsides and disturbed land. Widespread by 1900.

***Conyza bonariensis* ***
ASTERACEAE

Flaxleaf Fleabane

Life history

Growth form: Robust, erect herb to 1 m high.

Vegetative spread: No.

Longevity: Annual.

Primary juvenile period: Less than 1 year.

Flowers: At any time.

Fruit/seed: Achene with pappus of white–pink capillary bristles 3 mm long, mature August–April.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed locally and probably long distance. Coloniser of disturbed sites.

Fire response: Probably killed, fruit within 15 weeks of high-intensity fire (1/1994) at Lane Cove; possibly resprouts after low intensity fire (P. Kubiak pers. comm.).

Interaction with other organisms: Seed eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).

Distribution

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

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

Distribution Sydney area: Coastal and western Sydney.

Select locations: Cheltenham, Manly, Como (1887), Little Bay, Cabarita, Windsor, Campbelltown, Albion Park, Bowral.

Habitat

Habitat: Roadsides, pastures and wasteland.

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

Typical local abundance: Frequent.

Vegetation: With roadside weeds.

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

Exposure: Full sun.

Conservation

Conservation: Weed of cultivation, pasture and wasteland. Not invasive of bushland.

***Conyza canadensis* var. *canadensis* ***

ASTERACEAE

Canadian Fleabane

Life history**Growth form:** Robust, erect, herb to 1 m high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Throughout the year, flowers cream.**Fruit/seed:** Achene with pappus of bristles 4 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:** Resprouts at ground level or below (Fox 1988).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to N America.**Botanical subregions:** CC SC NT CT ST NWS SWS; LHI, Qld, Vic., Tas., S.A.**Distribution Sydney area:** Widespread, but mainly western Blue Mountains.**Select locations:** Clyde, Glen Davis, Coxs River (1909), Kowmung River.**Habitat****Habitat:** Weed of cultivation, pasture and wasteland.**Altitude:** 0–800 m**Annual rainfall:** 700–1000 mm**Typical local abundance:** Occasional.**Vegetation:** Grassland, disturbed areas, river flats.**Substrate:****Exposure:** Probably no shade.**Conservation****Conservation:** Minor weed of disturbed sites.***Conyza parva* ***

ASTERACEAE

Life history**Growth form:** Erect herb, occasionally to 80 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White or tinged with mauve, summer–autumn.**Fruit/seed:** Achene with pappus of barbed bristles 2–3 mm long, dispersed at maturity, February–May.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:** Probably killed.**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S America.**Botanical subregions:** NC CC SC NT ST SWS; LHI, Qld, Vic., W.A.**Distribution Sydney area:** Widespread, but mainly suburban area.**Select locations:** Putty, Gosford, Hornsby, Wahroonga, Kurnell (1906), Cronulla, Ashfield, Menangle Park, Hayes Crossing.**Habitat****Habitat:** Open sandy sites.**Altitude:** 0–500 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Woodland, e.g. with *Angophora floribunda*, *Allocasuarina torulosa*.**Substrate:** Sandy soil, red-brown loam, infertile. Watertable mostly low.**Exposure:****Conservation****Conservation:** Minor weed.

Coreopsis lanceolata *

ASTERACEAE

Coreopsis

Life history**Growth form:** Herb, forming clumps, to 1 m high with radical and cauline leaves.**Vegetative spread:** Spreads by stolons/rhizomes to form clumps.**Longevity:** Indefinite.**Primary juvenile period:****Flowers:** Yellow, summer.**Fruit/seed:** Achene 2-3 mm long, with pappus of 2 awns.**Dispersal, establishment & growth:** Diaspore: fruit, prolific seeder and germinator (anon 1991).**Fire response:** Resprouted and germinated after high-intensity fire (1/1994) at Narrabeen, seedlings observed (P. Kubiak pers. comm.). Resprouts from short woody rhizome (R. Buchanan & M. Clarke pers. comm.).**Interaction with other organisms:** Causes allergy in humans where density is high (Bass 1987).**Distribution****Status/origin:** Naturalised exotic, native of N. America.**Botanical subregions:** CC SC NT CT ST NWS SWP; Qld, Vic.**Distribution Sydney area:** Sydney suburbs and Blue Mountains.**Select locations:** Woy Woy, Northern Peninsula Beaches (M. Clarke pers. comm.), Terrey Hills, Belrose (P. Kodela pers. comm.), Cheltenham (1948), Northbridge, Middle Head, Camden, Linden, Wentworth Falls, Medlow Bath.**Habitat****Habitat:** Roadsides, railway lines and in disturbed areas.**Altitude:** 0-1000 mm**Annual rainfall:** above 700 mm, mainly above

1000 mm

Typical local abundance: Frequent.**Vegetation:** With other roadside weeds, or degraded native vegetation, e.g. *Eucalyptus haemastoma* woodland.**Substrate:** Sandy soils on sandstone, infertile, watertable permanently low, moisture supply intermittent, fresh.**Exposure:** Light shade-no shade.**Conservation****Conservation:** Vigorous weed capable of invading along tracks and stormwater drainage lines in bushland areas (R. Buchanan pers. comm.).**Cosmos bipinnatus** *

ASTERACEAE

Cosmos

Life history**Growth form:** Erect herb 1 m high.**Vegetative spread:** No.**Longevity:** 6 months.**Primary juvenile period:** 3 months.**Flowers:** White, mauve, pink or red, disc yellow, mostly spring, November-May.**Fruit/seed:** Achene with pappus of barbed awns.**Dispersal, establishment & growth:** Diaspore: fruit, possibly wind-dispersed (Carr et al. 1992). Prolific seeder and germinator (Anon 1991).**Fire response:** Probably killed.**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Mexico, garden plant.**Botanical subregions:** CC NT CT; Qld.**Distribution Sydney area:** North from Sydney, sporadic.**Select locations:** Erina, Richmond (1902), Royal Botanic Gardens (1902), Hornsby, Cheltenham, Glen Davis.

	Habitat
Habitat: Wasteland.	
Altitude: 0–300 m	Annual rainfall: above 700 mm
Typical local abundance: Occasional.	
Vegetation: Wasteland weeds.	
Substrate: Clay soils from shale, fertile.	
Exposure: Full sun.	
	Conservation
Conservation: Garden plant, occurring occasionally near habitation, not invasive of bush.	

Cotula alpina

ASTERACEAE

Alpine Cotula

Life history

Growth form: Stoloniferous, herb.
Vegetative spread: Stoloniferous.
Longevity: Indefinite.
Primary juvenile period:
Flowers: Summer.
Fruit/seed: Achene 1.5–2 mm long with thick wing undifferentiated from body, no pappus.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: CT ST; Vic Tas.
Distribution Sydney area: Lithgow.
Select locations: Littleton (near Lithgow) 1893, only record in area and northern limit. (Chiefly south from ACT.)

Habitat

Habitat: Wet sites.
Altitude: 900 m **Annual rainfall:** 900 mm
Typical local abundance:
Vegetation: Sphagnum bogs.
Substrate: Poorly drained peaty soils.
Exposure:

Conservation**Conservation:** Probably extinct in Sydney area, last collected in 1893.***Cotula australis***

ASTERACEAE

Common Cotula, Carrot Weed

Life history

Growth form: Herb usually less than 10 cm high, weakly rooting at nodes.
Vegetative spread: Possibly through rooting at nodes.
Longevity: Annual or short-lived perennial.
Primary juvenile period:
Flowers: August–March.
Fruit/seed: Achene, 1–1.5 mm long, with narrow wing.
Dispersal, establishment & growth: Diaspore: fruit, possibly wind or water-dispersed.
Fire response: Probably killed, fruiting within 15 weeks of high-intensity fire (1/1994) at Lane Cove, seedlings observed (P. Kubiak pers. comm.).
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC CC SC NT CT ST NWS CWS NWP SWP; LHI, Qld, Vic., Tas., S.A., W.A., N.Z.

Distribution Sydney area: Sydney suburbs and western Blue Mountains.

Select locations: Pennant Hills, Elizabeth Bay (1888), Cooks River, La Perouse, Burwood, Jenolan Caves, Glen Davis.

Habitat

Habitat: Roadsides, and gardens in Sydney area, clifflines above creek at Glen Davis.

Altitude: 0–600 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent–rare.

Vegetation: Open-forest, also roadsides, lawns, pastures, garden weed.

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

Exposure: ? full sun.

Conservation

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

***Cotula coronopifolia* ***

ASTERACEAE

Water Buttons

Life history

Growth form: Herb to 20 cm high, erect to spreading, with weak succulent stems rooting from nodes and yellow flowers, plants luxuriant in water forming dense floating masses but diminutive forms on damp land.

Vegetative spread: Spreads over short distances by rooting at nodes.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, August–December.

Fruit/seed: Achene 1.5–2 mm long, winged, mature October–May.

Dispersal, establishment & growth: Diaspore: fruit, animal and water-dispersed (Carr et al. 1992). Growth rate quick. Coloniser of bare mud.

Fire response:

Interaction with other organisms: The crab *Halicarcinus lacustris* shows a distinct association with *C. coronopifolia* (Aston 1977).

Distribution

Status/origin: Native to S Africa (Harden 1992) long regarded also as native to Australia but now described as naturalised exotic (Harden 1992). Reported by Robert Brown to be introduced to Sydney by 1804 (Maiden 1909).

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

Distribution Sydney area: Coast, also Cumberland Plain but rare.

Select locations: Norah Head, Cheltenham, Dee Why, Centennial Park, Kogarah (1896), Homebush Bay, Lidcombe, Doonside, Campbelltown, Mt Kembla.

Habitat

Habitat: Wet mud along ephemeral creeks and saline flats.

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

Typical local abundance: Frequent–occasional.

Vegetation: Freshwater or brackish swamp, herbland and sedgeland, e.g. with *Triglochin procera* and saltmarsh, e.g. with *Sarcocornia quinqueflora*, *Samolus repens*.

Substrate: Saline and freshwater areas in still or slow-flowing waters to 45 cm deep and on surrounding dampland mud. Salinity range 0.2–60.0 ppt T.D.S. (Aston, 1977). Soil fertile. Watertable mostly high, moisture supply intermittent. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

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

Craspedia canens

ASTERACEAE

Life history

Growth form: Tufted herb 15–65 cm high, with 1–5 flowering scapes, fine white hairs covering the leaves, and thick, spreading roots. Plant in standing water 80 cm high (P. Kodela pers. comm.)

Vegetative spread: Erect herb to 50 cm high.

Longevity: Short-lived (1–3 years).

Primary juvenile period:

Flowers: Yellow, mainly September–December.

Fruit/seed: Achene 1.5–2 mm long with pappus of plumed bristles 4 mm long.

Dispersal, establishment & growth: Wind-dispersed short distances, possibly also water or stock-dispersed (J. Everett pers. comm.).

Fire response:

Interaction with other organisms: Palatable to cattle (J. Everett pers. comm.).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Thirlmere, Southern Highlands.

Select locations: Thirlmere, Wingecarribee Swamp.

Habitat

Habitat: Peatland.

Altitude: 0–700 m

Annual rainfall: above 900 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt woodland, grassland and swamps, e.g. with *Carex*. Amongst sedges and along edges of drainage changes on swamp (P. Kodela pers. comm.).

Substrate: Sandy to peaty soils, dry–poorly-drained, fertile–infertile. Often where there is a high watertable, collection from shallow standing water (P. Kodela pers. comm.).

Exposure:

Conservation

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

Craspedia variabilis

ASTERACEAE

Life history

Growth form: Erect herb to 50 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Early spring to early summer.

Fruit/seed: Achene 1.5–2.5 mm long with pappus of plumose bristles 3–6 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Western Sydney, southern Highlands.

Select locations: Agnes Banks, Long Swamp.

Habitat

Habitat: Eucalypt forest and near swamp margins (P. Kodela pers. comm.).

Altitude: 0–800 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Eucalypt forest, woodland, e.g. with *Eucalyptus parramattensis* and grassland.

Substrate: Clay loams, alluvial or colluvial soils, infertile, watertable mostly high.

Exposure:

Conservation

Conservation: Widespread but probably rare. Conservation status unknown.

***Crassocephalum crepidioides* ***

ASTERACEAE

Thickhead

Life history

Growth form: Erect herb 50–100 cm high.**Vegetative spread:** No.**Longevity:** Less than 1 year.**Primary juvenile period:** 4 months.**Flowers:** Reddish, April–June.**Fruit/seed:** Achene 2 mm long, with pappus of hairs 8–10 mm long, mature May–June.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:** Killed (M. Clarke pers. comm.). Seedling recruitment after high-intensity fire (1/1994) at Narrabeen, flowering within 4 months, seedlings observed (P. Kubiac pers. comm.).**Interaction with other organisms:** Used medicinally in Fiji (Cambie & Ash 1994).

Distribution

Status/origin: Naturalised exotic, native to Africa and Madagascar.**Botanical subregions:** NC CC NT; Qld.**Distribution Sydney area:** Coast and coastal suburbs.**Select locations:** Gordon & Warriewood (M. Clarke pers. comm.), Narrabeen (DHB), Clifton Gardens, Mosman (1966), Parsley Bay, Bellevue Hill, Otford.

Habitat

Habitat: Weed of disturbed sites.**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Eucalypt woodland.**Substrate:** Sandy soils, moderate nutrients.**Exposure:** Full sun to medium shade.

Conservation

Conservation: Weed status unknown.***Crepis capillaris* ***

ASTERACEAE

Smooth Hawksbeard

Life history

Growth form: Herb to 75 cm high, basal leaves usually a rosette.**Vegetative spread:** No.**Longevity:** 1–3 years.**Primary juvenile period:****Flowers:** Yellow, November–April. Insect-pollinated (Ciba-Geigy 1968–).**Fruit/seed:** Achene 2 mm long, with pappus of hairs 8 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed (Carr et al. 1992), also dispersed by wind, water and people; moderate user or nitrogen and competitor for space (Ciba-Geigy 1968–).**Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Naturalised exotic, native to Europe.**Botanical subregions:** NC CC NT CT ST; Tas.**Distribution Sydney area:** Coast but mainly Tablelands.**Select locations:** Hurstville, Cambewarra, Nowra, Kurrajong Heights, Lithgow, Bathurst, Blayney (1899), Orange, Wombeyan Caves, Robertson.

Habitat

Habitat: Roadsides and disturbed areas.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Occasional–frequent.**Vegetation:** Grassy slopes and banks.**Substrate:** Gravelly soils, from limestone, basalt, shale, fertile.**Exposure:**

Conservation

Conservation: Weed status unknown.

***Crepis foetida* subsp. *vulgare* ***

ASTERACEAE

Stinking Hawksbeard

Life history**Growth form:** Herb 10–50 cm high, basal leaves usually a rosette.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** Yellow, summer.**Fruit/seed:** Achene 12–17 mm long, pappus of hairs 5–7 mm long, mature June.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** CC ST CWS SWS; Vic., Tas.**Distribution Sydney area:** Penshurst.**Select locations:** Penshurst (1906) only record.**Habitat****Habitat:** Roadsides and disturbed areas.**Altitude:** 200 m**Annual rainfall:** 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Rare, Sydney is northern limit.***Crepis setosa* ***

ASTERACEAE

Life history**Growth form:** Herb to 80 cm high, basal leaves usually a rosette.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow, February.**Fruit/seed:** Achene 3–5 mm long, with pappus of hairs 4–5 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind and water-dispersed (Ciba-Geigy 1968–).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** CC; Vic., Tas.**Distribution Sydney area:** Hornsby.**Select locations:** Hornsby (1918) only record for NSW.**Habitat****Habitat:** Recorded along laneway.**Altitude:** 100 m**Annual rainfall:** 1200 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:** Soil rich in nutrients, moderately dry (Ciba-Geigy 1968–).**Exposure:****Conservation****Conservation:** Probably now extinct.

Cymbonotus lawsonianus (*Arctotis australiensis*)

ASTERACEAE

Bears-ear

Life history

Growth form: Stemless herb to 25 cm diameter.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Yellow, August–October, March–May.**Fruit/seed:** Achene 2.5 mm long, no pappus, mature September–October.**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; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Western Sydney, western Blue Mountains to Orange.**Select locations:** Scheyville, St Marys, Narellan, Yerranderie, Hartley, Jenolan Caves, Winburndale, Orange, Abercrombie Caves, Moss Vale.

Habitat

Habitat: Short grassland.**Altitude:** 0–1000 m **Annual rainfall:** 700–1000 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Eucalypt woodland with grassy ground cover, e.g. with *Eucalyptus moluccana*, *E. crebra*, *E. melliodora*, *E. macroryncha*.**Substrate:** Clay and sandy loams from shales, metamorphics, basalt, fertile, watertable permanently low.**Exposure:** Probably full sun.

Conservation

Conservation: Presumed extinct in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.***Cymbonotus preissianus*** (*Cymbonotus lawsonianus misappl.*)

ASTERACEAE

Life history

Growth form: Stemless herb to 25 cm diameter.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Yellow, August–March.**Fruit/seed:** Achene 3–3.5 mm long, no pappus.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CT ST CWS SWS SWP; Vic., S.A., W.A.**Distribution Sydney area:** Jenolan/Abercrombie, Orange.**Select locations:** Oberon, Jenolan SE, Little River, Abercrombie Caves, Mt Werong, Mullion Range.

Habitat

Habitat: Grassy ground cover.**Altitude:** above 800 m **Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–rare.**Vegetation:** Woodland or forest with grassy or open groundcover, e.g. with *Eucalyptus radiata*, *E. goniocalyx*.

Substrate: Basalt, granite, metamorphics, fertile soil, well-drained, recorded from scraped trail margin.

Exposure:

Conservation: Conservation status unknown.

Conservation

***Cynara scolymus* ***

ASTERACEAE

Globe Artichoke

Life history

Growth form: Herb to 2 m high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Purplish-blue, December.

Fruit/seed: Achene 6 mm long, with pappus of hairs 3–4 cm long.

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

Fire response:

Interaction with other organisms: Cultivated, young flower heads used as a vegetable.

Distribution

Status/origin: Naturalised exotic, native to Europe, introduced as vegetable plant.

Botanical subregions: CC CT CWS SWP; W.A.

Distribution Sydney area: Sporadic.

Select locations: Catherine Hill Bay (1921), Minto, Bathurst Cemetery.

Habitat

Habitat: Earthworks, disturbed sites.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Rare.

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Naturalised sporadically, not invasive.

***Delairea odorata* * (Senecio mikanioides)**

ASTERACEAE

Cape Ivy

Life history

Growth form: Climbing or scrambling plant with stems many metres long.

Vegetative spread: Stoloniferous.

Longevity: Perennial.

Primary juvenile period: Probably less than 1 year (Lawrence 1985).

Flowers: Yellow, May–August. Probably bee-pollinated, self-incompatible (Lawrence 1985).

Fruit/seed: Achene 2 mm long, with pappus 5 mm long, not persistent, mature July, August. Potential seed set/plant 20 000–40 000 (Lawrence (1985).

Dispersal, establishment & growth: Diaspore: stem fragments, dispersed by gravity or water (Anon 1991). Effectiveness of seed dispersal not known.

Fire response: Usually fails to burn (R. Buchanan pers. comm.). Probably killed by high-intensity fire (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S Africa, introduced as garden plant.

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

Distribution Sydney area: Mainly coastal.

Select locations: Hornsby, Narrabeen, Middle Harbour Creek (L.McD.), Woolloomooloo (1902), Stanwell Park, Shellharbour 1906, Albion Park, Minnamurra, Liverpool, Douglas Park, Kangaloon.

Habitat

Habitat: Weed in moist gullies, roadsides, riverbanks.

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

Typical local abundance: Frequent–occasional.

Vegetation: Climbs on small trees or over shrubs forming dense ground cover. Moist eucalypt forest, e.g. with *Eucalyptus saligna*, *Syncarpia glomulifera*.

Substrate: Soils from shale, alluvium, and possibly basalt, medium to high nutrient. Requires moisture (M. Clarke pers. comm.).

Exposure: Sheltered, shady site.

Conservation

Conservation: Reported as major weed, carpeting the ground and covering shrubs on Gooseberry Island (Lake Illawarra) in 1891, first reported there in 1857 — recommended control was to use goats (note with Herbarium specimen). Now a widespread and significant bushland weed, though not frequent, e.g. restricted by limited distribution of moist eucalypt forest (R. Buchanan pers. comm.).

Dimorphotheca pluvialis* **ASTERACEAE**

Cape Marigold

Life history

Growth form: Herb to 20 cm high.

Vegetative spread:

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow and purplish, August–November.

Fruit/seed: Achene 6–8 mm long, with broad wing, no pappus.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to South Africa, introduced as ornamental.

Botanical subregions: CC NWS; S.A.

Distribution Sydney area: Coastal headlands in Sydney suburbs.

Select locations: Bangally Head, Sth Bungan Head, Bronte/Tamarama Headland (1976).

Habitat

Habitat: Coastal headlands.

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

Typical local abundance: Frequent–occasional.

Vegetation: Grassy shrubland with *Gazania*, *Westringia*, *Chrysanthemoides*.

Substrate: Sandstone cliffs, probably with clay soil influence.

Exposure:

Conservation

Conservation: Locally naturalised from nearby gardens.

Dittrichia graveolens* **ASTERACEAE**

Stinkwort

Life history

Growth form: Erect, densely-branched herb with characteristic conical shape, 30–60 cm high; stem with glandular hairs that exude sticky, strong-scented oil.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, March–April.

Fruit/seed: Achene 2 mm long, pubescent, with pappus of bristles, mature April–June.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed, reported growing to 1.2 m high after heavy rains at Ingleburn.

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Mediterranean region including N Africa.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Wahroonga, Duck River (1909), Cabramatta, Five Islands, Nowra, Clarence (1900), Kowmung River, Hilltop, Carcoar.**Habitat****Habitat:** Roadsides, old quarries, saltmarsh.**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Weedy, disturbed sites.**Substrate:** Stony river flats, clay soils, recorded in saltmarsh indicating possible salt tolerance. Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Full sun.**Conservation****Conservation:** Weed status unknown.***Echinops sphaerocephalus* *****ASTERACEAE**

Globe Thistle

Life history**Growth form:** Erect herb 0.5–2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White or greyish, summer–autumn.**Fruit/seed:** Achene, with partially fused pappus, surrounded by bristles.**Dispersal, establishment & growth:** Diaspore: fruit. Possibly animal-dispersed, e.g. sheep, in wool.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe, Asia.**Botanical subregions:** CT CWS.**Distribution Sydney area:** Gulgong–Orange.**Select locations:** Gulgong (1976), Orange (1976).**Habitat****Habitat:** Disturbed sites.**Altitude:** 800 m **Annual rainfall:** 1000 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:** Basalt, fertile soil.**Exposure:****Conservation****Conservation:** Recently reported exotic species, status unknown.***Eclipta platyglossa*****ASTERACEAE**

Twin-heads

Life history**Growth form:** Usually prostrate herb to 25 cm high, rooting at the nodes.**Vegetative spread:** Limited, rooting from nodes.**Longevity:** 2 years.**Primary juvenile period:****Flowers:** Yellow, January–April.

Fruit/seed: Achene, c. 3 mm long, pappus minute. Mature January–April.
Dispersal, establishment & growth: Diaspore: fruit, probably water-dispersed.
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT NWS CWS SWS NWP SWP SFWP; all mainland States.

Distribution Sydney area: Coastal and western Sydney.

Select locations: Narrabeen, Manly, Royal NP, Richmond, Doonside, Casula.

Habitat

Habitat: Swamps, creeklines.

Altitude: 0–200 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent–occasional.

Vegetation: Swamp woodland,, e.g. with *Eucalyptus amplifolia*, *Casuarina glauca*, *Melaleuca styphelioides*.

Substrate: Floodplain alluvium, fertile. Watertable mostly high.

Exposure: Light shade.

Conservation

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

Enydra fluctuans**ASTERACEAE****Life history**

Growth form: Herb with soft, creeping stems and opposite leaves.

Vegetative spread: Stem-creeping, rooting from nodes.

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellowish, spring–summer.

Fruit/seed: Achene, no pappus.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coast, Sydney Harbour to Port Hacking

Select locations: Kurnell, Port Hacking.

Habitat

Habitat: Swamps.

Altitude: 0–10 m

Annual rainfall: above 1200 mm

Typical local abundance:

Vegetation: Swamps

Substrate:

Exposure:

Conservation

Conservation: Port Hacking is the southern limit. Rare, status unknown.

Epaltes australis* (Sphaeromorpha australis)*ASTERACEAE**

Spreading Nut-heads

Life history

Growth form: Herb 3–25 cm high.

Vegetative spread:

Longevity: Probably short-lived.

Primary juvenile period:

Flowers: Yellowish, September–April.

Fruit/seed: Achene 1–1.5 mm long, with membranous pappus, mature September–April.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT NWP SWP NFWP SFWP; all mainland States.

Distribution Sydney area: Coast and western Sydney.

Select locations: Roseville, Manly, Revesby, Fairfield, Richmond, St Marys, Warrimoo, Appin, Wattamolla, Albion Park.

Habitat

Habitat: Margins of swampy areas.

Altitude: 0–300 mm

Annual rainfall: above 700 mm

Typical local abundance: Frequent.

Vegetation: Swamp vegetation.

Substrate: Sandy to clay soils, watertable periodically high, sometimes brackish.

Exposure: Full sun to light shade.

Conservation

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

Erechtites valerianifolia *

ASTERACEAE

Brazilian Fireweed

Life history

Growth form: Erect herb 1–1.5 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: White–mauve, June–November.

Fruit/seed: Achene 2.5–3.5 mm long, with pappus of numerous hairs.

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

Fire response: Probably killed, one plant flowering and fruiting withing 30 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

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

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coastal, mainly Gosford–Wyong.

Select locations: Dora Creek, Avoca, Peats Ridge, Woy Woy (1929), Red Cedar Flat (Royal NP 1984).

Habitat

Habitat: Weed of fertile soils.

Altitude: 0–100 m

Annual rainfall: above 1200 mm

Typical local abundance:

Vegetation:

Substrate: Fertile soils.

Exposure:

Conservation

Conservation: Mainly confined north of Gosford but recent collection (1984) from Royal NP suggests species is spreading. Common name suggests potential to spread after fire.

***Erigeron karvinskianus* ***

ASTERACEAE

Bony-tip Fleabane

Life history**Growth form:** Sprawling herb 20–30 cm high.**Vegetative spread:** From prostrate stems (R. Buchanan pers. comm.).**Longevity:** Indefinite.**Primary juvenile period:****Flowers:** Pale purple turning white then pink. Flowers at any time of year (R. Buchanan pers. comm.).**Fruit/seed:** Achene, flattened, 1 mm long with pappus of fine whitish hairs 2 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed, water-dispersed (M. Clarke pers. comm.).**Fire response:** Resprouted and flowered within 11 weeks, releasing seeds within 26 weeks of high-intensity fires (1/1994) at Lane Cove (P. Kubiak pers. comm.). Resprouts after low-moderate intensity fires, germinates after any fire (R. Buchanan pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to America. Introduced as garden ornamental occasionally escaping from gardens and rockeries (Harden 1992).**Botanical subregions:** NC CC CT NWS; Vic., S.A., W.A.**Distribution Sydney area:** Widespread but near habitation.**Select locations:** Avoca, Cheltenham, Lindfield (1960), Pymble, Foxground (1944), Leura, Katoomba, Blackheath.**Habitat****Habitat:** Watercourses, stormwater drains, slopes, path edges.**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm**Typical local abundance:** Frequent.**Vegetation:** Moist eucalypt forest, disturbed watercourses.**Substrate:** Sandy soils, fertile–infertile. Damp sandstone rocks, garden rock walls,

stormwater outlets (R. Buchanan & M. Clarke pers. comm.).

Exposure: Mid shade–full sun (R. Buchanan pers. comm.).**Conservation****Conservation:** Potential to invade bush along disturbed creeks, e.g. Katoomba area.***Euchiton gymnocephalus* (Gnaphalium gymnocephalum)**

ASTERACEAE

Creeping Cudweed

Life history**Growth form:** Herb 10–35 cm high.**Vegetative spread:** Spreads by stolons.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** October–April.**Fruit/seed:** Achene 0.7 mm long with pappus of non-persistent bristles 3 mm long, mature December–April.**Dispersal, establishment & growth:** Diaspore: fruit. Coloniser.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST NWS CWS SWS; Vic., Tas., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Culoul Range, Ourimbah, Bayview, Wahroonga, Royal NP, Dapto, Razorback, Jenolan Caves, Mullion Range.**Habitat****Habitat:** Eucalypt open-forest.**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Occasional

Vegetation: Eucalypt open-forest, e.g. *Eucalyptus deanei*, *E. dives*, *E. eugenioides*, occasionally in dry rainforest margins.

Substrate: Sandy to clay loam from shale, granite, metasediments, infertile–fertile.

Exposure:

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

Conservation

Euchiton involucratu (*Gnaphalium involucratum*)

ASTERACEAE

Star Cudweed

Life history

Growth form: Woolly, stoloniferous herb 12–50 cm high.

Vegetative spread: Spreads by stolons.

Longevity: Annual or biennial (Purdie 1977).

Primary juvenile period: 1–2 years.

Flowers: At any time of year.

Fruit/seed: Achene 0.6 mm long, mature December–February.

Dispersal, establishment & growth: Diaspore: fruit. Coloniser.

Fire response: Seedlings recorded less than 1 year after fire (Purdie 1977).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast and montane areas.

Select locations: Martinsville, Carlingford, Beecroft, Bundeena, Orange, Wingecarribee Swamp.

Habitat

Habitat: Creeks, roadsides, pasture, swamps.

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

Typical local abundance: Frequent.

Vegetation: Moist woodland, sedgeland, grassland, alluvial or peaty soils, fertile–infertile, watertable mostly high.

Substrate: Alluvial or fibrous peaty soils, fertile–infertile. Watertable mostly high.

Exposure:

Conservation

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

Euryops chrysanthemoides * (*Gamolepis chrysanthemoides*)

ASTERACEAE

Life history

Growth form: Shrub 0.5–1.5 m high.

Vegetative spread:

Longevity: Indefinite.

Primary juvenile period:

Flowers: Yellow, June.

Fruit/seed: Achene 0.5 mm long, no pappus.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S Africa.

Botanical subregions: CC.

Distribution Sydney area: Northbridge to Wollongong (Harden 1992).

Select locations: (no specimens)

Habitat

Habitat: Weed of roadsides.

Altitude: 0–200 mm

Annual rainfall: above 1200 mm

Typical local abundance:

Vegetation: Roadside weeds.

Substrate:

Exposure:

Conservation

Conservation: Weed status unknown.

Facelis retusa *

ASTERACEAE

Life history

Growth form: Herb, 5–30 cm high, with decumbent stems.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: White, purple-tipped, October–January.

Fruit/seed: Achene 1–1.5 mm long, with pappus of numerous papillary hairs.

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

Fire response:

Interaction with other organisms:

Distribution

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

Botanical subregions: NC CC SC CWS.

Distribution Sydney area: Suburban area and Albion Park.

Select locations: Cheltenham, Northbridge, Wentworthville, Leumeah, Albion Park (1948).

Habitat

Habitat: Weed near habitation: gardens, paths, paddocks.

Altitude: 0–100 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Wasteland weeds.

Substrate: Sandy, well-drained soils, fertile.

Exposure:

Conservation

Conservation: Garden weed, probably not invasive of bushland, though probably actively spreading.

Galinsoga parviflora *

ASTERACEAE

Potato Weed

Life history

Growth form: Herb 10–60 cm high, with opposite leaves.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Flowers 4–6 weeks after germination (Ciba-Geigy 1968–), fruiting within 15 weeks (P. Kubiak pers. comm.).

Flowers: White, disc yellow, February–August. Self-pollinated (Ciba-Geigy 1968–).

Fruit/seed: Achene 2 mm long, with pappus of short bristles. Fruits ripen on pulled out plants (Ciba-Geigy 1968–).

Dispersal, establishment & growth: Diaspore: fruit. Dispersed by wind, water, animals and people; germinates in light; vigorous user of nitrogen and competitor for space; sensitive to frost; 2–3 generations per year in favourable conditions (Ciba-Geigy 1968–).

Fire response: Killed (M. Clarke pers. comm.). Flowered within 12 weeks, and fruiting within 15 weeks of high-intensity fire (1/1994) at Lane Cove, seedlings observed (P. Kubiak pers. comm.).

Interaction with other organisms: Cattle and sheep especially like this herb (Ciba-Geigy 1968–).

<p>Status/origin: Naturalised exotic, native to S America. Botanical subregions: NC CC SC NT CT NWS; Qld, Vic., Tas., N.T., S.A., W.A. Distribution Sydney area: Widespread. Select locations: Waitara, Dural, Lane Cove, Pennant Hills (M. Clarke pers. comm.). Port Jackson (1850), Como (1887), Richmond, Heathcote, Wollongong, Albion Park, Mt Irvine, Mt Wilson.</p>	Distribution
<p>Habitat: Disturbed habitats and agricultural areas. Altitude: 0–1000 m Annual rainfall: above 700 mm Typical local abundance: Frequent–occasional. Vegetation: Moist eucalypt forests, mangrove edges, disturbed watercourses (M. Clarke pers. comm.). Substrate: Fertile soil on sandstone, shale. Nitrogenous soil (Ciba-Geigy 1968–). Exposure: Full sun–semi-shade (M. Clarke pers. comm.).</p>	Habitat
<p>Conservation: Weed of disturbed sites, minor invader of bush. Often confused with <i>Bidens pilosa</i> or <i>Sigesbeckia orientalis</i> (M. Clarke pers. comm.).</p>	Conservation

Gazania rigens *

ASTERACEAE

<p>Growth form: Herb with decumbent stems forming mats. Vegetative spread: Longevity: Perennial. Primary juvenile period: Flowers: Bright orange–deep yellow, most of the year. Fruit/seed: Achene 4 mm long, covered by hairs. Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed, probably also water-dispersed. Fire response: Interaction with other organisms:</p>	Life history
<p>Status/origin: Naturalised exotic, native to S Africa. Introduced as garden ornamental, occasionally escaping. Botanical subregions: CC; S.A. Distribution Sydney area: Coastal headlands and beaches. Select locations: Pearl Beach (1973), Palm Beach (1972), Bangally Head, Bronte/Tamarama Headland.</p>	Distribution
<p>Habitat: Coastal sand dunes and roadsides. Altitude: 0–50 m Annual rainfall: above 1200 mm Typical local abundance: Frequent. Vegetation: Coastal herbland, e.g. with <i>Carpobrotus</i>, <i>Lampranthus</i>, <i>Westringia</i>. Substrate: Beach sand and sandstone cliffs. Exposure: Full sun.</p>	Habitat
<p>Conservation: Localised garden escape though relatively recent collections (since 1972) possibly indicate increasing spread.</p>	Conservation

Glossogyne tannensis (*Glossogyne tenuifolia*)

ASTERACEAE

Cobbler's Tack

<p>Growth form: Herb with erect stems to 60 cm. Vegetative spread: Longevity: Perennial. Primary juvenile period:</p>	Life history
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Flowers: Yellow, December–April.

Fruit/seed: Achene 7–8 mm long, pappus with barbed awns 1–2 mm long, mature December–April.

Dispersal, establishment & growth: Diaspore: fruit, probably animal-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC NT CT NWS CWS NWP NFWP; all mainland States, Pac., Asia, India.

Distribution Sydney area: Western Sydney, Capertee and Shoalhaven Valleys.

Select locations: Ryde, Glenfield, Ingleburn, Doonside, Capertee Valley, Shoalhaven Gorge.

Habitat

Habitat: Drier grasslands and woodlands.

Altitude: 0–600 m **Annual rainfall:** 700–1000 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassland and woodland, e.g. with *Eucalyptus moluccana* and *E. fibrosa*.

Substrate: Clay soils of moderate fertility, from shales, quartzite, slates.

Exposure: Probably full sun.

Conservation

Conservation: Rare and vulnerable in Western Sydney (Benson & McDougall 1991), though elsewhere in NSW reported to be 'common and abundant in large areas if there has been a high summer rainfall' (Harden 1992).

Gnaphalium americanum *

ASTERACEAE

Life history

Growth form: Slender herb 10–35 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Cream–white, mainly October–January.

Fruit/seed: Achene 0.5 mm high, with pappus of bristles 2 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic of relatively recent origin, native to Central and S America.

Botanical subregions: NC CC SC CT ST; LHI.

Distribution Sydney area: Mainly coastal.

Select locations: Royal Botanic Gardens, Silverwater (1964), Leuhmeah (1964), Werong Beach, Hartley, Burrawang.

Habitat

Habitat: Disturbed areas, tracks, vacant land.

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

Typical local abundance: Frequent.

Vegetation: With grasses and herbs.

Substrate: Sandy to stony clay soils.

Exposure: Probably full sun.

Conservation

Conservation: Weed of disturbed sites, probably still expanding range.

***Gnaphalium calviceps* ***

ASTERACEAE

Life history

Growth form: Herb 10–20 cm high.
Vegetative spread: No.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Brown, mainly October–December.
Fruit/seed: Achene 0.4–0.6 mm long, with a pappus of bristles 2 mm long, mature October–February.
Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed.
Fire response: Probably killed.
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S America.
Botanical subregions: NC CC SC NT ST NWS; Vic., Tas., S.A.
Distribution Sydney area: Sydney, Cumberland Plain and Bathurst.
Select locations: Royal Botanic Gardens (1902), Little Bay, Cabarita, Castle Hill, Glenfield, Norton's Basin, Mt Annan, Thirlmere, Bathurst.

Habitat

Habitat: Disturbed sites including sheep pens.
Altitude: 0–1000 m **Annual rainfall:** above 700 mm
Typical local abundance: Occasional.
Vegetation: Grassland or open woodland, e.g. with *Eucalyptus blakelyi*.
Substrate: Clay soils, fertile.
Exposure:

Conservation

Conservation: Weed of disturbed sites, not invasive of bushland.

Gnaphalium coarctatum

ASTERACEAE

Purplish Cudweed

Life history

Growth form: Herb 7–40 cm high.
Vegetative spread: No.
Longevity: 1–2 years.
Primary juvenile period:
Flowers: October–April.
Fruit/seed: Achene, 0.7 mm long, mature November–December.
Dispersal, establishment & growth: Diaspore: fruit, wind- and possibly animal-dispersed (Carr et al. 1992).
Fire response: Probably killed; fruiting within 25 weeks, seeds shed within 27 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).
Interaction with other organisms: Leaves, seed, and stems eaten by Crimson Rosella *Platycercus elegans* (Lepschi 1993).

Distribution

Status/origin: Naturalised exotic, native to America.
Botanical subregions: NC CC SC NT NWS CWS SWS; LHI, Qld, Vic.
Distribution Sydney area: Mainly coast.
Select locations: Narara, Point Claire (1931), Pennant Hills, Narrabeen, Manly, Granville, Lower Portland, Castle Hill.

Habitat

Habitat: Disturbed ground, footpaths, parks, cleared areas.
Altitude: 0–100 m **Annual rainfall:** above 750 mm
Typical local abundance: Occasional–frequent.
Vegetation: Lawns, grassland and with weeds of disturbed sites, e.g. *Bidens pilosa*, *Plantago lanceolata*.
Substrate: Mainly clay soils, fertile, cracks in pavements.
Exposure: Full sun.

Conservation

Conservation: Weed of disturbed sites, not likely to be invasive of bushland.

***Gnaphalium pensylvanicum* ***

ASTERACEAE

Life history**Growth form:** Erect to procumbent woolly herb 20–50 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, September–October.**Fruit/seed:** Achene 0.5 mm long, with pappus of non-persistent bristles 2 mm long, mature July–December.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:** Probably killed; flowering and fruiting within 15 weeks of high-intensity fire at Lane Cove, seedlings observed (P. Kubiak pers. comm.).**Interaction with other organisms:**

Distribution**Status/origin:** Naturalised exotic, native to America and introduced by 1805.**Botanical subregions:** NC CC SC; LHI, Qld.**Distribution Sydney area:** Sydney suburbs.**Select locations:** Ettalong, Harbord, Carlingford, Lane Cove, Port Jackson (1805), Centennial Park, Sans Souci, Ingleburn, Castle Hill, Richmond.

Habitat**Habitat:** Disturbed sites, garden and lawn weed, along tracks.**Altitude:** 0–100 m**Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** Weeds of disturbed sites.**Substrate:** Sandy soil, infertile.**Exposure:** Full sun.

Conservation**Conservation:** Long established weed of disturbed sites, unlikely to invade bushland.***Gnaphalium polycaulon***

ASTERACEAE

Life history**Growth form:** Erect to ascending herb to 15 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** July–December.**Fruit/seed:** Achene 0.5 mm long, with pappus of barbed bristles 2 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, probably animal-dispersed.**Fire response:** Probably killed.**Interaction with other organisms:**

Distribution**Status/origin:** Native.**Botanical subregions:** CT NWP SWP; Qld, Vic., W.A.**Distribution Sydney area:** Newnes Plateau.**Select locations:** Newnes Glowworm tunnel (only record for area).

Habitat**Habitat:** Along road verge though reported along watercourses further west.**Altitude:** 1000 m**Annual rainfall:** 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Heath–scrub.**Substrate:** Sandy podsolic soil on sandstone.**Exposure:**

Conservation**Conservation:** Mainly a western species, Newnes is eastern limit. Conservation status unknown.

Gnaphalium sphaericum

ASTERACEAE

Life history

Growth form: Erect herb 5–50 cm high, rarely biennial.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:** Less than 1 year.**Flowers:** At any time of year.**Fruit/seed:** Achene 0.7 mm long with pappus of non-persistent bristles 2 mm long, matures at any time of year.**Dispersal, establishment & growth:** Diaspore: fruit. Coloniser.**Fire response:** Probably killed.**Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Culoul range, Windsor, Castle Hill, Wahroonga, Minto, Bulli Pass, Albion Park, Berry, Mt Bindo, Boyd Plateau.

Habitat

Habitat: Disturbed sites, roadsides, bare ground, ridge-top, slopes, creek bank.**Altitude:** 0–1100 m**Annual rainfall:** above 700 mm**Typical local abundance:** Occasional–common.**Vegetation:** Eucalypt woodland and grassland, e.g. with *Eucalyptus deanei*, *E. tereticornis*, *E. fibrosa*, *E. pauciflora*, *E. dalrympleana*, *E. dives*.**Substrate:** Various soils from shale, volcanics, slate, metasediment, rare on sandstone.**Exposure:** Mid shade–full sun.

Conservation

Conservation: Conserved in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.**Grindelia camporum** var. *australis* *

ASTERACEAE

Life history

Growth form: Herb with woody crown growing 0.5–1.2 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow, summer–autumn. January–May.**Fruit/seed:** Achene 2–3.5 mm long, with pappus of several smooth awns.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Exotic, native to N America. Occasionally naturalised.**Botanical subregions:** CT.**Distribution Sydney area:** Bathurst–Orange.**Select locations:** Bathurst–Orange (1932), Bathurst (1944).

Habitat

Habitat: Pasture and stream banks.**Altitude:** 700–1000 m**Annual rainfall:** 600–900 mm**Typical local abundance:****Vegetation:** Ground stratum, pasture and stream banks.**Substrate:****Exposure:**

Conservation

Conservation: Occasionally naturalised.

***Guizotia abyssinica* ***

ASTERACEAE

Rantil, Niger Seed

Life history

Growth form: Herb to 2 m high.
Vegetative spread: No.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Yellow, April–June.
Fruit/seed: Achene 4 mm long, no pappus.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Ethiopia. Cultivated in Africa and India for oil. The few collections have resulted from imported bird seed (Harden 1992).
Botanical subregions: NC CC; Qld.
Distribution Sydney area: Sydney suburbs.
Select locations: Eastwood, Earlwood, Kellyville (1974).

Habitat

Habitat: Gardens.
Altitude: 0–100 m **Annual rainfall:** above 1000 mm.
Typical local abundance:
Vegetation:
Substrate:
Exposure:

Conservation

Conservation: Uncommon weed.

***Gymnocoronis spilanthoides* ***

ASTERACEAE

Temple Plant, Senegal Tea

Life history

Growth form: Rhizomatous herb 1–2.5 m high; stems ribbed, hollow and cane-like.
Vegetative spread: Spreading by rhizome.
Longevity: Perennial.
Primary juvenile period:
Flowers: White, February.
Fruit/seed: Achene 0.5 mm long, no pappus.
Dispersal, establishment & growth: Diaspore: fruit, also regrows from stem nodes. Re-grew from plants raked from dam and sprayed with herbicide (Herbarium note 1985).
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to S America.
Botanical subregions: NC CC.
Distribution Sydney area: Sydney, Illawarra.
Select locations: Duck River (Auburn) (1991), Dapto (1985), Fairy Meadow (1985).

Habitat

Habitat: Riverbanks and in still to slow-flowing waters in dams, drains and creeks.
Altitude: 0–100 m **Annual rainfall:** above 1000 mm
Typical local abundance: Dominant–frequent.
Vegetation: Wetland.
Substrate: Riverbank alluvium. Soil fertile. Watertable permanently high, moisture supply continuous, fresh; grows from bank into water 1 m deep (Herbarium note 1985).
Exposure: No shade.

Conservation

Conservation: A declared noxious weed in NSW. Probably spreading.

***Hedypnois rhagadioloides* subsp. *cretica* ***

ASTERACEAE

Cretan Weed

Life history**Growth form:** Annual 3–50 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow, August–November.**Fruit/seed:** Achene 5–7 mm long, with pappus 3–6 mm long, barbed.**Dispersal, establishment & growth:** Diaspore: fruit, possibly animal-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Mediterranean region.**Botanical subregions:** CC NT NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Western Sydney.**Select locations:** Hornsby, Homebush (1909), Flemington Saleyards, Bringelly, Menangle, Camden, Albion Park.**Habitat****Habitat:** Weed of pastures and disturbed sites.**Altitude:** 0–200 m**Annual rainfall:** 700–1200 mm**Typical local abundance:** Rare.**Vegetation:** Grassland.**Substrate:** Clay soil from shale, fertile. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Minor weed of pastures, not invasive of bushland.***Helianthus annuus* ***

ASTERACEAE

Common Sunflower

Life history**Growth form:** Herb with taproot, 1–2 m high.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:** 3 months.**Flowers:** Bright yellow, throughout the year.**Fruit/seed:** Achene, 5–10 mm long, no pappus.**Dispersal, establishment & growth:** Diaspore: fruit, dispersed by humans.**Fire response:** Flowering within 12–13 weeks of high-intensity fire 1/1994 at Lane Cove and Narrabeen, possibly growing from seed introduced to feed wildlife (P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America. Widely cultivated for the oil extracted from the seeds, and sometimes grown as an ornamental. Cultivated forms have larger heads than naturalised plants.**Botanical subregions:** NC CC ST NWS CWS NWP SWP NFWP SFWP; all mainland States.**Distribution Sydney area:** Narellan.**Select locations:** Narellan Rubbish tip (1968) only record.**Habitat****Habitat:** Roadsides and disturbed sites.**Altitude:** 0–300 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:** Full sun.**Conservation****Conservation:** Probably established from split grain and unlikely to persist. Unlikely to be naturalised in Sydney area.

***Helianthus tuberosus* ***

ASTERACEAE

Jerusalem Artichoke

Life history**Growth form:** Erect herb with short rhizomes and tubers, 1.5–3 m high.**Vegetative spread:** Tubers.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** Yellow, summer.**Fruit/seed:** Achene, 4–6 mm long, with pappus of scales.**Dispersal, establishment & growth:** Diaspore: fruit, tubers, dispersed by humans.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native of North and S America. Frequently cultivated for its edible tubers. Rare garden escape probably as a result of dumping tubers.**Botanical subregions:** CC CWS SWP; W.A.**Distribution Sydney area:** Sydney suburbs.**Select locations:** Northbridge (1965), Campbelltown (1971).**Habitat****Habitat:** Roadsides and in wasteland near habitation (Harden 1992).**Altitude:** 0–300 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:****Substrate:** Clay soil.**Exposure:****Conservation****Conservation:** Minor weed, rare in Sydney area.***Helichrysum adenophorum* var. *waddelliae***

ASTERACEAE

Life history**Growth form:** Herb 20–50 cm high, grows in clumps.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White–pink, September–March.**Fruit/seed:** Achene with pappus of barbed bristles, mature April.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed, possibly colonising disturbed soil.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC CT ST; Vic, S.A.**Distribution Sydney area:** Newnes, Putty area, Paddys River.**Select locations:** Howes Valley, Putty, Clarence, Lithgow, Paddys River.**Habitat****Habitat:** Hillsides, ridgetops.**Altitude:** 0–1100 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Eucalypt forest.**Substrate:** Sand and sandy soil on sandstone, infertile, well-drained.**Exposure:****Conservation****Conservation:** Conservation status unknown.

Helichrysum calvertianum

ASTERACEAE

- Life history**
- Growth form:** Twiggy subshrub to 30 cm high.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: White, often tinged pink, January–July.
Fruit/seed: Achene with pappus of bristles.
Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed.
Fire response:
Interaction with other organisms:
-
- Distribution**
- Status/origin:** Native.
Botanical subregions: CT.
Distribution Sydney area: Restricted to Fitzroy Falls, Berrima and Mittagong.
Select locations: Mittagong, Berrima, Joadja, Fitzroy Falls, Barbers Creek.
-
- Habitat**
- Habitat:** Eucalypt woodland.
Altitude: 800–1000 m **Annual rainfall:** above 900 mm
Typical local abundance:
Vegetation: Dry eucalypt woodland.
Substrate: Sandy soil.
Exposure:
-
- Conservation**
- Conservation:** Local endemic species, uncommon, conservation status unknown.

Helichrysum collinum

ASTERACEAE

- Life history**
- Growth form:** Robust, woody herb to 1 m high, grey–white woolly.
Vegetative spread:
Longevity: Perennial.
Primary juvenile period:
Flowers: Yellow, September–March, peak November.
Fruit/seed: Achene with pappus of bristles, mature October–December.
Dispersal, establishment & growth: Diaspore: fruit.
Fire response: Regrowth only from surviving rootstocks, seedlings recorded less than 1 year after fire (Purdie 1977).
Interaction with other organisms:
-
- Distribution**
- Status/origin:** Native.
Botanical subregions: NC CC SC NT CT ST NWS CWS NWP; Qld.
Distribution Sydney area: Widespread.
Select locations: Wollombi, Como, Macquarie Fields, Glenbrook, Yanderra, Yerranderie, Bomaderry, Kanangra, Hill Top, Mittagong, Wingello.
-
- Habitat**
- Habitat:** Ridges.
Altitude: 0–1000 m **Annual rainfall:** above 800 mm
Typical local abundance: Occasional.
Vegetation: Eucalypt woodland, e.g. with *Angophora bakeri*, *Eucalyptus sieberi*, *E. punctata* with shrubby understorey.
Substrate: Sandy loam from sandstone, also shale, deep, well-drained.
Exposure:
-
- Conservation**
- Conservation:** Not common, conservation status unknown.

Helichrysum elatum

ASTERACEAE

White Paper Daisy

Life history

Growth form: Woody shrub or subshrub 60–200 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, June–November, peak September.**Fruit/seed:** Achene with pappus of bristles 7 mm long, mature June–January, peak October.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed (Westoby et al. 1990), possible coloniser of disturbed soil.**Fire response:** Possibly killed by high-intensity fire at Narrabeen (P. Kubiak pers. comm.).**Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST; Qld, Vic**Distribution Sydney area:** Widespread, localised.**Select locations:** Mt Kindarun, Tuggerah, Gosford, Hornsby, Mt Keira, Thirlmere, Berry, Kangaroo Valley, Mt Wilson, Katoomba, Hill Top, Kangaloon (P. Kodela pers. comm.).

Habitat

Habitat: Hillsides, valleys.**Altitude:** 0–1000 m**Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** In open to tall open eucalypt forest, e.g. *Eucalyptus fastigata*, *E. cypellocarpa*, *E. obliqua*, *E. globoidea* (P. Kodela pers. comm.), also edge of rainforest.**Substrate:** High nutrient soils, disturbed sites, mostly on basalt, shale or on sandy soil from sandstone, conglomerate. On shale, sometimes sandstone, in Kangaloon area (P. Kodela pers. comm.).**Exposure:** Sheltered.

Conservation

Conservation: Conservation status unknown.***Helichrysum leucopsideum***

ASTERACEAE

Satin Everlasting

Life history

Growth form: Herb 15–20 cm high, with woody rootstock.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, sometimes tinged pink in bud, November–May.**Fruit/seed:** Achene with pappus of barbed bristles, January–April.**Dispersal, establishment & growth:** Diaspore: fruit. Possible coloniser of disturbed ground.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC CT ST NWP SWP SFWP; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread, but mainly upper Blue Mountains, localised.**Select locations:** Kogarah, Cambewarra, Newnes Plateau, Bell, Hassans Walls, Hilltop, Kangaloon, Wingello.

Habitat

Habitat: Slopes and ridges.**Altitude:** 0–1100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Frequent.**Vegetation:** Eucalypt forest, e.g. with *Pteridium esculentum*, *Lomandra longifolia*, *Eucalyptus rossii*.**Substrate:** Sandy loam.

Exposure: Open areas.

Conservation: Conservation status unknown.

Conservation

Helichrysum rutidolepis

ASTERACEAE

Pale Everlasting

Life history

Growth form: Decumbent, woolly herb 15–40 cm high.

Vegetative spread: Creeping rhizome.

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, December–June, peak March–April.

Fruit/seed: Achene with pappus of bristles, mature March–April.

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

Fire response: Resprouted, a few plants flowering and fruiting within 18 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast and mountains.

Select locations: Eastwood, Lane Cove River, Douglas Park, Euroka, Austinmer, Mt Gibraltar, Kangaroo Valley, Mt Hay, Jenolan Caves, Kanangra.

Habitat

Habitat: Hillsides, rocky gorges.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Occasional.

Vegetation: Wet eucalypt forest and rainforest fringes, e.g. with *Eucalyptus fastigata*, *E. radiata*, *E. stellulata*, *E. punctata*, or grasslands, e.g. with *Stellaria pungens*.

Substrate: Basalt soils, less commonly sandy loam from sandstone, fertile soil.

Exposure:

Conservation

Conservation: Not known.

Helichrysum scorpioides

ASTERACEAE

Button Everlasting

Life history

Growth form: Herb to 30 cm high. An undescribed taxon close to *H. scorpioides* occurs in the Robertson–Mittagong area (P. Kodala pers. comm.)

Vegetative spread: New growth from rhizomes up to 30 cm from old stem, probably with subsequent separation to form new plants. [Can be propagated by severing sucker shoots (Langkamp 1987).]

Longevity: Perennial. Individual plants probably relatively short-lived.

Primary juvenile period:

Flowers: Yellowish, December–June.

Fruit/seed: Achene with barbed hairs. Mature February–June.

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

Fire response: Resprouted, some plants flowering within 16 weeks and fruiting within 23 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: Lane Cove River, Otford, Berry, Kangaroo Valley, Castlereagh, Glenbrook, Mt Wilson, Kanangra Deep, Jenolan Caves, Hilltop, Mt Gibraltar.

Habitat

Habitat: Disturbed sites, edges of wooded roadsides.

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

Typical local abundance: Frequent–occasional.

Vegetation: Open-forest, e.g. with *Eucalyptus radiata*, *E. punctata*, *E. piperita*, *E. fastigata*, *E. viminalis*, *E. blaxlandii*. Woodland, e.g. *Eucalyptus sclerophylla*–*Angophora bakeri*.

Substrate: Variable brown clay from basalt, sandy loam from sandstone, shale–sandstone transition. Soil very fertile–fertile. Watertable mostly low, moisture supply intermittent, fresh, sometimes moist sites, e.g. swamp edge.

Exposure: Sheltered situations; light shade.

Conservation

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

***Helminthotheca echioides* *** (Picris echioides)**ASTERACEAE**

Ox-tongue

Life history

Growth form: Herb 30–100 cm high, with taproot.

Vegetative spread:

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Yellow, October–November.

Fruit/seed: Achene 3 mm long, with pappus of bristles 5 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

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

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

Distribution Sydney area: Wollongong.

Select locations: Mt Ousley Road (1967) only record for Sydney area.

Habitat

Habitat: Gravel dump.

Altitude: 0–400 m **Annual rainfall:** above 1200 mm

Typical local abundance: Occasional.

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Minor weed, rare in Sydney area, mainly recorded from western NSW.

Hemizonia pungens* **ASTERACEAE**

Spikeweed

Life history

Growth form: Herb; glandular, hairy and aromatic.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, summer–autumn.

Fruit/seed: Achene 1–2 mm long with small apically offset horn.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

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

Botanical subregions: CT ST SWS.

Distribution Sydney area: Orange.

Select locations: Orange (1923) only record for Sydney area.

Habitat

Habitat: Pasturelands.

Altitude: 800 m

Annual rainfall: 1000 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Uncommon weed in the Orange, Culcairn and Canberra districts.

***Hypochaeris glabra* ***
ASTERACEAE

Smooth Catsear

Life history

Growth form: Herb 10–40 cm high with slender taproot.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, October–December.

Fruit/seed: Achene 3–5 mm long, of two types: inner with pappus of plumose bristles, outer with scabrous bristles, 8–10 mm long. Mature October–December.

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

Fire response: Seedlings recorded less than 1 year after fire (Purdie 1977).

Interaction with other organisms: Roots eaten by Sulphur-crested Cockatoo *Cacatua galerita* (Lepschi 1993).

Distribution

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

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

Distribution Sydney area: Sydney and lower Blue Mountains.

Select locations: Pennant Hills, Port Jackson (1882), Cooks River, Liverpool, Camden, Machins Crater, Bullio.

Habitat

Habitat: Lawns, pastures, woodland and disturbed habitats.

Altitude: 0–800 m

Annual rainfall: above 700 mm

Typical local abundance: Frequent.

Vegetation: Woodland, mown areas.

Substrate: Clay soils and sandy loam from shale, volcanic necks, fertile, well drained.

Exposure:

Conservation

Conservation: Common weed though not invasive of bushland.

***Hypochaeris microcephala* var. *albiflora* ***
ASTERACEAE

White Flatweed

Life history

Growth form: Herb 10–40 cm high, with radical leaves and a fleshy taproot.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: White, October–December.

Fruit/seed: Achene 5 mm long, with pappus of plumose bristles 5–8 mm long, mature October–December.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed, also possibly spread in grain.

Fire response:

Interaction with other organisms:

Distribution

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

Botanical subregions: NC CC NWS NWP; Qld.

Distribution Sydney area: Sydney and Cumberland Plain

Select locations: Denistone, Concord (1965), Whalan, Mt Druitt, Camden.

Habitat

Habitat: Disturbed native vegetation and lawns, e.g. with *Hypochaeris radicata*, *Taraxicum officinale*.

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

Typical local abundance: Occasional–frequent.

Vegetation: Moist eucalypt forest, lawn.

Substrate: Clay soil from Wianamatta Shale, fertile. Watertable permanently low.

Exposure:

Conservation

Conservation: Weed of relatively recent introduction. Probably not invasive of bushland.

Hypochaeris radicata* **ASTERACEAE**

Catsear, Flatweed

Life history

Growth form: Herb 15–80 cm high with a basal rosette; growing from hard, thickened overwintering base, fibrous-rooted, but often with several enlarged roots and appearing tap-rooted (Turkington & Aarssen 1983).

Vegetative spread: Only by perennating buds, frequently multi-crowned in lawns; root segments do not regenerate without portion of the crown (Turkington & Aarssen 1983).

Longevity: Several years?

Primary juvenile period: Flowering plants can be produced from seed in 2 months (Turkington & Aarssen 1983).

Flowers: Yellow, at any time with peaks in June and November. Cross-pollinated and self-incompatible; sunlight essential for flower-opening — once open cannot close for at least 3 hours (Turkington & Aarssen 1983).

Fruit/seed: Achene 4–7 mm long, with plumed pappus 8–14 mm long, mature at any time.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed, probably over long distances. Animal-dispersed (Carr et al. 1992). Coloniser of disturbed sites. Usually found as isolated rosettes, or small group probably clonal; light required for germination 33–94% from fresh seed, no dormancy; over-winters as basal rosette; true hemicryptophyte; mowing and grazing appears to stimulate growth of new leaves and favour flowering and fruiting in N.Z. (Turkington & Aarssen 1983). Grazing by snails *Helix aspersa* influences plant size variability (Weiner 1993).

Fire response: Regrows from surviving rootstocks, seedlings recorded less than 1 year after fire (Purdie 1977). Resprouted, flowering and fruiting within 10–13 weeks of high-intensity fire (1/1994) at Lane Cove and Narrabeen (P. Kubiak pers. comm.).

Interaction with other organisms: May have allelopathic effects on other plant species inducing reduced shoot growth rate, also autotoxic (Turkington & Aarssen 1983). Palatable to rabbits (Leigh et al. 1987). Flowers eaten by Galah *Cacatua roseicapilla*, roots eaten by Sulphur-crested Cockatoo *Cacatua galerita*, flowers eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993). (For list of insect predators see Turkington & Aarssen 1983.)

Distribution

Status/origin: Naturalised exotic, native to Europe.

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

Distribution Sydney area: Widespread.

Select locations: Chatswood, Centennial Park, Lady Robinsons Beach (1887), Berry, Parramatta, Elderslie, Medlow Bath, Bathurst, Orange, Wildes Meadow.

Habitat

Habitat: Lawns, gardens, roadsides, pastures, swamp margins, disturbed habitats.

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

Typical local abundance: Frequent

Vegetation: Grassland and disturbed forest, but found on swamp margins (P. Kodela pers. comm.).

Substrate: Clay to sandy soils, from shale, basalt, sandstone, coal waste, fertile–infertile. Drought-tolerance related to deep rooting, found on well-drained sites, absent from waterlogged sites, tolerant of nutrient-deficient soils, has some degree of salt-tolerance (Turkington & Aarssen 1983).

Exposure: Full sun.

Conservation

Conservation: Widespread and common weed on edges of disturbed native vegetation and capable of invasion into open grassland areas and along tracks. Neutral to slightly alkaline soil conditions aid invasion of bushland (R. Buchanan pers. comm.).

Isoetopsis graminifolia

ASTERACEAE

Grass Cushion

Life history

Growth form: Herb to 5 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellowish.

Fruit/seed: Achene 2 mm long, with outer hairs and scales, inner achenes aborted.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Winburndale.

Select locations: Winburndale (1977) only Sydney area record.

Habitat

Habitat:

Altitude: 1000 m

Annual rainfall: 1000 mm

Typical local abundance: Rare.

Vegetation: With herbaceous species, e.g. *Helipterum australe*, *Anguillaria*, *Plantago*, *Ophioglossum*.

Substrate: Sandy to loamy red earths.

Exposure:

Conservation

Conservation: Chiefly a western species, rare in Sydney area.

Lactuca saligna *

ASTERACEAE

Willow-leaved Lettuce

Life history

Growth form: Herb 30–100 cm high, with long taproot.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Yellow, October–May.

Fruit/seed: Achene 5–9 mm long, with pappus of bristles 3 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

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

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

Distribution Sydney area: Widespread.

Select locations: Hornsby, Flemington, Penrith, Mt Wilson (1902), Bathurst.

Habitat

Habitat: Gardens, roadsides, wasteland, cultivation and degraded pastures.

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

Typical local abundance:

Vegetation:

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

Exposure:

Conservation

Conservation: Common weed but not invasive of bushland.

Lactuca serriola* **ASTERACEAE**

Prickly Lettuce

Life history

Growth form: Erect herb 1–2 m high, with long taproot.

Vegetative spread: No.

Longevity: Less than 2 years.

Primary juvenile period:

Flowers: Yellow, September–April.

Fruit/seed: Achene 6–8 mm long, with pappus of bristles 3 mm long.

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

Fire response:

Interaction with other organisms: Seed eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993).

Distribution

Status/origin: Naturalised exotic, native to Europe, 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: Widespread.

Select locations: Bondi, Gladesville, Richmond, Penrith (1912), Camden, Abercrombie River, Robertson (P. Kodela pers. comm.), Moss Vale.

Habitat

Habitat: Gardens, roadsides, wasteland, cultivation and degraded pastures.

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

Typical local abundance: Frequent–occasional.

Vegetation: Ephemeral weeds.

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

Exposure: Full sun.

Conservation

Conservation: Minor weed.

Lagenifera gracilis**ASTERACEAE**

Slender Lagenophora

Life history

Growth form: Herb with short rhizome, roots fleshy.

Vegetative spread: No, rhizome short, vertical.

Longevity:

Primary juvenile period:

Flowers: White–purple, October–April.

Fruit/seed: Achene 2–3.5 mm long, no pappus, mature October–April, peak March.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response: Probably resprouts at ground level or below.

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread at lower elevations.

Select locations: Watagans, MacDonald River, Dalrymple Hay NR, Scarborough, Bilpin, Berkshire Park, Kentlyn, Thirlmere, Albion Park, Kangaroo Valley.

Habitat

Habitat: Moist gullies and near water

Altitude: 0–600 m

Annual rainfall: above 700 mm

Typical local abundance: Occasional.

Vegetation: Various — moist open-forest, e.g. with *Eucalyptus saligna*, *Syncarpia glomulifera*, *Allocasuarina torulosa*, *Melaleuca* scrub and sedge moorland. Ground stratum.

Substrate: Sandy loam from shale enriched sandstone, or from shales. Soil fertile–infertile. Watertable mostly low, moisture supply continuous, fresh, sometimes seepage areas.

Exposure: In sheltered situations, mid–light shade.

Conservation

Conservation: Conservation status unknown.

Lagenifera stipitata

ASTERACEAE

Blue Bottle-daisy, Common Lagenophora

Life history

Growth form: Stoloniferous herb to 40 cm high, roots fibrous.

Vegetative spread: Spreads by stolons.

Longevity: Perennial.

Primary juvenile period:

Flowers: White, pale pink, bluish or mauve to purple, September–April, peak November–December.

Fruit/seed: Achene 2–4 mm long, no pappus, mature November–April.

Dispersal, establishment & growth: Diaspore: fruit, no special dispersal morphology (Westoby et al. 1990).

Fire response: Stems killed, resprouted from ground level and flowered within a month at Mona Vale after high-intensity fire (1/1994) (L.McD.). Resprouted, flowering within 9 weeks and seeds shed within 12 weeks of high-intensity fire at Lane Cove in 1994 (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast and Upper Blue Mountains.

Select locations: Mooney Mooney Creek, Mona Vale (L.McD.), Austinmer, Seven Mile Beach, Culoul Range, Londonderry, Mt Tomah, Mt Cameron, Lithgow, Govetts Leap, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Moist sheltered sites.

Altitude: 0–1200 m

Annual rainfall: above 1200 mm

Typical local abundance: Occasional.

Vegetation: Moist eucalypt open-forest, e.g. with *Eucalyptus deanei*, *E. cypellocarpa*, *E. fastigata*, *E. viminalis* with grassy understorey. Ground stratum.

Substrate: Basalt, shale, granite, talus, sandy loam. Soil very fertile–fertile. Watertable mostly low, moisture supply intermittent, fresh.

Exposure: In sheltered places, mid-shade–full sun.

Conservation

Conservation: Conservation status unknown.

***Leontodon taraxacoides* subsp. *taraxacoides* ***

ASTERACEAE

Lesser Hawkbit

Life history**Growth form:** Herb 15–40 cm high, with radical leaves.**Vegetative spread:** No.**Longevity:** 2–25 years.**Primary juvenile period:****Flowers:** Yellow, October–April.**Fruit/seed:** Achene 5 mm long, with pappus of plumose bristles, mature October–April.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe. Cultivated at Royal Botanic Gardens in 1951 from seed removed as impurity from linseed apparently grown in Victoria.**Botanical subregions:** NC CC SC NT CT ST SWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Coast, western Sydney, Southern Highlands.**Select locations:** Pittwater (1962), La Perouse, Yennora, Glenfield (1963), Casula, Doonside, Mt Druitt, Menangle, Camden, Wingecarribee Swamp (P. Kodela pers. comm.).**Habitat****Habitat:** Lawns, wasteland, cemeteries, swamp margins (P. Kodela pers. comm.).**Altitude:** 0–700 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Weedy areas, grassland, e.g. with *Taraxicum officinale*, *Hyochaeris radicata*.

Pasture/sedgeland ecotone (P. Kodela pers. comm.).

Substrate: Sandy soil, clayey soils from shale, possibly salt-tolerant? Damp swamp margin area (P. Kodela pers. comm.).**Exposure:** Full sun.**Conservation****Conservation:** Recently introduced weed species probably still spreading, but unlikely to invade bushland.***Leptinella longipes* (Cotula longipes)**

ASTERACEAE

Life history**Growth form:** Herb with prostrate branches.**Vegetative spread:** Stolonerous.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** April.**Fruit/seed:** Achene 1–2.5 mm long, no pappus.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC CT; Qld, Vic., Tas.**Distribution Sydney area:** Mainly coastal.**Select locations:** Woy Woy, Narrabeen, Dee Why, Manly, Botany, Rockdale, Stanwell Park, Mt Kembla, Jenolan Caves (1900).**Habitat****Habitat:** Swamps.**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:** Swamps, lagoon margins.**Substrate:** Poorly-drained sites, possibly salt-tolerant?**Exposure:****Conservation****Conservation:** Rare, last collected in Sydney area in 1950, (at Dee Why).

Leptorhynchos elongatus

ASTERACEAE

Life history

Growth form: Herb to 40 cm high, with woody taproot.**Vegetative spread:****Longevity:** Short, perennial.**Primary juvenile period:****Flowers:** White-pale yellow, November.**Fruit/seed:** Achene with pappus of bristles, mature November.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NT CT ST NWS CWS SWS; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Western parts of area.**Select locations:** Jenolan Caves (1899) only Sydney area record.

Habitat

Habitat:**Altitude:** 800 m**Annual rainfall:** 900 mm**Typical local abundance:****Vegetation:** Woodland and grassland.**Substrate:****Exposure:**

Conservation

Conservation: Rare, no recent records for Sydney area.***Leptorhynchos nitidulus***

ASTERACEAE

Life history

Growth form: Slender, stoloniferous herb to 25 cm high.**Vegetative spread:** Stoloniferous.**Longevity:****Primary juvenile period:****Flowers:** Yellow, summer-autumn.**Fruit/seed:** Achene with pappus of bristles.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC CT; Vic., Tas.**Distribution Sydney area:** Hurstville-Yennora, Bathurst.**Select locations:** Hurstville (1895), Auburn (1888), Yennora (1965), Bathurst (19th century).

Habitat

Habitat: Forests, clearings and roadsides.**Altitude:** 0-800 m**Annual rainfall:** above 1000 mm**Typical local abundance:****Vegetation:** Woodland with shrubby understorey, e.g. *Callistemon pinifolius*, *Chorizema parvifolium*, *Pultenaea pedunculata*, sometimes swampy areas.**Substrate:** Sandy clay soil from Wianamatta Shale.**Exposure:**

Conservation

Conservation: Northern limit (Auburn), rare and probably extinct in Sydney area and at Bathurst.

***Leptorhynchos squamatus* subsp. A**

ASTERACEAE

Scaly Buttons

Life history

Growth form: Herb to 25 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** October–December (limited data).**Fruit/seed:** Achene with pappus of bristles.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed. Willis and Groves report: Optimal germination regime 20°/10°C. Effect of light on germination — nil. No strong after-ripening requirement. Germination inhibited by high temperature and cold stratification (Willis & Groves 1991).**Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.**Botanical subregions:** NC NT CT ST NWS CWS SWS SWP; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Western Blue Mountains.**Select locations:** Canobolas (1908), Hartley Vale (1913), Moss Vale (1915), Cordeaux Creek, Tuena.

Habitat

Habitat: Creek bank.**Altitude:** 400–1400 m **Annual rainfall:** above 800 mm**Typical local abundance:** Rare.**Vegetation:** Grasslands and forests. Ground stratum.**Substrate:****Exposure:**

Conservation

Conservation: Rare, mostly old records (5 specimens).***Leucanthemum vulgare* subsp. *maximum* ***

ASTERACEAE

Oxeye Daisy

Life history

Growth form: Erect, herb 30–90 cm high.**Vegetative spread:** Extensive creeping roots produce new aerial growth annually (Parsons & Cuthbertson 1992).**Longevity:** Perennial.**Primary juvenile period:** More than 1 year (Parsons & Cuthbertson 1992).**Flowers:** White, disc bright yellow, November–February.**Fruit/seed:** Achene 2.5 mm long. Seed produced in summer after which the aerial growth dies back; seed production is prolific, most seed is viable even after passing through the digestive tract of animals (Parsons & Cuthbertson 1992).**Dispersal, establishment & growth:** Diaspore: fruit. No special adaptations for dispersal but small seeds spread in mud on animals and vehicles, water, grain; wind-dispersed along roadsides possibly assisted by turbulence from heavy vehicles (A. Rodd pers. comm.); germination in autumn, develops slowly during winter and spring, an extensive root system develops with shallow laterals which produce new aerial growth each autumn; some seed remains dormant for at least 20 years (Parsons & Cuthbertson 1992). Tolerates infrequent mowing.**Fire response:****Interaction with other organisms:** Grows so densely it excludes most other vegetation, not readily grazed by stock so reduces carrying capacity of farmland (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to Europe. Introduced as garden ornamental, naturalised in Victoria by 1905 and since then in NSW (Parsons & Cuthbertson 1992).**Botanical subregions:** NC NT CT ST; Vic., S.A., Tas.

Distribution Sydney area: Tablelands.

Select locations: Lawson (1911), Mt Wilson (1914), Kowmung River, Orange (1906), Fitzroy Falls, Robertson (P. Kodela pers. comm.), Wildes Meadow, Belanglo.

Habitat

Habitat: Roadsides and cleared land, creek channels, disturbed sites.

Altitude: 200–1000 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Woodland, roadsides, and pastures.

Substrate: Sandstone, basalt, alluvium, fertile–infertile soil. Watertable mostly low. Heavy, damp soil (Parsons & Cuthbertson 1992).

Exposure:

Conservation

Conservation: 'Dreaded pest' at Mt Wilson where it has already rendered useless large areas of land (J.H. Maiden 1914). Presently spread along Bells Line of Road as far as Mt Tomah and probably still spreading (A. Rodd pers. comm. 1994).

Leucochrysum albicans* subsp. *albicans* var. *tricolor**ASTERACEAE****Life history**

Growth form: Woolly herb with woody rootstock, to 45 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Pale brown–white, October–April, peak October.

Fruit/seed: Achene 2–3 mm long with pappus of feather-like bristles.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ST CWS; Vic., Tas.

Distribution Sydney area: West of area.

Select locations: Hill End, Abercrombie, Trunkey Creek, Picton–Mittagong, Berrima, Wingello, Tallong.

Habitat

Habitat:

Altitude: 600–1000 m **Annual rainfall:** above 800 mm

Typical local abundance:

Vegetation:

Substrate: Sandstone and other sedimentary rock, deep soils.

Exposure:

Conservation

Conservation: Mostly old collections. Conservation status unknown.

Leucochrysum albicans* subsp. *albicans* var. *albicans**ASTERACEAE**

(*Helipterum albicans*)

Life history

Growth form: Woolly herb with woody rootstock to 45 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Pale brown–yellow, August–April.

Fruit/seed: Achene 2–3 mm long with pappus of feather-like bristles, mature March (limited data).

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Willis and Grove (1991) report: Optimal germination regime 20°/10°C (90–80 %). No effect of light on

germination. No strong after ripening requirement. Dormancy broken by GA₃, high temperature, cold-stratification.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Bathurst area.

Select locations: Jenolan Caves (1899), Hartley Vale, Zig Zag, Megalong Creek, Kirkconnel/Bowenfels (1904).

Habitat

Habitat:

Altitude: 700–1000 m **Annual rainfall:** 600–1000 mm

Typical local abundance: Now rare in area.

Vegetation: Grasslands and tall forests. Ground stratum.

Substrate: Shallow soil over sandstone, clay soils, infertile.

Exposure:

Conservation

Conservation: Rare — mostly old records (8 specimens). Conservation status unknown.

Leucochrysum graminifolium (*Helipterum albicans* var. *graminifolium*) **ASTERACEAE**

Life history

Growth form: Erect, tufted herb with woody rootstock, to 20 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, November–July.

Fruit/seed: Achene 2–3 mm long with pappus of feather-like bristles.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT.

Distribution Sydney area: Newnes Plateau.

Select locations: Wolgan Gap, Newnes Plateau, Glowworm Tunnel, Zig Zag, Clarence.

Habitat

Habitat: Rock outcrops, crevices, ironstone shelves and ledges.

Altitude: above 900 m **Annual rainfall:** 900–1100 mm

Typical local abundance: Frequent–occasional.

Vegetation: Open-heath, scrub and woodland; Pagoda rock complex of Benson & Keith 1990.

Substrate: Skeletal sandy soil or dry peaty soil on sandstone, among 'pagoda' rock formations.

Exposure:

Conservation

Conservation: Endemic to Newnes Plateau, conservation status unknown, habitat possibly vulnerable to cliff collapse due to underground mining.

***Madia sativa* ***

ASTERACEAE

Tarweed, Pitchweed

Life history

Growth form: Herb to 2 m high, hairy and strongly perfumed.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.
Flowers: Yellow, June–September.
Fruit/seed: Achene 4–5 mm long, no pappus.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Chile and Argentina.
Botanical subregions: CT ST SWS; Vic.
Distribution Sydney area: South from Orange district.
Select locations: Orange (1918), Milthorpe (1953), Carcoar (1922).

Habitat

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

Conservation

Conservation: Naturalised weed, status unknown.

***Matricaria matricarioides* *** (Chamomilla suaveolens)**ASTERACEAE**

Pineapple Weed

Life history

Growth form: Pineapple-scented herb 8–45 cm high.
Vegetative spread: No.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Disc greenish yellow, no florets. Flowers spring–autumn; insect and self-pollinated (Ciba-Geigy 1968–).
Fruit/seed: Achene 1.2–1.5 mm long, pappus small, scarious.
Dispersal, establishment & growth: Dispersed by wind, animals and humans; germinates in spring (Ciba-Geigy 1968–).
Fire response:
Interaction with other organisms: Medicinal plant (Ciba-Geigy 1968–).

Distribution

Status/origin: Naturalised exotic, native to Europe, Asia, S Africa and possibly N America.
Botanical subregions: CT CWS SWS; Vic., Tas., S.A.
Distribution Sydney area: Orange–Molong.
Select locations: Orange 1983 (only Sydney area record).

Habitat

Habitat: Roadsides, footpaths and disturbed sites.
Altitude: 800–1000 m **Annual rainfall:** 1000 mm
Typical local abundance: Occasional.
Vegetation:
Substrate: Loamy soils rich in nutrients (Ciba-Geigy 1968–).
Exposure:

Conservation

Conservation: Appears to be locally naturalised weed. Status unknown.

Melanthera biflora (Wedelia biflora)**ASTERACEAE****Life history**

Growth form: Scrambling herb to 1 m high, with opposite leaves.
Vegetative spread: Limited spread possible by rooting at nodes.
Longevity: Perennial.
Primary juvenile period:

Flowers: Yellow, December–April.

Fruit/seed: Achene 2–4 mm long, pappus absent or with 1–3 non-persistent bristles, 1 mm long, mature December–April.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Tertiary sand coloniser (Clarke 1989).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; LHI, Qld, N.T., Afr, Asia, Pac. I.

Distribution Sydney area: Sea coasts.

Select locations: Maroubra Bay, Cronulla, Werong, Otford, Burning Palms, Shellharbour.

Habitat

Habitat: Beach and rocky slopes near beaches.

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

Typical local abundance: Frequent.

Vegetation: Coastal herbland, e.g. with *Lomandra longifolia*, *Scaevola calendulacea*, *Hydrocotyle bonariensis*.

Substrate: Sand dunes, foredune and backdune, shale embankments.

Exposure: Tolerant of sun and shade (Clarke 1989).

Conservation

Conservation: Conservation status unknown.

Microseris lanceolata

ASTERACEAE

Life history

Growth form: Herb with fleshy, tuberous root.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, September–November.

Fruit/seed: Achene 8–10 mm long, with pappus of scales.

Dispersal, establishment & growth:

Fire response: Probably resprouts at ground level or below.

Interaction with other organisms: Tubers were food source for Aborigines. Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Native.

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

Distribution Sydney area: Bathurst–Orange area.

Select locations: Rylstone, Mullion Range, Hill End, Abercrombie Caves, Barbers Creek.

Habitat

Habitat: Steep rocky hillsides.

Altitude: 600–1000 m **Annual rainfall:** 700–1000 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt woodland, e.g. *Eucalyptus macrorhyncha*, *E. polyanthemos*, *E. nortonii*, *Angophora floribunda*.

Substrate: Sandy, infertile soil. Watertable permanently low, moisture supply intermittent, fresh.

Exposure:

Conservation

Conservation: Conservation status unknown. Possibly needing local conservation?

Olearia argophylla

ASTERACEAE

Native Musk, Silver Shrub

Life history

Growth form: Shrub or small tree to 9 m high, with alternate leaves; musky scent (Floyd 1983). Chromosome number: N = 54 (N. Lander pers. comm.).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, September–April.

Fruit/seed: Achene with pappus of bristles. Matures December (Floyd 1989).

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms: Foodplant of moth caterpillar *Anthela acuta*; pupation occurs in the foliage or under bark (Coupar & Coupar 1992). Timber could be used for cabinet work but usually too small (Floyd 1983).

Distribution

Status/origin: Native.

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

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

Select locations: Gosford (1888), Mt Kembla, Macquarie Pass, Robertson, Minnamurra Falls, Mt Tomah, Kanangra Walls, Mt Werong, Hilltop, Kangaroo Valley.

Habitat

Habitat:

Altitude: 0–1200 m

Annual rainfall: above 1000 mm

Typical local abundance:

Vegetation: Tall eucalypt forest, e.g. with *Eucalyptus fastigata*, *E. radiata*, *E. dalrympleana* or rainforest margins, e.g. associated with *Eucryphia moorei*, *Doryphora sassafras* and *Atherosperma moschatum* (Floyd 1983). Remnant patches of warm temperate/cool temperate rainforest at Robertson (P. Kodela pers. comm.).

Substrate: Fertile soils, well-drained but moist, e.g. from Wianamatta Shale, basalt (P. Kodela pers. comm.).

Exposure:

Conservation

Conservation: Conservation status unknown.

Olearia asterotricha

ASTERACEAE

Rough Daisy Bush

Life history

Growth form: Shrub to 2 m high, with alternate leaves. Chromosome number N = 9 (N. Lander pers. comm.).

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, October–July.

Fruit/seed: Achene, silky; pappus of long bristles.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC CT; Vic.

Distribution Sydney area: Blue Mountains, Moss Vale.

Select locations: Wallerawang, Marangaroo, Katoomba, Megalong Valley, Bargo, Hilltop, Bowral, The Gib.

Habitat

Habitat:

Altitude: 0–1000 m

Annual rainfall: above 900 mm

Typical local abundance:**Vegetation:** Heath and eucalypt forest.**Substrate:** Sandstone, soil infertile.**Exposure:****Conservation****Conservation:** Status unknown.***Olearia burgessii*****ASTERACEAE****Life history****Growth form:** Shrub to 1.8 m high, with alternate leaves.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, July–November.**Fruit/seed:** Achene, 2 mm long, with pappus of long bristles.**Dispersal, establishment & growth:** Wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC CT ST.**Distribution Sydney area:** Thirlmere–Hilltop (also near Tumarumba).**Select locations:** Burragorang Lookout, Thirlmere, Tahmoor, Hilltop.**Habitat****Habitat:****Altitude:** 200–600 m**Annual rainfall:** 900–1000 mm**Typical local abundance:****Vegetation:** Dry sclerophyll forest.**Substrate:** Sandy loam over sandstone or shale.**Exposure:****Conservation****Conservation:** Rare, this species is known from two areas some 400 km apart and was last collected in 1971. It appears to warrant the category 3K of Briggs & Leigh 1988 (Lander 1991).***Olearia chrysophylla*****ASTERACEAE****Life history****Growth form:** Shrub to 3 m high, with opposite leaves.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, December–January.**Fruit/seed:** Achene, with pappus of bristles.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC NT CT.**Distribution Sydney area:** Blue Mountains to Orange.**Select locations:** Springwood, Jenolan Caves, Oberon, Sunny Corner.**Habitat****Habitat:****Altitude:** 500–1000 m**Annual rainfall:** above 800 mm

Typical local abundance:
Vegetation: Sclerophyll forest.
Substrate: Granite.
Exposure:

Conservation: Status unknown. Few collections, rare.

Conservation

Olearia cordata

ASTERACEAE

Growth form: Shrub to 2 m high, with alternate leaves.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: Deep blue-mauve, November-April.
Fruit/seed: Achene, silky, with pappus of bristles.
Dispersal, establishment & growth:
Fire response: Resprouts; many seedlings at Yengo (M. Matthes pers. comm.).
Interaction with other organisms:

Life history

Status/origin: Native.
Botanical subregions: CC.
Distribution Sydney area:
Select locations: Wollemi Creek, Big Yengo Track, Fernances Trig, St. Albans, Wisemans Ferry.

Distribution

Habitat: Sandstone rocky ridge
Altitude: 0-300 m **Annual rainfall:** 800-1000 mm
Typical local abundance: Occasional.
Vegetation: Dry open sclerophyll forest and open shrubland, e.g. with *Angophora bakeri*, *Eucalyptus eugenioides*, *E. punctata*.
Substrate: Low-nutrient soils from sandstone, possibly with shale influence.
Exposure:

Habitat

Conservation: A rare local endemic, coded 2RCa by Briggs & Leigh (1988). Known populations appear to be conserved.

Conservation

Olearia elliptica

ASTERACEAE

Sticky Daisy Bush

Growth form: Shrub to 2 m high, with alternate leaves.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: White, November-May.
Fruit/seed: Achene, with pappus of long bristles.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

Life history

Status/origin: Native.
Botanical subregions: NC CC NT NWS CWS NWP; LHI, Qld.
Distribution Sydney area: Widespread.
Select locations: Killara, Stanwell Park, Mt Kembla, Jamberoo, Yerrinbool, Wentworth Falls, Mt Victoria, Carrington Falls, Bundanoon.

Distribution

Habitat**Habitat:****Altitude:** 0–1000 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:** Heath, woodland and sclerophyll forest.**Substrate:** Sandy or dark silty soils.**Exposure:****Conservation****Conservation:** Status unknown.***Olearia erubescens*****ASTERACEAE**

Silky Daisy Bush

Life history**Growth form:** Shrub 2 m high with alternate leaves.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, September–March.**Fruit/seed:** Achene with pappus of bristles.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST; Vic., Tas., S.A.**Distribution Sydney area:** Blue Mountains.**Select locations:** Glenbrook, Yerranderie, Springwood, Leura, Katoomba, Blackheath, Mt Banks, Clarence, Mittagong.**Habitat****Habitat:****Altitude:** 0–1200 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:** Dry eucalypt forest.**Substrate:****Exposure:****Conservation****Conservation:** Status unknown but possibly rare. 60% of specimens collected pre 1940.***Olearia glandulosa*****ASTERACEAE****Life history****Growth form:** Shrub to 1.5 m high with alternate leaves.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White, November–June.**Fruit/seed:** Achene, silky; pappus of bristles.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT ST; Tas., S.A., W.A.**Distribution Sydney area:** Mittagong southwards.**Select locations:** Wingecarribee Swamp, Hanging Rock Swamp (near Penrose). (Other specimens not available)

Habitat: Near moist gullies, swamps, river banks. Altitude: 600–700 m Annual rainfall: above 1000 mm Typical local abundance: Rare–occasional. Vegetation: Woodland, wet heathlands or sedgelands. Amongst sedges and other herbs (P. Kodela pers. comm.). Substrate: Peat, tolerates wetness. Exposure: Observed growing in full sun (P. Kodela pers. comm.).	Habitat
Conservation: Conservation status unknown.	Conservation

Olearia megalophylla

ASTERACEAE

Growth form: Shrub to 2 m high, with alternate or opposite leaves. Vegetative spread: Longevity: Primary juvenile period: Flowers: White, December–March. Fruit/seed: Achene, with pappus of bristles. Dispersal, establishment & growth: Fire response: Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: CT ST SWS; Vic. Distribution Sydney area: Widespread but rare. Select locations: Port Kembla, Bargo, Jenolan Caves, Canobolas SF.	Distribution

Habitat: Altitude: 0–1000 m Annual rainfall: above 900 mm Typical local abundance: Vegetation: Moist eucalypt forest. Substrate: Exposure:	Habitat
Conservation: Conservation status unknown, rare. Orange is northern limit.	Conservation

Olearia microphylla

ASTERACEAE

Snow Bush

Growth form: Shrub to 2 m high with alternate leaves. Vegetative spread: Longevity: Primary juvenile period: Flowers: White, June–October. Fruit/seed: Achene with pappus of long bristles, mature June–October. Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed, possibly colonising disturbed sites. Fire response: Mostly killed, only 1 plant observed resprouting from base after high-intensity fire, no seedlings (1/1994) at Lane Cove; probably also killed by moderate-intensity fire, flowering after moderate–high-intensity fire, most of the viable soil-stored seed probably destroyed by very high-intensity fire (P. Kubiak pers. comm.). Interaction with other organisms:	Life history
Status/origin: Native.	Distribution

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

Distribution Sydney area: Widespread.

Select locations: Gordon, Lane Cove, Rookwood, Chester Hill, Campbelltown, Port Hacking, Austinmer, Hilltop, The Gib, Bundanoon.

Habitat
Habitat:

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

Typical local abundance: Frequent–occasional.

Vegetation: Sclerophyll forest, e.g. with *Eucalyptus sieberi*, *E. sclerophylla*, and heathy scrub.

Substrate: Sandy soils on sandstone, also sandy clay soils, low nutrient.

Exposure:

Conservation

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

Olearia myrsinoides
ASTERACEAE

Blush Daisy Bush

Life history

Growth form: Shrub to 1.5 m high, with alternate leaves.

Vegetative spread: Possibly root suckers.

Longevity:

Primary juvenile period:

Flowers: White and violet or pale yellow, November–March.

Fruit/seed: Achene with pappus of bristles.

Dispersal, establishment & growth:

Fire response: Possibly resprouts from root suckers.

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly upper Blue Mountains.

Select locations: Glenbrook, Wentworth Falls, Blackheath, Mt York, Clarence, Portland, Rylstone.

Habitat

Habitat: Eucalypt woodland.

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

Typical local abundance: Occasional.

Vegetation: Open grassland, eucalypt woodlands and swampy areas, e.g. with *Eucalyptus sieberi*, *E. oreades*, *E. dives* (Newnes Plateau Woodland of Benson & Keith 1990).

Substrate: Sandstone soils, medium nutrients.

Exposure:

Conservation

Conservation: Conservation status unknown.

Olearia nernstii
ASTERACEAE

Life history

Growth form: Shrub to 2 m high, with alternate leaves.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, March–November.

Fruit/seed: Achene, with pappus of long bristles.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

<p>Status/origin: Native. Botanical subregions: NC CC NT CT; Qld. Distribution Sydney area: Mainly Gosford-Wyong. Select locations: Wyong Creek (1893), Ourimbah (1911), Gosford (1888), Yerranderie (1916).</p>	Distribution
<p>Habitat: Altitude: 0-200 m Annual rainfall: above 800 mm Typical local abundance: Vegetation: Eucalypt forest and open woodland. Substrate: Probably clay soils. Exposure:</p>	Habitat
<p>Conservation: Southern limit, old collections only. Now probably rare in Sydney area.</p>	Conservation

Olearia oliganthera

ASTERACEAE

<p>Growth form: Shrub with alternate leaves. Vegetative spread: Longevity: Primary juvenile period: Flowers: Yellow. Fruit/seed: Achene. Dispersal, establishment & growth: Fire response: Interaction with other organisms:</p>	Life history
<p>Status/origin: Native. Botanical subregions: CT. Distribution Sydney area: Blue Mountains. Select locations: Collected twice from 'Blue Mountains' before 1866, and not recorded since (Leigh et al. 1984).</p>	Distribution
<p>Habitat: Altitude: Annual rainfall: Typical local abundance: Vegetation: Unknown, possibly eucalypt open-forest. Substrate: Unknown, but possibly on shale soil. Exposure:</p>	Habitat
<p>Conservation: Coded 2X, extinct (Briggs & Leigh 1988), last collected 1866.</p>	Conservation

Olearia phlogopappa

ASTERACEAE

<p>Growth form: Shrub to 1 m high, with alternate leaves. Chromosome number $N = 9$ (N. Lander pers. comm.). Vegetative spread: Longevity: Primary juvenile period: Flowers: White, November-March. Fruit/seed: Achene with pappus of long bristles. Dispersal, establishment & growth: Fire response:</p>	Life history
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Interaction with other organisms:**Distribution****Status/origin:** Native.**Botanical subregions:** NT CT ST; Vic., Tas.**Distribution Sydney area:** Blue Mountains and Southern Highlands.**Select locations:** Leura Gap, Burratorang, Carrington Falls, Kangaroo River Bridge.**Habitat****Habitat:****Altitude:** 0–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:****Vegetation:** Eucalypt woodland, forest and heath.**Substrate:****Exposure:****Conservation****Conservation:** Possibly rare, conservation status unknown.***Olearia quercifolia*****ASTERACEAE****Life history****Growth form:** Shrub to 2 m high, with alternate leaves.**Vegetative spread:** No.**Longevity:****Primary juvenile period:****Flowers:** White, July, November–December.**Fruit/seed:** Achene, silky, with pappus of long bristles.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CT.**Distribution Sydney area:** Upper Blue Mountains.**Select locations:** Mt Wilson, Mt Tomah, Newnes Plateau.**Habitat****Habitat:** Swampy or moist terrain.**Altitude:** 800–1200 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Occasional.**Vegetation:** Margins of shrub swamps, e.g. Newnes Plateau Shrub-swamps (Benson & Keith 1990).**Substrate:** Peaty soils on sandstone, periphery of swamps, very infertile, watertable mostly high.**Exposure:** Full sun–light shade.**Conservation****Conservation:** Restricted local endemic, coded 3RC in Briggs & Leigh (1988), vulnerable to changes in water flow and water quality and in its swamp habitat.***Olearia ramosissima*****ASTERACEAE****Life history****Growth form:** Shrub to 1.3 m high with alternate leaves.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Blue–mauve, June–August.**Fruit/seed:** Achene, silky, with pappus of 27–47 long bristles.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

<hr/>		Distribution
Status/origin: Native.		
Botanical subregions: CC CT NT NWS SWP; Qld, W.A.		
Distribution Sydney area: Shoalhaven River gorge (Harden 1992).		
Select locations: Specimens unavailable.		
<hr/>		Habitat
Habitat:		
Altitude:	Annual rainfall:	
Typical local abundance:		
Vegetation: Sclerophyll forest (Harden 1992).		
Substrate:		
Exposure:		
<hr/>		Conservation
Conservation:		

Olearia ramulosa

ASTERACEAE

<hr/>		Life history
Growth form: Shrub to 1.6 m high, scabrous, pubescent, sometimes sticky. Chromosome number N = 9 (N. Lander pers. comm.).		
Vegetative spread:		
Longevity:		
Primary juvenile period:		
Flowers: Pale blue or mauve or white, October–May. Insect-pollinated (Sulman 1914).		
Fruit/seed: Achene, with pappus of 20–40 long bristles.		
Dispersal, establishment & growth: Wind-dispersed.		
Fire response:		
Interaction with other organisms:		
<hr/>		Distribution
Status/origin: Native.		
Botanical subregions: NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Vic., Tas., S.A.		
Distribution Sydney area: Widespread.		
Select locations: Specimens unavailable.		
<hr/>		Habitat
Habitat: Hilly terrain (Harden 1992).		
Altitude:	Annual rainfall:	
Typical local abundance:		
Vegetation: Tall open-forest.		
Substrate: Shales, medium to high nutrient.		
Exposure:		
<hr/>		Conservation
Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991).		

Olearia rosmarinifolia

ASTERACEAE

<hr/>		Life history
Growth form: Shrub to 1.6 m high, hoary or silvery.		
Vegetative spread:		
Longevity:		
Primary juvenile period:		
Flowers: White, October–December.		
Fruit/seed: Achene, with pappus of 60–84 bristles.		
Dispersal, establishment & growth:		
Fire response:		
Interaction with other organisms:		

Status/origin: Native. Botanical subregions: NT CT ST NWS CWS; Qld. Distribution Sydney area: Western parts of area. Select locations: Specimens unavailable.	Distribution
Habitat: Rocky areas around riverbeds and gorges (Harden 1992). Altitude: Annual rainfall: Typical local abundance: Vegetation: Substrate: Exposure:	Habitat
Conservation:	Conservation

Olearia stellulata (*Olearia lirata*)

ASTERACEAE

Growth form: Shrub to 3 m high with alternate leaves. Vegetative spread: Longevity: Primary juvenile period: Flowers: White, August–January. Fruit/seed: Achene, silky, with pappus of bristles. Dispersal, establishment & growth: Fire response: Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: CC SC NT CT ST; Vic., Tas. Distribution Sydney area: Select locations: Specimens unavailable.	Distribution
Habitat: Hillsides and creekbanks (Harden 1992). Altitude: Annual rainfall: Typical local abundance: Vegetation: Sclerophyll forest (Harden 1992). Substrate: Exposure:	Habitat
Conservation:	Conservation

Olearia suffruticosa

ASTERACEAE

Growth form: Shrub to 0.7 m high with alternate leaves. Vegetative spread: Longevity: Primary juvenile period: Flowers: White or pink, January–May. Fruit/seed: Achene, silky, with pappus of bristles. Dispersal, establishment & growth: Fire response: Interaction with other organisms:	Life history
Status/origin: Native.	Distribution

Botanical subregions: CT; Vic., S.A.
Distribution Sydney area:
Select locations: Specimens unavailable.

Habitat

Habitat:
Altitude: Annual rainfall:
Typical local abundance:
Vegetation:
Substrate:
Exposure:

Conservation

Conservation:

Olearia tenuifolia

ASTERACEAE

Life history

Growth form: Shrub to 2 m high with alternate leaves.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: Blue or mauve, at any time of year.
Fruit/seed: Achene, with pappus of bristles.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: SC CT ST CWS SWS SWP; Vic.
Distribution Sydney area:
Select locations: Specimens unavailable.

Habitat

Habitat: Rocky areas (Harden 1992).
Altitude: Annual rainfall:
Typical local abundance:
Vegetation: Dry sclerophyll forest, mallee and woodland (Harden 1992).
Substrate:
Exposure:

Conservation

Conservation:

Olearia tomentosa

ASTERACEAE

Life history

Growth form: Shrub to 2 m high with alternate leaves.
Vegetative spread:
Longevity:
Primary juvenile period:
Flowers: Blue or white, August–May.
Fruit/seed: Achene, with pappus of bristles.
Dispersal, establishment & growth:
Fire response: Probably most killed by high-intensity fire (1/1994) at Narrabeen, a few suckering plants observed (P. Kubiak pers. comm.).
Interaction with other organisms:

Distribution

Status/origin: Native.
Botanical subregions: NC CC SC CT ST.

Distribution Sydney area: Widespread including exposed headlands on coast.

Select locations: Listed in national park areas from Brisbane Water NP to Sydney Harbour NP. Barrenjoey headland and Mona Vale (L.McD.). Specimens unavailable.

Habitat

Habitat:

Altitude:

Annual rainfall:

Typical local abundance:

Vegetation: Dry sclerophyll forest, scrub and heath (Harden 1992).

Substrate: Sandstone

Exposure:

Conservation

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

Olearia viscidula

ASTERACEAE

Wallaby Weed

Life history

Growth form: Viscid shrub to 2.5 m high with alternate or opposite leaves.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: White, July–November.

Fruit/seed: Achene, silky, with pappus of 27–37 long bristles.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast to Blue Mountains.

Select locations: Specimens unavailable.

Habitat

Habitat:

Altitude:

Annual rainfall:

Typical local abundance:

Vegetation: Eucalypt tall open-forest and rainforest. Dry sclerophyll forest and eucalypt woodland (Harden 1992).

Substrate: Medium-high nutrient soils.

Exposure:

Conservation

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

Onopordum acanthium subsp. *acanthium* *

ASTERACEAE

Scotch Thistle

Life history

Growth form: Biennial herb to 1 m high.

Vegetative spread: No.

Longevity: 2 years.

Primary juvenile period:

Flowers: Florets purple, September–December.

Fruit/seed: Achene 4–5 mm long, with pappus of barbed bristles 7–9 mm long.

Dispersal, establishment & growth: Diaspore fruit, wind-dispersed. Pioneer species, establishing on bare soil after, e.g. roadbuilding or soil erosion (Doing et al. 1969).

Fire response:

Interaction with other organisms: Foodplant of butterfly caterpillar *Vanessa kershawi* (Coupar & Coupar 1992). Weevil *Larinus latus* the first biological control agent for *Onopordum* spp., released in 1992, destroys seeds (Tanner 1993).

<p>Status/origin: Naturalised exotic, native to Europe. Botanical subregions: CC NT CT ST CWS SWS NWP SWP SFWP; Vic., Tas., S.A. Distribution Sydney area: Flemington, Orange. Select locations: Flemington Saleyards (1968, 1980), Orange (1941).</p>	<p>Distribution</p>
<p>Habitat: Cultivated areas, saleyards. Altitude: 0–1000 m Annual rainfall: 1000 mm Typical local abundance: Rare. Vegetation: Thistle communities, roadside and riverbank vegetation mainly with <i>Cirsium vulgare</i>, <i>Carduus nutans</i>, <i>C. tenuiflorus</i>, <i>C. pycnocephalus</i>, <i>Silybum marianum</i> or grassland communities with <i>Hordeum leporinum</i>, <i>Bromus diandrus</i>, <i>B. hordeaceus</i> etc. (Doing et al. 1969). Substrate: Replaces <i>Carduus nutans</i> on limestone and coarse sandy soils, fertile soils with moisture holding capacity (Doing et al. 1969). Exposure:</p>	<p>Habitat</p>
<p>Conservation: Naturalised weed, declared noxious in many shires of NSW.</p>	<p>Conservation</p>

***Osteospermum ecklonis* ***

ASTERACEAE

<p>Growth form: Shrub or subshrub to 100 cm high. Vegetative spread: Appears to root along stems. Longevity: Primary juvenile period: Flowers: White and blue-violet, disc azure blue, April–December. Fruit/seed: Achene 7 mm long, no pappus. Dispersal, establishment & growth: Fire response: Interaction with other organisms:</p>	<p>Life history</p>
<p>Status/origin: Naturalised exotic, native to S Africa, introduced as garden ornamental. Botanical subregions: CC; Qld. Distribution Sydney area: Suburban areas. Select locations: Blackwall Mtn, Palm Beach, Cheltenham, Ingleburn, Macquarie Fields (1941), Campbelltown, Orangeville.</p>	<p>Distribution</p>
<p>Habitat: Footpaths, wasteland, beaches, roadsides. Altitude: 0–300 m Annual rainfall: above 800 mm Typical local abundance: Occasional. Vegetation: Wasteland weeds. Substrate: Sandy soils, e.g. beaches, and loamy soils from shales, low–moderately fertile. Exposure: Full sun.</p>	<p>Habitat</p>
<p>Conservation: Probably mainly localised garden escape from rubbish dumping.</p>	<p>Conservation</p>

***Ozothamnus adnatus* (Helichrysum adnatum)**

ASTERACEAE

<p>Growth form: Heath-like shrub 1–2 m high. Vegetative spread: Longevity: Primary juvenile period: Flowers: Cream, October–December. Fruit/seed: Achene with pappus of bristles, November–January. Dispersal, establishment & growth: Fire response: Interaction with other organisms:</p>	<p>Life history</p>
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Distribution

Status/origin: Native.

Botanical subregions: CC NT CT ST; Vic.

Distribution Sydney area: Coast and Blue Mountains.

Select locations: Hurstville (1900), Oatley, Waterfall, Thirlmere Lakes, Glenbrook, Scotts Main Range, Bullaburra, Katoomba, Moorara Boss, Jenolan Caves, Hilltop.

Habitat

Habitat: Hillsides.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Occasional–rare.

Vegetation: Dry eucalypt forest, e.g. with *Syncarpia glomulifera*, *Eucalyptus gummifera*, *E. punctata*, *E. sieberi*, *E. sideroxylon*.

Substrate: Sandy to sandy loam to shaley soils from sandstone, infertile. Watertable mostly low.

Exposure:

Conservation

Conservation: Rare, conservation status unknown.

Ozothamnus argophyllus* (Helichrysum argophyllum)*ASTERACEAE****Life history**

Growth form: Aromatic shrub to 2.5 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Spring–summer. October–November.

Fruit/seed: Achene with pappus of bristles, mature December.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast.

Select locations: Pearl Beach, Mt Kembla, Shellharbour (1899), Berry, Kangaroo Valley, Robertson, Bombaderry.

Habitat

Habitat: Eucalypt forest and edge of rainforest.

Altitude: 0–600 m

Annual rainfall: above 1200 mm

Typical local abundance:

Vegetation: Tall eucalypt forests, edge of rainforest.

Substrate: High nutrient soils, basalt.

Exposure:

Conservation

Conservation: Conservation status unknown.

Ozothamnus diosmifolius* (Helichrysum diosmifolium)*ASTERACEAE**

White Dogwood

Life history

Growth form: Much branched shrub to 5 m high with white flowers.

Vegetative spread: No.

Longevity: Probably medium.

Primary juvenile period:

Flowers: White or pink, October–January, peak November.

Fruit/seed: Achene with pappus of fine hairs, matures December–January.

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed (Westoby et al. 1990).

Fire response: Resprouted at Agnes Banks (Benson 1981). Most killed by high-intensity fire

(1/1994) at Lane Cove, a few scattered plants resprouted from base and some plants resprouted from stems after lower fire intensities, scattered occurrence of seedlings (P. Kubiak pers. comm.).

Interaction with other organisms: Known to cause severe contact allergy in humans (Bass 1987).

Status/origin: Native.

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

Distribution Sydney area: Widespread.

Select locations: Howes Mountain, Spencer, Cheltenham, Otford, Minamurra Falls, Kurrajong, St Marys, Yerranderie, Hill Top, Mt Corricudgy, Kandos, Wildes Meadow (P. Kodela pers. comm.).

Habitat: Open-forest, a tall open-forest.

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

Typical local abundance: Frequent–occasional.

Vegetation: Tall moist forests, e.g. with *Eucalyptus saligna*, *E. cypellocarpa* or *E. fastigata*, to dry forests, e.g. with *Eucalyptus fibrosa*, *E. tereticornis*.

Substrate: Clay soils, fertile, from Wianamatta Shale, volcanics, sometimes sandstones. Recorded on saline soils near Lower Boro (Kodela & Foster 1990).

Exposure:

Conservation: Probably adequate. Conserved in Western Sydney (Benson & McDougall 1991).

Ozothamnus ferrugineus (*Helichrysum dendroideum*)

Tree Everlasting

Growth form: Erect shrub or small tree 2–5 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Summer–autumn.

Fruit/seed: Achene, with pappus of bristles.

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

Fire response:

Interaction with other organisms:

Status/origin: Native.

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

Distribution Sydney area: Mainly upper Blue Mountains.

Select locations: Kiama (1888), Mt Coricudgy, Mt Tomah, Jenolan Caves Road, Mt Murray, Foxground, Bundanoon.

Habitat: Ridges and hillsides.

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

Typical local abundance: Frequent–occasional.

Vegetation: Open eucalypt forest and scrub.

Substrate: Basalt soil, high nutrient.

Exposure:

Conservation: Conservation status unknown.

Distribution

Habitat

Conservation

ASTERACEAE

Life history

Distribution

Habitat

Conservation

Ozothamnus rosmarinifolius (*Helichrysum rosmarinifolium*)

ASTERACEAE

Life history

Growth form: Shrub to 1.5 m high.**Vegetative spread:****Longevity:** ?**Primary juvenile period:****Flowers:** Golden, January–February.**Fruit/seed:** Achene with pappus of bristles, mature February.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CT ST; Vic., Tas.**Distribution Sydney area:** Jenolan–Oberon area.**Select locations:** Jenolan Caves (1899), Boyd River, Duckmaloi River, Gurnang SF.

Habitat

Habitat:**Altitude:** 800–1200 m**Annual rainfall:** 800–1000 mm**Typical local abundance:****Vegetation:** Eucalypt forest, often beside water courses.**Substrate:****Exposure:**

Conservation

Conservation: Conservation status unknown.***Picris hieracioides* ***

ASTERACEAE

Hawkweed *Picris*

Life history

Growth form: Erect herb 30–80 cm high.**Vegetative spread:** No.**Longevity:** 2 years.**Primary juvenile period:****Flowers:** Yellow, most of the year.**Fruit/seed:** Achene 6–9 mm long, with pappus of plumed bristles 8 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).

Distribution

Status/origin: Naturalised exotic, native to Europe, Asia, Africa.**Botanical subregions:** NC CC SC NT ST NWS NFWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Colo River area.**Select locations:** Culoul Range (1976) only record for Sydney area.

Habitat

Habitat: Weed of disturbed areas.**Altitude:** 600 m**Annual rainfall:** 800 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation:

Podolepis canescens

ASTERACEAE

Large Copper-wire Daisy

Growth form: Woolly herb to 80 cm high. **Life history****Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Straw-coloured, March.**Fruit/seed:** Achene 2 mm long, with pappus of bristles.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Status/origin:** Native. **Distribution****Botanical subregions:** CT CWS NWP SWP NFWP SFWP; Vic., N.T., S.A., W.A.**Distribution Sydney area:** Bathurst.**Select locations:** Hill End (1885), Bathurst (1894, 1901) only records for Sydney area.**Habitat:** **Habitat****Altitude:** 800 m**Annual rainfall:** 700 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation:** Rare in area, possibly extinct. **Conservation*****Podolepis hieracioides***

ASTERACEAE

Growth form: Herb to 70 cm high, with long taproot. **Life history****Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Yellow, January–March.**Fruit/seed:** Achene 3 mm long, with pappus of bristles, mature January–March.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:****Interaction with other organisms:****Status/origin:** Native. **Distribution****Botanical subregions:** NT CT ST; Vic.**Distribution Sydney area:** Mainly western Blue Mountains.**Select locations:** Ben Bullen, Marrangaroo Creek, Little Hartley, Duckmaloi, Oberon/Jenolan Road, Burragorang Valley, Bargo River, Bowral.**Habitat:** **Habitat****Altitude:** 500–1200 m**Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Moist eucalypt forest, e.g. with *Eucalyptus cypellocarpa*, *E. viminalis*, *E. radiata*, *E. ovata*, and grassland.**Substrate:** Clay loam from shales and slatey shales.**Exposure:****Conservation:** Conservation status unknown (50% of Herbarium collections pre 1940). **Conservation**

Podolepis jaceoides

ASTERACEAE

Showy Copper-wire Daisy

Life history**Growth form:** Herb to 70 cm high, with several stems arising from perennial stock each year.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Yellow, August–January.**Fruit/seed:** Achene 3 mm long, with pappus of bristles.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed**Fire response:****Interaction with other organisms:** Palatable to rabbits (Leigh et al. 1987).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Widespread.**Select locations:** Otford, Mt Kembla, Nepean Dam Road, Thirlmere, Mt Victoria, Mt Werong, Moorara Boss, Bowral, Long Swamp.**Habitat****Habitat:** 'Amongst grasses in open situations and forest land' (Davis 1956).**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Grassy woodland, e.g. with *Eucalyptus sieberi*, *E. blaxlandii*, *E. obliqua* and grassy slopes of swamp margins.**Substrate:** Sandy to clay soil from shale, granite, fertile–infertile.**Exposure:****Conservation****Conservation:** Status unknown but probably becoming increasingly rare.***Pseudognaphalium luteoalbum*** (*Gnaphalium luteo-album*)

ASTERACEAE

Jersey Cudweed

Life history**Growth form:** Erect, greyish–white, woolly herb to 45 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** At any time of year.**Fruit/seed:** Achene 0.6 mm long, with pappus of bristles 3 mm long, mature September–May.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed locally. Coloniser.**Fire response:** Probably killed.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A., almost cosmopolitan.**Distribution Sydney area:** Coast and western Blue Mountains.**Select locations:** Awaba, Hornsby, Como, Bulli Pass, Gerringong, Camden, Silverdale, Blackheath, Clarence, Mt Blaxland, Robertson (P. Kodela pers. comm.).**Habitat****Habitat:** Grassland, watercourses, saltmarsh flats, swamps.**Altitude:** 0–1100 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Grasslands and open areas, e.g. with *Juncus*, *Cyperus*. Swamps, pastures (P. Kodela pers. comm.).**Substrate:** Sandy soils, infertile, watertable mostly high, fresh–? brackish. More fertile

situations in the Robertson area (P. Kodela pers. comm.).

Exposure: Full sun.

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

Conservation

Rhodanthe anthemoides (Helipterum anthemoides)

ASTERACEAE

Growth form: Erect, bushy herb with many slender stems arising from perennial root-stock.

Vegetative spread: Probably not.

Longevity: Possibly short-lived, less than 5 years.

Primary juvenile period:

Flowers: Pale brown, May–December.

Fruit/seed: Achene 2 mm long, with silky pappus.

Dispersal, establishment & growth: Diaspore: fruit, locally wind-dispersed. Seedling recruitment probably not fire-related though in subalpine habitats is common on exposed slopes especially after fire or disturbance (Burbidge & Gray 1976). Population at Mt Annan expanding in absence of grazing and fire.

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native.

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

Distribution Sydney area: Southwestern Sydney.

Select locations: Bringelly, Mt Annan, Razorback.

Distribution

Habitat: Woodland.

Altitude: 0–300 m

Annual rainfall: 700–800 mm

Typical local abundance: Frequent.

Vegetation: Grasslands and tall forests, woodland of *Eucalyptus moluccana*–*E. tereticornis* with grassy understorey. Ground stratum.

Substrate: Fertile, clay soils from Wianamatta Shale. Watertable mostly low, moisture supply intermittent, fresh.

Exposure: Sheltered sites; light shade.

Habitat

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

Conservation

Rhodanthe pygmaea (Helipterum pygmaeum)

ASTERACEAE

Pigmy Sunray

Growth form: Sparsely woolly herb to 6 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: August.

Fruit/seed: Achene 2.5 mm long, with pappus of bristles 5–7 mm long.

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

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native in western NSW, but introduced to Central Coast.

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

Distribution Sydney area: Flemington.

Distribution

Select locations: Flemington (1968) only record.

Habitat

Habitat: Saleyard.

Altitude: 0–100 m

Annual rainfall: 900 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Conservation

Conservation: Probably introduced to Flemington from western NSW with stock, and now unlikely to occur there.

***Roldana petasitis* *** (Senecio petasitis)

ASTERACEAE

Life history

Growth form: Shrub or herb, mostly 1.5–2 m high, softy hairy.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, August–October.

Fruit/seed: Achene 2.5–4 mm long, with pappus of slender hairs 8–10 mm long, not persistent.

Dispersal, establishment & growth:

Fire response: Resprouted after high-intensity fire (1/1994) at Lane Cove, flowers in bud within 30 weeks (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Mexico. Cultivated as an ornamental.

Botanical subregions: NC CC; LHI, Qld.

Distribution Sydney area:

Select locations: Galston (J. Howell), Epping, Lane Cove, Rookwood, Campbelltown (1969), Kembla Grange (1967), Macquarie Pass.

Habitat

Habitat: Roadsides, railway lines, disturbed areas.

Altitude: 0–300 m

Annual rainfall: above 800 mm

Typical local abundance:

Vegetation: Tall eucalypt forest.

Substrate: Medium-nutrient soils, e.g. from Wianamatta Shale.

Exposure:

Conservation

Conservation: Occasionally naturalised.

Schkuhria pinnata* var. *abrotanoides*

ASTERACEAE

Dwarf Marigold

Life history

Growth form: Much-branched herb to 50 cm high.

Vegetative spread:

Longevity: Probably short-lived (1–2 years).

Primary juvenile period:

Flowers: Yellow, March–April.

Fruit/seed: Achene 4 mm long, with pappus of scales, mature April.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Chile.

Botanical subregions: NC CC NT NWS CWS NWP SWP; Qld, Vic.

Distribution Sydney area: Mainly western Sydney.

Select locations: Flemington, Miranda (1925), Dural, Rouse Hill, Doonside.

Habitat: Disturbed sites and roadsides.

Altitude: 0–100 m

Annual rainfall: above 800 mm

Typical local abundance: Occasional.

Vegetation:

Substrate: Clay soils from Wianamatta Shale.

Exposure:

Habitat

Conservation: Naturalised roadside weed, rare.

Conservation

Senecio amygdalifolius

ASTERACEAE

Growth form: Herb or shrub, mostly 80–150 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period: Probably less than 1 year (Lawrence 1985).

Flowers: October. Probably native bee-pollinated, self-incompatible (Lawrence 1985).

Fruit/seed: Achene 4–6 mm long, with pappus of hairs 8–10 mm long, mature November.

Potential seed set/plant 500–1000; seed weight without pappus 1.85 mg (Lawrence 1985).

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Germinates readily without treatment when fresh.

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native.

Botanical subregions: NC CC NT NWS; Qld.

Distribution Sydney area: North from Morisset.

Select locations: Morisset (1959) only record for Sydney area.

Distribution

Habitat:

Altitude: 0–100 m

Annual rainfall: 1100 mm

Typical local abundance: Frequent.

Vegetation: Open eucalypt forest, disturbed.

Substrate: High nutrient soils, disturbed sites.

Exposure:

Habitat

Conservation: Morisset (southern limit), conservation status unknown.

Conservation

Senecio anacampserotis

ASTERACEAE

Growth form: Herb, stems prostrate then erect, 15–50 cm long.

Vegetative spread: Creeping, rooting at nodes along stems.

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, August–December.

Fruit/seed: Achene 5 mm long, with appressed white hairs and pappus 7–8 mm long.

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

Fire response:

Interaction with other organisms:

Life history

Status/origin: Native.

Botanical subregions: NC CC; Tas.

Distribution

Distribution Sydney area: Coastal.

Select locations: Wamberal, Dee Why Beach, Kurnell, Cronulla Beach.

Habitat

Habitat: Sand dunes and dune slacks.

Altitude: 0–50 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent–occasional.

Vegetation:

Substrate: Beach sand dunes, bare moist areas.

Exposure: Full sun.

Conservation

Conservation: Rare (60% of Herbarium records collected pre 1940). Conservation status unknown.

Senecio bipinnatisectus

ASTERACEAE

Life history

Growth form: Erect shrub, 60–120 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: January–March. Probably native bee-pollinated, self-compatible (Lawrence 1985).

Fruit/seed: Achene 2 mm long, with pappus of hairs 5–6 mm long. Potential seed set/plant 5000–15 000 ; seed weight without pappus 0.22 mg (Lawrence 1985).

Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed (Westoby et al. 1990), mature March–May. Germination 70% (Lawrence 1985).

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Coast and higher mountains.

Select locations: Watagan, Asquith, Blakehurst (1903), Audley, Helensburgh, Mt Keira, Minnamurra, Thirlmere Lakes, Mt Tomah, Govetts Leap, Robertson.

Habitat

Habitat: Gullies, creek banks, swamp.

Altitude: 0–1000 m

Annual rainfall: above 900 mm

Typical local abundance: Rare–occasional.

Vegetation: Heath, woodland and forest.

Substrate: Sandy soils, alluvial, infertile, watertable mostly high, fresh.

Exposure: Mid–deep shade.

Conservation

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

Senecio biserratus

ASTERACEAE

Life history

Growth form: Erect herb, 50–100 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Most of year.

Fruit/seed: Achene 2 mm long, with pappus of hairs 5 mm long.

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

Fire response:

Interaction with other organisms:

Status/origin: Native. Botanical subregions: NC CC SC NT ST; Vic., Tas., S.A., N.Z. Distribution Sydney area: Picton, Lithgow. Select locations: Mt Walker (Lithgow), Blue Gum Creek (Picton).	Distribution
Habitat: Altitude: 0–800 m Annual rainfall: 900 mm Typical local abundance: Vegetation: Moist eucalypt forest, e.g. with <i>Eucalyptus deanei</i> or drier woodland, e.g. with <i>Eucalyptus dives</i> , <i>E. mannifera</i> (Mt Walker complex of Keith & Benson 1988). Substrate: Soils on sandstone, siltstones or claystones, fertile–infertile, well-drained. Exposure:	Habitat
Conservation: Rare, conservation status unknown.	Conservation

***Senecio crassiflorus* ***

ASTERACEAE

Growth form: Decumbent herb with silvery white stems 20–50 cm high. Vegetative spread: Longevity: Perennial. Primary juvenile period: Flowers: Throughout the year. Fruit/seed: Achene 3–5 mm long, with pappus of hairs 14–15 mm long. Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Fire response: Interaction with other organisms:	Life history
Status/origin: Naturalised exotic, native to S America, introduced as garden ornamental. Botanical subregions: NC CC. Distribution Sydney area: Coast near habitation. Select locations: Belmont (1947), Cowan (1924).	Distribution
Habitat: Altitude: 0–100 m Annual rainfall: above 1200 mm Typical local abundance: Vegetation: Substrate: Probably sandy soils. Exposure:	Habitat
Conservation: Sometimes locally naturalised in coastal districts. Cowan–Berowra current southern limit of naturalised distribution.	Conservation

Senecio diaschides

ASTERACEAE

Growth form: Erect herb, 50–100 cm high. Vegetative spread: Longevity: Short-lived perennial. Primary juvenile period: Flowers: November–March. Fruit/seed: Achene 2.5 mm long, with pappus of hairs 3–5 mm long, mature January–August. Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Fire response: Killed, seedlings grow vigorously after fire. Interaction with other organisms:	Life history
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Distribution**Status/origin:** Native.**Botanical subregions:** NC CC NT CT ST NWS CWS; Qld, Vic., *W.A.**Distribution Sydney area:** Widespread.**Select locations:** Boarding House Dam, Hornsby, Many Reservoir, Malabar, Engadine, Culoul Range, Doonside, Wilton, Mt Tomah, Clarence, Glanmire, Rockley, Wildes Meadow (P. Kodala pers. comm.).**Habitat****Habitat:** Forest, roadsides, creeks.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:** High rainfall eucalypt forest, e.g. with *Eucalyptus tereticornis*, *E. sieberi* or coastal heath with *Banksia integrifolia*.**Substrate:** Usually damp places, clays soil, medium nutrient, from basalt, shale, also sandy soils.**Exposure:****Conservation****Conservation:** Conservation status unknown.***Senecio glomeratus*****ASTERACEAE****Life history****Growth form:** Erect herb mostly 30–100 cm high.**Vegetative spread:** No.**Longevity:** Short, 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Spring. Probably native bee-pollinated, self-compatible (Lawrence 1985).**Fruit/seed:** Achene 1.3–1.7 mm long, with pappus of hairs 5 mm long. Potential seed set/plant 5000–10 000; seed weight without pappus 0.1 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed. Germination 95% (Lawrence 1985).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC ST CWS SFWP; Vic., Tas., S.A., W.A.**Distribution Sydney area:** La Perouse, Western Sydney.**Select locations:** La Perouse (1965) only Herbarium record, Prospect (D.H.B.)**Habitat****Habitat:****Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:** Moist sites, probably on sandy soil from sandstone.**Exposure:****Conservation****Conservation:** Not common, vulnerable in Western Sydney (Benson & McDougall 1991). Status elsewhere unknown.***Senecio hispidulus* var. *dissectus*****ASTERACEAE****Life history****Growth form:** Erect herb, mostly 30–100 cm high, with lower leaves pinnatifid, upper leaves pinnatisect to bipinnatisect.**Vegetative spread:****Longevity:** Less than 1 year (Lawrence 1985).**Primary juvenile period:** Less than 1 year (Lawrence 1985).**Flowers:** Spring–summer. Probably native bee-pollinated, self-compatible (Lawrence 1985).

Fruit/seed: Achene 1.5–2.5 mm long, with pappus of hairs 5 mm long, mature January–April. Potential seed set/plant 3000–10 000; seed weight without pappus 1.2 mg (Lawrence 1985).

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

Germination 90% (Lawrence 1985).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Mainly Bathurst–Orange.

Select locations: Doonside, Capertee, Orange, Mandurama, Carcoar, Bowral.

Habitat

Habitat: Disturbed sites.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Clay and gravelly soil, basalt, fertile.

Exposure:

Conservation

Conservation: Not known.

Senecio hispidulus var. *hispidulus*

ASTERACEAE

Hill Fireweed

Life history

Growth form: Erect herb, mostly 30–100 cm high, leaves more or less lanceolate or oblanceolate — margins finely to coarsely toothed or more or less pinnatifid.

Vegetative spread: No.

Longevity: Less than 1 year (Lawrence 1985).

Primary juvenile period: Less than 1 year (Lawrence 1985).

Flowers: At any time of year. Probably native bee-pollinated, self-compatible (Lawrence 1985).

Fruit/seed: Achene 1.5–2.7 mm long, with pappus of hairs 5 mm long, mature October–June.

Potential seed set/plant 5000–10 000; seed weight without pappus 0.15 mg (Lawrence 1985).

Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Recruitment mainly after fire (D. Keith pers.comm.). Germination 95% (Lawrence 1985).

Fire response: Killed by fire (D. Keith pers.comm.). Flowers within 33 weeks of 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 SWS; Qld, Vic., Tas., W.A.

Distribution Sydney area: Coast and lower mountains.

Select locations: Putty, Avoca, Pymble, Rookwood, La Perouse, Otford, Shellharbour, Grose Vale, Nortons Basin, Thirlmere, Mt Tomah, Bowral.

Habitat

Habitat: Forest and coastal headlands, disturbed sites.

Altitude: 0–1000 m

Annual rainfall: above 900 mm

Typical local abundance: Frequent.

Vegetation: Moist eucalypt forest, e.g. *Eucalyptus saligna*, to drier forest, e.g. *Eucalyptus piperita*, *E. eugenioides*.

Substrate: Sandy loams from shaded, sandstone, infertile.

Exposure: Sheltered sites, light–no shade.

Conservation

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

***Senecio jacobaea* ***

ASTERACEAE

Ragwort

Life history**Growth form:** Rhizomatous herb, mostly 30–80 cm high.**Vegetative spread:** Rhizomatous.**Longevity:** Perennial or biennial.**Primary juvenile period:****Flowers:** Autumn.**Fruit/seed:** Achene 2 mm long, with pappus of hairs 5–6 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe and Asia.**Botanical subregions:** CT ST; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Kangaloon.**Select locations:** Kangaloon (1938) only Sydney record.**Habitat****Habitat:** Cultivated land.**Altitude:** 800 m**Annual rainfall:** 1500 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Rare, collected at Kangaloon and Goulburn, rare (Harden 1992).

Weed of cultivation, unlikely to be a problem weed.

Senecio lautus* subsp. *dissectifolius

ASTERACEAE

Variable Groundsel

Life history**Growth form:** Herb or small shrub.**Vegetative spread:****Longevity:** Perennial (Lawrence 1985).**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** March–October. Probably native bee-pollinated, self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 2 mm long with pappus of hairs 5 mm long, mature March–October.

Potential seed set 5000–10 000; seed weight without pappus 0.23 mg (Lawrence 1985).

Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Germination 80% (Lawrence 1985).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT CT NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Mainly western Blue Mountains.**Select locations:** Kincumber (1905), Tempe (1899), Jenolan Caves, South Megalong, Mt Werong, Mt Canobolas, Mt Jellore, Bowral.**Habitat****Habitat:** Rocky outcrops, hillsides, creekbeds.**Altitude:** 0–1000 m**Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Dry eucalypt forest and woodland.**Substrate:** Rocky sites on granite, basalt, metamorphics.**Exposure:****Conservation****Conservation:** Status unknown.

Senecio lautus* subsp. *lanceolatus

ASTERACEAE

Variable Groundsel

Life history

Growth form: Herb or subshrub.**Vegetative spread:****Longevity:** Perennial (Lawrence 1985).**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** March–July (limited data). Probably native bee-pollinated, self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 3 mm long, with pappus of hairs 5 mm long. Potential seed set/plant 10 000–20 000; seed weight without pappus 0.29 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed. Germination 85% (Lawrence 1985).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC NT CT; Qld, Vic., W.A.**Distribution Sydney area:****Select locations:** Maroubra (1893), Yerranderie, Kowmung River.

Habitat

Habitat: Ridgetops.**Altitude:** 0–800 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Open-forest.**Substrate:****Exposure:**

Conservation

Conservation: Not known.***Senecio lautus* subsp. *maritimus***

ASTERACEAE

Variable Groundsel

Life history

Growth form: Herb or small shrub.**Vegetative spread:****Longevity:** Perennial (Lawrence 1985).**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** March–October. Probably native bee-pollinated; self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 3 mm long, with pappus of hairs 5 mm long, mature mostly July–December. Potential seed set/plant 2000–6000; seed weight without pappus 0.26 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed. Germination 85% (Lawrence 1985).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Coastal, occasionally inland.**Select locations:** Norah Head, Long Bay, Kurnell, Wattamolla, Five Islands, Geringong, Kiama, Glenorie, Yerranderie.

Habitat

Habitat: Coastal headlands and beaches.**Altitude:** 0–200 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** With grasses and herbs, e.g. *Scaevola calandulacea*.**Substrate:** Rocky sea coast, or sand dunes near the sea.**Exposure:**

Conservation

Conservation: Status unknown.

Senecio linearifolius

ASTERACEAE

Life history

Growth form: Herb or shrub 50–150 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** Yellow, at any time of year. Probably native bee-pollinated, self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 2–2.5 mm long, with pappus of long hairs 5–8 mm long, mature October–June. Potential seed set/plant 10 000–20 000; seed weight without pappus 0.29 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit. Wind-dispersed, possibly also water-dispersed. Possibly a coloniser species of disturbed sites. Germination 75% (Lawrence 1985).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS SWS; Vic., Tas.**Distribution Sydney area:** Coast and Blue Mountains.**Select locations:** Gosford, Hornsby, Northbridge, Ingleburn, Bulli, Culoul Range, Bilpin, Katoomba, Kanangra, Robertson, Wingello.

Habitat

Habitat: Moist forest, disturbed sites?**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Rainforest and moist eucalypt forest, e.g. with *Eucalyptus saligna*, *E. deanei*, *E. fastigata*, *E. radiata*, *E. dalrympleana*.**Substrate:** Clay soils from basalt, shale, occasionally sandstone gullies, fertile–very fertile.**Exposure:**

Conservation

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

ASTERACEAE

Life history

Growth form: Erect herb mostly 50–100 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** Yellow, August–November. Probably native bee-pollinated, self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 4–5 mm long, with pappus 8–10 mm long, mature September–November. Potential seed set/plant 1000–3000; seed weight without pappus 2.4 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed. Germination 65% (Lawrence 1985).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC NT CT NWS CWS.**Distribution Sydney area:** Western parts of Blue Mountains.**Select locations:** Yerranderie, Mt Colong, Mt Werong, Killiecrankie Pass, Jenolan Caves, Winburndale, Upper Turon.

Habitat

Habitat: Moist gullies and hillsides.**Altitude:** 500–1000 m**Annual rainfall:** above 900 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt forest, e.g. with *Eucalyptus rossii*, *E. dives*, *Ficus rubiginosa*, *Acacia falciformis*, also rainforest gullies.

Substrate: Rocky hillsides on soils from shale and basalt, fertile, well-drained.

Exposure:

Conservation: Not known.

Conservation

Senecio madagascariensis *

ASTERACEAE

Fireweed

Life history

Growth form: Herb, 20–60 cm high. Taproot shallow, branching, with numerous fibrous roots within 20 cm of soil surface (Parsons & Cuthbertson 1992).

Vegetative spread: Limited vegetative spread, stems may take root at nodes when in contact with moist soil.

Longevity: 1–2 years. Most plants are winter annuals, top growth dying off during summer and regrowing in autumn but in some situations can perennate (Sindel 1989).

Primary juvenile period: 6–10 weeks (Parsons & Cuthbertson 1992), 20 weeks (P. Kubiak pers. comm.).

Flowers: Yellow, June–October.

Fruit/seed: Achene 2 mm long, with pappus of fine silky white feathery hairs, 6 mm long, mature June–November. Each flower produces 100–150 seeds and one plant may produce 25,000–30,000 seeds (Watson et al. 1984). Growth rate quick.

Dispersal, establishment & growth: Diaspore: fruit. Mainly wind dispersed, close to parent plant (Parsons & Cuthbertson 1992), spread in hay and grain products, on clothing and vehicles and by livestock, birds and other animals (Watson et al. 1983). Soil-stored seedbank (Parsons & Cuthbertson 1992). Non-dormant fraction more than 90 %, stimulated by moisture. Optimum germination occurs between 15°–27° C. At 20° C, 50 % of seed germinated in light while only 8 % germination in the dark; germination can take place over much of the year but most germination is from March–June and plants can produce flowers 6–10 weeks after emergence (Watson et al. 1984). Young seedlings are more sensitive to frost than older plants (Sindel & Michael 1980).

Fire response: Killed; flowering within 15 weeks and fruiting within 20 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.). Spreads into bushland following fire (R. Buchanan pers. comm.). Not clear whether recruitment is from pre- or post-fire seed dispersal.

Interaction with other organisms: Toxic to livestock (cattle and horses) if eaten (Sindel & Michael 1992), but palatable to sheep and goats (Watson et al. 1984). Host to beetle *Chalcolampra* sp., Magpie Moth *Nyctemera amica*, Blue Stem Borer *Patagoniodes farinaria*, leaf and stem mining flies, and two species of flower head feeding flies (Tanner 1993).

Distribution

Status/origin: Naturalised exotic, native to S Africa and Madagascar. First recorded in the Hunter Valley 1918 (Parsons & Cuthbertson 1992).

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

Distribution Sydney area: Gosford, northern Sydney, Cumberland Plain, Western Sydney & Orange area.

Select locations: Wyong Creek (1954), Pennant Hills, Kurmond, Kellyville, Windsor (M. Clarke pers. comm.), Casula (1967), Campbelltown, Molong, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Heavily grazed pastures, cultivated land, roadsides and wasteland

Altitude: 0–1100 m

Annual rainfall: above 600 mm

Typical local abundance: Frequent–dominant.

Vegetation: Exotic pastures, weedy herbaceous vegetation. Ground stratum.

Substrate: Sandy to clay soil from shales and sandstones. Soil fertile. Watertable mostly low, moisture supply intermittent, fresh.

Exposure: Indifferent–sheltered sites; light–no shade.

Conservation

Conservation: Spread in Sydney area mainly since 1960s. Not generally found in bushland areas but an agricultural weed in heavily grazed or neglected pastures and on cultivated or

disturbed ground during autumn–spring (Watson et al. 1984). Best control is to encourage competing pasture species. Declared noxious weed in some shires in NSW. Spreads into bushland following fire (R. Buchanan pers. comm.).

Senecio minimus

ASTERACEAE

Life history

Growth form: Erect herb, 20–100 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: October–March.

Fruit/seed: Achene 2 mm long, with pappus 4–5 mm long.

Dispersal, establishment & growth: Diaspore: fruit. Wind dispersed (Westoby et al. 1990).

Probably quick growing coloniser species.

Fire response: Probably killed.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC SC CC NT CT ST; Qld, Vi c, Tas., S.A., W.A., N.Z.

Distribution Sydney area: Mainly coastal, widespread.

Select locations: Mooney Mooney, Dural, Lane Cove, Otford, Mt Kembla, Bilpin, Ingleburn, Douglas Park, Razorback, Thirlmere Lakes, Mittagong.

Habitat

Habitat: Moist places, gullies, roadsides.

Altitude: 0–700 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt forest, e.g. with *Eucalyptus pilularis*, *Syncarpia glomulifera* and margin of rainforest, also riverbanks, e.g. with *Viminaria juncea*, *Phragmites australis*.

Substrate: Clay loam from shale to organic soils, fertile. Watertable high to low, periodically waterlogged.

Exposure: Shaded sites.

Conservation

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

Senecio pterophorus *

ASTERACEAE

Life history

Growth form: Erect shrub mostly 80–150 cm high.

Vegetative spread:

Longevity: Perennial (Lawrence 1985).

Primary juvenile period: Probably less than 1 year (Lawrence 1985).

Flowers: Yellow, January–March. Probably native bee-pollinated, self-incompatible (Lawrence 1985).

Fruit/seed: Achene 2 mm long, with pappus of hairs 5 mm long. Potential seed set/plant 20 000–30 000; seed weight without pappus 0.17 mg (Lawrence 1985).

Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Germination 80% (Lawrence 1985).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S Africa. Recently reported as a naturalised.

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

Distribution Sydney area: Western Sydney — a recently reported weed.

Select locations: Doonside (1989), Mt Druitt (1990), Kurmond (1990).

<p>Habitat: Remnant bush. Altitude: 0–200 m Typical local abundance: Frequent. Vegetation: Remnant bush, e.g. <i>Eucalyptus tereticornis</i>–<i>E. crebra</i> woodland. Mid–stratum. Substrate: Clay soil from Wianamatta Shale, fertile. Watertable mostly low, moisture supply intermittent, fresh. Exposure:</p>	<p>Habitat</p>
<p>Conservation: Only recently reported as a naturalised species but its occurrence in remnant bushland areas in western Sydney suggests that it may be a potential bushland weed species.</p>	<p>Conservation</p>

Senecio quadridentatus

ASTERACEAE

Cotton Fireweed

<p>Growth form: Herb to about 40–100 cm high. Vegetative spread: No. Longevity: Annual or biennial (Purdie 1977). Primary juvenile period: Probably less than 1 year (Lawrence 1985). Flowers: October–March. Probably native bee-pollinated, self-compatible (Lawrence 1985). Fruit/seed: Achene 3–4 mm long with pappus of hairs 5–7 mm long, mature October–March. Potential seed set/plant 15 000–30 000; seed weight without pappus 0.15 mg (Lawrence 1985). Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Recruitment fire-related (Harden 1992). Germination 95% (Lawrence 1985). Fire response: Seedlings recorded less than 1 year after fire (Purdie 1977). Interaction with other organisms:</p>	<p>Life history</p>
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<p>Status/origin: Native. Botanical subregions: NC CC NT ST CWS SWS NWP; Vic. Distribution Sydney area: Western Sydney, Bathurst. Select locations: Denistone, Marayong, Glenfield, Grose Vale, Razorback, Thirlmere, Linden, Medlow Bath, Capertee, Bathurst, Wildes Meadow (P. Kodela pers. comm.).</p>	<p>Distribution</p>
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<p>Habitat: Ephemeral watercourses, roadsides, disturbed sites. Altitude: 0–1000 m Annual rainfall: 700–1200 mm Typical local abundance: Frequent–occasional. Vegetation: Eucalypt woodland, e.g. with <i>Eucalyptus moluccana</i>, <i>E. polyanthemos</i>, <i>E. macrorhyncha</i>. Substrate: Generally clay soils from Wianamatta Shale, also granite and limestone, fertile soil. Watertable mostly low. Exposure: Light shade–full sun.</p>	<p>Habitat</p>
<p>Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991), status elsewhere unknown.</p>	<p>Conservation</p>

***Senecio* species E**

ASTERACEAE

<p>Growth form: Erect herb 20–80 cm high. (Reported as annual at Culoul Range in 1981.) Vegetative spread: Longevity: Probably relatively short-lived. Primary juvenile period: Flowers: September–March. Fruit/seed: Achene 3–4 mm long, with pappus 6–7 mm long. Dispersal, establishment & growth: Diaspore: fruit, probably wind-dispersed. Fire response:</p>	<p>Life history</p>
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Interaction with other organisms:**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT CT ST CWS SWS; Vic., Tas., W.A.**Distribution Sydney area:** Mainly upper Blue Mountains but widespread.**Select locations:** Culoul Range, Tuggerah, Bobbin Head, Kentlyn, Thirlmere Lakes, Medlow Bath, Wolgan Valley, Sunny Corner, Moss Vale.**Habitat****Habitat:** Eucalypt woodland, possibly disturbed sites.**Altitude:** 0–1200 mm**Annual rainfall:** above 900 mm**Typical local abundance:** Occasional.**Vegetation:** Eucalypt forest, e.g. with *Eucalyptus punctata*, *E. beyeriana*, *Syncarpia glomulifera* and woodland, e.g. with *Eucalyptus mannifera*.**Substrate:** Sandy loam, e.g. from shale enriched sandstone, well-drained–poorly drained, infertile.**Exposure:****Conservation****Conservation:** Rare in coastal areas, conservation status unknown.***Senecio tamioides* *****ASTERACEAE****Life history****Growth form:** Scrambling herb.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Yellow, winter.**Fruit/seed:** Achene 2 mm long, with pappus 6–7 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to S Africa. Introduced as ornamental, occasionally naturalised.**Botanical subregions:** CC; Qld.**Distribution Sydney area:** Northern Sydney suburbs.**Select locations:** Narrabeen (1917), Pennant Hills (1921).**Habitat****Habitat:****Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Occasionally naturalised in moist gullies in Sydney area.***Senecio tenuiflorus*****ASTERACEAE****Life history****Growth form:** Herb, usually 30–80 cm high.**Vegetative spread:** No.**Longevity:** Less than 2 years.**Primary juvenile period:****Flowers:** Spring–summer.**Fruit/seed:** Achene 2.5 mm long, with pappus 6–8 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CT; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Western Blue Mountains.**Select locations:** Blackheath (1899), Jenolan Caves (1899), Gibraltar Rocks Trail.**Habitat****Habitat:** Dispersed sites, open woodland.**Altitude:** 800–1000 m **Annual rainfall:** 900–1200 mm**Typical local abundance:** Occasional.**Vegetation:** Woodland, e.g. *Eucalyptus sieberi*–*E. blaxlandii* (Keith & Benson 1988).**Substrate:** Well-drained sandy soil on sandstones of shoalhaven group.**Exposure:****Conservation****Conservation:** Localised and probably uncommon, conservation status unknown.***Senecio vagus* subsp. *eglandulosus*****ASTERACEAE****Life history****Growth form:** Herb or shrub 60–120 cm high.**Vegetative spread:****Longevity:** ? 2–4 years.**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** Yellow, October–January. Probably native bee-pollinated, self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 5 mm long, with pappus 7–10 mm long, mature October–January. Potential seed set/plant 1000–2000; seed weight without pappus 1.92 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.

Germination 45% (Lawrence 1985).

Fire response: Killed, seedlings grow vigorously after fire.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT CT; Qld.**Distribution Sydney area:** Coast, and Blue Mountains.**Select locations:** Avoca, Narrabeen, Ingleburn, Stanwell Park, Wallacia, Bargo, Blackheath, Jamieson Valley.**Habitat****Habitat:** Moist gullies, creekbanks, headlands.**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Chiefly rainforest or eucalypt forest, high rainfall.**Substrate:** Med-high nutrient soils, from sandstone or alluvium.**Exposure:** Mid-shade.**Conservation****Conservation:** Bargo is southern limit. Vulnerable in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.

Senecio velleioides

ASTERACEAE

Life history**Growth form:** Herb or shrub 30–130 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:** Probably less than 1 year (Lawrence 1985).**Flowers:** Yellow, October–May. Probably native bee-pollinated, self-incompatible (Lawrence 1985).**Fruit/seed:** Achene 2.5 mm long, with pappus 5–8 mm long. Potential seed set/plant 2000–5000; seed weight without pappus 0.54 mg (Lawrence 1985).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed. Germination 35% (Lawrence 1985).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST CWS; Vic., Tas.**Distribution Sydney area:** Mainly Blue Mountains and Southern Highlands.**Select locations:** Ourimbah SE, Thirlmere Lakes, Bargo, Macquarie Pass, Mt Kerry, Mt Cameron, Mt Victoria, Kangaloon, Fitzroy Falls, Wingello.**Habitat****Habitat:** Moist Eucalypt forest.**Altitude:** 0–1100 m**Annual rainfall:** above 900 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Eucalypt forest, e.g. with *Eucalyptus gummifera* or more moist forest, e.g. with *Eucalyptus smithii*, *E. quadrangulata* (Fallding & Benson 1985).**Substrate:** Sandy soils from sandstone, occasionally on basalt.**Exposure:****Conservation****Conservation:** Status unknown.**Senecio vulgaris ***

ASTERACEAE

Groundsel

Life history**Growth form:** Erect herb 10–50 cm high.**Vegetative spread:****Longevity:** Annual or overwintering (Ciba-Geigy 1968–).**Primary juvenile period:****Flowers:** Pale yellow, throughout the year, usually self-pollinated, rarely insect-pollinated (Ciba-Geigy 1968–).**Fruit/seed:** Achene 2 mm long, with pappus 5–7 mm long.**Dispersal, establishment & growth:** Dispersed by wind, water, animals and humans; germinates throughout the year, often 2 or more generations in one year (Ciba-Geigy 1968–).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** CC CT ST; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:****Select locations:** Specimens unavailable.**Habitat****Habitat:****Altitude:****Annual rainfall:****Typical local abundance:****Vegetation:****Substrate:** Soils rich in nutrients, nitrogen indicator (Ciba-Geigy 1968–).**Exposure:** Disappears in closed stands for want of light (Ciba-Geigy 1968–).**Conservation****Conservation:**

Sigesbeckia orientalis* subsp. *orientalis

ASTERACEAE

Indian Weed

Life history**Growth form:** Erect herb to 80 cm high.**Vegetative spread:** No.**Longevity:** Short-lived.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow, January–May, peak March–April, flowerheads surrounded by sticky, glandular bracts.**Fruit/seed:** Achene 2–3 mm long; mature March–June.**Dispersal, establishment & growth:** Diaspore: fruit, no special seed dispersal morphology (Westoby et al. 1990), but fruit-head possibly dispersed by attachment as well as individual achenes dispersed by attachment (L.McD.). Coloniser of disturbed sites.**Fire response:** Killed, germinates vigorously from soil-stored seed immediately after fire, even in absence of rain. Grew to 30 cm high and flowered in 4 months at Culoul Range in 1980 drought after fire. Killed by high-intensity fire (1/1994) at Lane Cove, seedlings flowered within 11 weeks, fruiting within 16 weeks (P. Kubiak pers. comm.).**Interaction with other organisms:** Seeds eaten by White-browed Scrubwren *Sericornis frontalis* (Barker & Vestjens 1989, 1990). Contains a saponin, used medicinally in Asia and Polynesia (Cambie & Ash 1994).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST NWP SWP; Qld, Vic., Tas., N.T., S.A., W.A., Asia, Africa.**Distribution Sydney area:** Widespread.**Select locations:** Watagan Mountains, Hornsby, Waterfall, Albion Park, Bomaderry, Grose Vale, Springwood, Goodmans Ford, Mount Wilson, Robertson.**Habitat****Habitat:** Deep valleys, creeks, roadsides.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Margins of rainforest; open areas in tall forest, e.g. with *Eucalyptus pilularis*, *E. paniculata*, woodland, e.g. with *Angophora floribunda*.**Substrate:** Fertile soils, from limestones, slate, volcanic necks, or sandy alluvium, often disturbed sites, one record indicates 'weed of cultivation'. Basalt (P. Kodela pers. comm.).**Exposure:** Mid-shade.**Conservation****Conservation:** Conserved in Western Sydney (Benson & McDougall 1991), conservation status elsewhere unknown.***Silybum marianum* ***

ASTERACEAE

Variegated Thistle

Life history**Growth form:** Herb to 2.5 m high.**Vegetative spread:** No.**Longevity:** 2 years.**Primary juvenile period:****Flowers:** Purple, September–December.**Fruit/seed:** Achene 6–8 mm long, with pappus of bristles 15–20 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:** Poisonous to stock. Seed eaten by Galah *Cacatua roseicapilla* (Lepschi 1993).**Distribution****Status/origin:** Naturalised exotic, native to S Europe & N. Africa.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Widespread.

Select locations: Warwick Farm, Liverpool (1909), Doonside, Mt Annan, Berry, Mt Cameron, Orange, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Stockyards, paddocks, pastures.

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

Typical local abundance: Occasional.

Vegetation: Cultivated paddocks. Grazed pastures (P. Kodela pers. comm.).

Substrate: Clay soils from Wianamatta Shale, basalt, fertile, well drained. Recorded on saline sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Widespread weed.

Solenogyne bellioides (Lagenifera bellioides)**ASTERACEAE****Life history**

Growth form: Herb 5–18 cm high, with radical leaves and fleshy roots; rhizome short, vertical.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: White–bluish, spring–summer.

Fruit/seed: Achene 2 mm long, no pappus. Mature October–May, peak April.

Dispersal, establishment & growth: Diaspore: fruit. Springs up after summer rain (Blakely, Herbarium note).

Fire response: Probably resprouts at ground level or below.

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread — lower elevations.

Select locations: Mt Wareng, Cheltenham, Concord, Blackett, Ingleburn, Menangle, Thirlmere, Glanmire, Butlers Swamp (P. Kodela pers. comm.), Goodmans Ford.

Habitat

Habitat: Low growing grassy sites, often subject to some disturbance.

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

Typical local abundance: Frequent.

Vegetation: Low-growing grassland, e.g. burnt, compacted soil, between bricks in footpath. Sedgeland (P. Kodela pers. comm.). Understorey in woodland.

Substrate: Clay soils from Wianamatta Shale, also granite. Soil fertile. Watertable permanently low, moisture supply intermittent, fresh.

Exposure: Indifferent to exposure, light shade–full sun.

Conservation

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

Solenogyne dominii (Lagenifera sp. B)**ASTERACEAE****Life history**

Growth form: Herb 1.5–10 cm high; rhizome short, vertical, roots fleshy.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Magenta-tinged.

Fruit/seed: Achene 2 long, no pappus, mature October–May, peak March.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC NT CT ST CWS SWS; Vic.**Distribution Sydney area:** Coast and western Blue Mountains.**Select locations:** Hurstville (1899), Ryde, Albion Park, Goodmans Ford, Turondale, Glanmire.**Habitat****Habitat:****Altitude:** 0–700 m**Annual rainfall:** 600–1200 mm**Typical local abundance:** Frequent.**Vegetation:** Woodland, e.g. with *Eucalyptus melliodora*, *E. albens*. Ground stratum.**Substrate:** Granite, slate. Fertile–infertile. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:****Conservation****Conservation:** Conservation status unknown.***Solenogyne gunnii* (Lagenifera sp. A var. B)****ASTERACEAE****Life history****Growth form:** Herb to 11 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Magenta-tinged, November–March.**Fruit/seed:** Achene 2–3 mm long, no pappus, mature January–May.**Dispersal, establishment & growth:** Diaspore: fruit.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NT CT ST; Vic., Tas.**Distribution Sydney area:** Western Blue Mountains, Southern Highlands.**Select locations:** Lidsdale, Hartley, Orange, Oberon, Abercrombie Caves, Wingecarribee Swamp.**Habitat****Habitat:** Grassland. Swamp margins.**Altitude:** 500–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent–rare.**Vegetation:** Grassland with *Brachycome*, *Plantago varia* etc. Ground stratum; sedgeland/pasture ecotone area (P. Kodela pers. comm.).**Substrate:** Sandy loam or on metamorphic rock. Infertile soil or more fertile peaty soil (P. Kodela pers. comm.). Watertable permanently low, moisture supply intermittent, fresh.**Exposure:** Full sun.**Conservation****Conservation:*****Solidago canadensis* var. *scabra* *****ASTERACEAE**

Goldenrod

Life history**Growth form:** Herb 0.8–2 m high with stolons and rhizomes.**Vegetative spread:** Spreads by stolons up to several metres.**Longevity:** Indefinite.

Primary juvenile period:**Flowers:** Yellow, summer.**Fruit/seed:** Achene 1–2 mm long, with pappus of bristles 2–3 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed, though establishment mainly result of human dispersal of stolons, e.g. dumping garden waste.**Fire response:** Resprouted from base, flowering within 16 weeks and fruiting within 19 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).**Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to N America; introduced for horticulture, localised garden escape.**Botanical subregions:** NC CC NT CWS; Qld, S.A.**Distribution Sydney area:** Suburban areas.**Select locations:** Wyong (1961), Roseville, Maroota, Blacktown, Casula, Minto, Campbelltown.**Habitat****Habitat:** Roadsides and disturbed sites near habitation.**Altitude:** 0–200 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent.**Vegetation:** Disturbed sites.**Substrate:** Disturbed sites on sandstone, shale. Soil fertile–infertile. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:** Full sun.**Conservation****Conservation:** Localised garden escape, spreads vegetatively in limited areas.***Soliva anthemifolia* *****ASTERACEAE**

Dwarf Jo-jo, Button Weed

Life history**Growth form:** Small, diffuse, prostrate, stemless herb with radical leaves.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** June–March, peak November.**Fruit/seed:** Achene 3 mm long, with 2–3 mm spine.**Dispersal, establishment & growth:** Diaspore: fruit, burr, animal-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S America.**Botanical subregions:** NC CC SC NWS NWP SWP; Qld, Vic., S.A.**Distribution Sydney area:** Mainly suburban areas.**Select locations:** Sydney (1805), Cheltenham, Penshurst, Glenfield, Richmond, Camden, Albion Park.**Habitat****Habitat:** Weed of lawns and playing fields.**Altitude:** 0–200 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Grasslands, crops, pastures, lawns.**Substrate:** Sandy and clay soils.**Exposure:****Conservation****Conservation:** Weed of lawns and playing fields.

***Soliva sessilis* *** (*Soliva pterosperma*)

ASTERACEAE

Jo-jo, Bindyi, Lawn Burweed

Life history**Growth form:** Small, diffuse, prostrate, stemless herb; leaves radical, branches stolon-like.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pale greenish-yellow, August–December.**Fruit/seed:** Achene 3–4 mm long, with wings and spine 3 mm long, forming a burr. Mature August–December.**Dispersal, establishment & growth:** Diaspore: burr, animal-dispersed, including human feet. Seed germinates in winter, plant dies in summer unless irrigated (Commens et al. 1982).**Fire response:****Interaction with other organisms:** May cause dermatitis of knees, soles of feet, and arms in humans (Commens et al. 1982).**Distribution****Status/origin:** Naturalised exotic, native to S America. First identified on the hill of Sydney Cricket Ground in 1890s (Commens et al. 1982).**Botanical subregions:** NC CC SC ST NWS CWS SWS Vic.**Distribution Sydney area:** Mainly coastal areas.**Select locations:** Woy Woy, Pennant Hills, Moore Park (1899), Cabarita, Glenfield, Dural, Windsor, Albion Park, Kangaroo Valley.**Habitat****Habitat:** Weed of lawns, disturbed sites.**Altitude:** 0–200 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Lawns.**Substrate:** Sandy soils, infertile, well-drained.**Exposure:** Full sun.**Conservation****Conservation:** Nuisance weed of lawns.***Sonchus asper* subsp. *glaucescens* ***

ASTERACEAE

Prickly Sowthistle

Life history**Growth form:** Herb, 20–150 cm high, with woody taproot.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:** Less than 2 years.**Flowers:** Yellow, October–December. Insect-pollinated (Ciba-Geigy 1968–).**Fruit/seed:** Achene 2–3 mm long, with pappus 8 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, dispersed by wind, water, animals and humans; moderate to vigorous competitor for space and nutrients (Ciba-Geigy 1968–).**Fire response:** Seedlings recorded less than 1 year after fire (Purdie 1977).**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NC CC SC NT CT ST CWS SWS SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Colo (1911), Woy Woy (1912), Liverpool, Richmond, Mt Annan, Mt Tomah, Blackheath, Hartley, Robertson (P. Kodela pers. comm.).**Habitat****Habitat:** Weed of roadsides, cultivation, gardens and wasteland.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Occasional.**Vegetation:** Wasteland weeds.**Substrate:** Clay soils from shale and basalt, fertile.

Exposure: Full sun.

Conservation

Conservation: Weed of disturbed sites, not invasive of bush.

Sonchus hydrophilus

ASTERACEAE

Native Sowthistle

Life history

Growth form: Herb 50–120 cm high, with woody taproot.

Vegetative spread: No.

Longevity: 1–3 years.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, at any time, probably insect-pollinated.

Fruit/seed: Achene 4 mm long, with pappus 8 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC; Qld, S.A., N.G.

Distribution Sydney area: Coast south from Sydney.

Select locations: Cronulla (1816), Gerringong (1928).

Habitat

Habitat: Sea shore cliffs and rocky headlands.

Altitude: 0–50 m

Annual rainfall: above 1200 mm

Typical local abundance:

Vegetation:

Substrate: Temporarily wet ground.

Exposure:

Conservation

Conservation: Uncommon.

***Sonchus oleraceus* ***

ASTERACEAE

Common Sowthistle

Life history

Growth form: Herb 30–110 cm high with taproot and fibrous roots.

Vegetative spread: No

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, most of the year. Insect-pollinated (Ciba-Geigy 1968–).

Fruit/seed: Achene 3–4 cm long, with pappus 5–8 mm long, mature March–November.

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

Fire response: Killed after medium to high-intensity fire, flowering and fruiting within 15 weeks of high-intensity fire (1/1994) at Lane Cove, seedlings observed (P. Kubiak pers. comm.).

Interaction with other organisms: Foodplant of Grey Teal *Anas gibberifrons* (Barker & Vestjens 1989, 1990). Eaten by rabbits (R. Buchanan pers. comm.). Used as green feed for caged birds.

Distribution

Status/origin: Naturalised exotic, native to Europe. Formerly used in folk medicine and as a salad (Ciba-Geigy 1968–).

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

Distribution Sydney area: Widespread.

Select locations: Cheltenham, Dural, Balgowlah, Centennial Park (1901), Casula, Liverpool, Hilltop, Minnamurra, Robertson (P. Kodela pers. comm.), Cambewarra.

Habitat

Habitat: Wetlands, gardens, mechanically disturbed places, roadsides.

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

Typical local abundance: Occasional.

Vegetation: Disturbed woodland, wetlands.

Substrate: Clay soils from Wianamatta Shale or moist sandy alluvium, fertile. Recorded on saline sites in western NSW (Semple 1993). Soils rich in nitrogen (Ciba-Geigy 1968–).

Exposure: Light shade–full sun.

Conservation

Conservation: Widespread weed of cultivation, pastures and disturbed areas but not invasive of bushland except after fires. A minor invader of bushland after fire of any intensity, especially near edges (R. Buchanan pers. comm.).

Stemmacantha australis (Leuzea australis, Centaurea australis)**ASTERACEAE****Life history**

Growth form: Erect herb to 60 cm high, branches slightly woolly.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Purplish, spring–autumn.

Fruit/seed: Achene 8 mm long, with pappus 20 mm long.

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

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ?NWP; Qld, Vic.

Distribution Sydney area: Jenolan Caves.

Select locations: Jenolan Caves (1899), only Sydney record.

Habitat

Habitat:

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

Typical local abundance:

Vegetation:

Substrate: Heavy soils.

Exposure:

Conservation

Conservation: Probably very rare or extinct in Sydney area, conservation status unknown.

Stuartina muelleri**ASTERACEAE**

Spoon Cudweed

Life history

Growth form: Herb 2–12 cm high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Greenish, spring.

Fruit/seed: Achene 0.5–1 mm long, no pappus.

Dispersal, establishment & growth: Diaspore: fruit.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CT ST NWS CWS SWS NWP SWP NFWP; Vic., S.A., W.A.

Distribution Sydney area: Abercrombie Caves.

Select locations: Abercrombie Caves (1951).

Habitat:

Altitude: 600 m

Annual rainfall: 600 mm

Typical local abundance:

Vegetation: Grassland, woodland and sclerophyll forest.

Substrate: Rocky hillsides.

Exposure:

Habitat

Conservation: Widespread in inland districts. Eastern limit is Abercrombie Caves, conservation status unknown.

Conservation***Tagetes minuta* *****ASTERACEAE**

Stinking Roger

Life history

Growth form: Strongly aromatic herb 1–2 m high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, February–May.

Fruit/seed: Achene 5–8 mm long, with pappus of scales 3 mm long.

Dispersal, establishment & growth: Diaspore: fruit, probably animal-dispersed.

Fire response: Probably killed, flowering and fruiting within 20 weeks of high-intensity fire at Narrabeen (1/1994) (P. Kubiak pers. comm.). Dense stands along roadsides near Narrabeen Lakes and Ingleside after high-intensity fire (1/1994) (L.McD.), probably from soil-stored seed.

Interaction with other organisms: Contains a volatile oil with tagetone; reported to have an irritant effect on eyes and skin and cause contact dermatitis; taints dairy products if eaten by cows, and suspected of poisoning stock (Hurst 1942).

Distribution

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

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

Distribution Sydney area: Mainly coastal.

Select locations: Kincumber, Avalon, Hornsby, Forestville (L.McD.), Sydney (1893), Kurrajong, Doonside, Picton, Bulli, Wollongong, Kiama, Berry.

Habitat

Habitat: Roadsides, riverbanks.

Altitude: 0–100 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent–dominant.

Vegetation: With weeds, e.g. *Bidens pilosa*, *Sida rhombifolia*.

Substrate: Alluvial and clay soils, fertile, watertable mostly low.

Exposure: Mid shade–full sun.

Conservation

Conservation: Weed of disturbed sites.

Tanacetum parthenium* **ASTERACEAE**

Feverfew

Life history

Growth form: Erect, aromatic herb to 60 cm high, with rhizome.

Vegetative spread: No.

Longevity: About 5 years.

Primary juvenile period: Less than 1 year.

Flowers: White, disc yellow, spring–summer.

Fruit/seed: Achene 1.5 mm long, with minute pappus.

Dispersal, establishment & growth: Diaspore: fruit, ligule persistent for long enough to aid wind-dispersal?

Fire response:
Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Europe, introduced as garden ornamental, rarely naturalised.

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

Distribution Sydney area:

Select locations: Campbelltown (1963).

Habitat

Habitat: Gardens, roadsides, wasteland.

Altitude: 0–100 m

Annual rainfall: above 700 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Clay soils.

Exposure:

Conservation

Conservation: Occasionally naturalised on roadsides and as a garden weed.

***Tanacetum vulgare* ***

ASTERACEAE

Tansy

Life history

Growth form: Erect, aromatic herb to 1.2 m high, with rhizome.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, spring–autumn.

Fruit/seed: Achene 1–2 mm long, with minute pappus.

Dispersal, establishment & growth: Diaspore: fruit. Ligule appears to be persistent for long enough to aid wind-dispersal.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe, sporadic garden escape.

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

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

Select locations: Cheltenham, Leichhardt, Otford, Nowra, Mt Wilson (1896), Bowenfels, Bathurst, Bowral, Kangaloon (P. Kodala pers. comm.), Bundanoon.

Habitat

Habitat: Roadsides and vacant land.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation: Grassy areas.

Substrate: Clay soils.

Exposure: Full sun.

Conservation

Conservation: Naturalised along roadsides, probably not invasive of bush.

***Taraxacum officinale* ***

ASTERACEAE

Dandelion

Life history

Growth form: Herb 5–40 cm high, with radical leaves.

Vegetative spread: No.

Longevity: Perennial.

Primary juvenile period:

Flowers: Yellow, most of the year.

Fruit/seed: Achene 2.5–4.5 mm long, with pappus of bristles 6 mm long.

Dispersal, establishment & growth: Diaspore: fruit. Wind-dispersed many kilometres (Buchanan 1989).

Fire response: Probably resprouted, flowering within 11 weeks and fruiting within 25 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms: Palatable to rabbits (Leigh et al. 1987). Foodplant of moth caterpillars *Amata* sp., *Xanthorhoe vicissata* and *Spilosoma glatignyi* (Coupar & Coupar 1992). Medicinal properties — used in Europe and in Australia, late 1800s.

Distribution

Status/origin: Naturalised exotic, native to Europe.

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

Distribution Sydney area: Widespread.

Select locations: Balgowlah, Ermington, Kurnell, Cabarita, Casula, Campbelltown, Mt Kembla (1891), Jenolan Caves (1886), Moss Vale.

Habitat

Habitat: Lawns, roadsides, wasteland and in cultivated and pasture areas.

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

Typical local abundance: Occasional.

Vegetation: Gardens, lawns.

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

Exposure: Light shade–full sun (R. Buchanan pers. comm.).

Conservation

Conservation: Minor weed. Rarely invades bushland (R. Buchanan pers. comm.).

Tolpis umbellata* **ASTERACEAE**

Yellow Hawkweed

Life history

Growth form: Herb to 40 cm high

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, rarely purple, November–March.

Fruit/seed: Achene 1–2 mm long, with hairs.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Mediterranean region, America, S Africa.

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

Distribution Sydney area: Western Sydney and Bathurst–Blayney.

Select locations: Mt Colah, Minto, Castle Hill, Richmond (1910), Marrangaroo, Glanmire, Blayney (1899).

Habitat

Habitat: Grassland, woodland.

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

Typical local abundance: Frequent–occasional.

Vegetation: Grassland, woodland.

Substrate: Heavy clay soils.

Exposure:

Conservation

Conservation: Occasionally naturalised, not invasive of bushland.

***Tragopogon porrifolius* ***

ASTERACEAE

Salsify

Life history**Growth form:** Herb to 1.2 m high with long taproot.**Vegetative spread:** No.**Longevity:** 2 years.**Primary juvenile period:** 2 years.**Flowers:** Pale-deep purple, October-Jan.**Fruit/seed:** Achene 10-15 mm long, with plumose pappus, 15-25 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind and probably animal-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe, Asia. Introduced as root vegetable plant, occasionally naturalised.**Botanical subregions:** CC NT CT ST NWS CWS SWS SWP NFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Western Sydney, Tablelands.**Select locations:** Blacktown, Revesby, Emu Plains, Liverpool, Mt Annan, Menangle (1893), Orange, Murrumbidgee, Moss Vale.**Habitat****Habitat:** Roadsides, grassland and wasteland.**Altitude:** 0-1000 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent-occasional.**Vegetation:** Wasteland weeds, e.g. *Echium*, *Papaver somniferum* and pasture grasses.**Substrate:** Clay soils. Recorded on saline sites in western NSW (Semple 1993).**Exposure:****Conservation****Conservation:** Occasionally naturalised in rural areas.***Tripleurospermum inodorum* * (Matricaria perforata)**

ASTERACEAE

Scentless Mayweed

Life history**Growth form:** Herb 15-100 cm high.**Vegetative spread:** No.**Longevity:** 2 years.**Primary juvenile period:** 2 years.**Flowers:** White, disc yellow, spring-summer. Insect-pollinated (Ciba-Geigy 1968-).**Fruit/seed:** Achene 2 mm long, with small pappus.**Dispersal, establishment & growth:** Diaspore: fruits dispersed by wind, water, animals, and humans (with cereals and seed); moderate-vigorous competitor for space and user of nitrogen (Ciba-Geigy 1968-).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe and Asia. Distribution world-wide (Ciba-Geigy 1968-).**Botanical subregions:** CC NT CWS; Tas.**Distribution Sydney area:** Ryde.**Select locations:** Ryde TAFE (1966) only Sydney record.**Habitat****Habitat:** Roadsides, and waste places.**Altitude:** 200 m **Annual rainfall:** 1000 mm**Typical local abundance:** Occasional.**Vegetation:****Substrate:** Nitrogenous soil (Ciba-Geigy 1968-).**Exposure:****Conservation****Conservation:** Uncommon in Sydney area.

Triptilodiscus pygmaeus (Helipterum australe)

ASTERACEAE

Life history

Growth form: Herb to 8 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow, Sept–Nov.**Fruit/seed:** Achene 2 mm long, with plumed pappus of 3–4 bristles.**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed.**Fire response:** Probably killed.**Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic., S.A., W.A.**Distribution Sydney area:** Mainly western Sydney and western Blue Mountains.**Select locations:** Hornsby, Auburn, Newton, Leumeah, Vineyard, Richmond, Menangle Park, Hartley Vale, Winburndale, Abercrombie Caves.

Habitat

Habitat: Grasslands.**Altitude:** 0–700 m**Annual rainfall:** 600–1200 mm**Typical local abundance:** Occasional.**Vegetation:** Grasslands and woodlands.**Substrate:** Clay soils, sometimes bare areas, wet places, infertile soils.**Exposure:**

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991).***Vellereophyton dealbatum*** * (Gnaphalium candidissimum)

ASTERACEAE

White Cudweed

Life history

Growth form: Herb to 50 cm high.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:** 1 year.**Flowers:** Yellow, October–December.**Fruit/seed:** Achene 0.4 mm long, with pappus of bristles 1.5 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to S Africa.**Botanical subregions:** CC; Vic., S.A., Tas.**Distribution Sydney area:** Mainly Maroubra–La Perouse.**Select locations:** Maroubra Bay (1959), Malabar, Little Bay, La Perouse, Rookwood Cemetery.

Habitat

Habitat: Disturbed moist sites.**Altitude:** 0–100 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Margins of swamp.**Substrate:** Wet sandy or clay soils, in depressions, disturbed sites.**Exposure:**

Conservation

Conservation: Locally naturalised exotic, probably still spreading.

***Verbesina encelioides* subsp. *encelioides* ***

ASTERACEAE

Crownbeard

Life history**Growth form:** Herb to 60 cm high, shallow-rooted.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow, January–April.**Fruit/seed:** Achene 5–8 mm long, with pappus of bristles 1–2 mm long (obscured by wings).**Dispersal, establishment & growth:** Diaspore: fruit, probably wind-dispersed and/or water-dispersed. Seasonally and locally abundant.**Fire response:****Interaction with other organisms:** Poisonous to stock if eaten.**Distribution****Status/origin:** Naturalised exotic, native to America.**Botanical subregions:** NC CC ST NWS CWS SWS NWP SWP NFWP; Qld, Vic., N.T., S.A.**Distribution Sydney area:** Hawkesbury–Nepean Floodplain.**Select locations:** Wisemans Ferry (1908), Ebenezer, Windsor, Richmond, Emu Plains.**Habitat****Habitat:** Creeks, roadsides and disturbed habitats.**Altitude:** 0–100 m**Annual rainfall:** 700–1000 mm**Typical local abundance:** Frequent.**Vegetation:** Weeds in disturbed areas.**Substrate:** Sandy riverbanks and rises, clay loams, fertile, watertable mostly low.**Exposure:****Conservation****Conservation:** Minor weed.***Vernonia cinerea* var. *cinera***

ASTERACEAE

Life history**Growth form:** Herb to 0.6 m high with tubular purple or white flowers and thick taproot.**Vegetative spread:** No.**Longevity:** 1–5 years.**Primary juvenile period:****Flowers:** White or purple, October–May, peak April.**Fruit/seed:** Achene 1–2 mm long, with pappus 4–5 mm long. Mature October–May.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed (Westoby et al. 1990).

Seedling establishment possibly related to disturbance.

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC NT CT NWP; Qld, N.T., Africa, Asia.**Distribution Sydney area:** Widespread especially Cumberland Plain.**Select locations:** Hornsby, Silverwater, Ingleburn, Doonside, Douglas Park, Bulli, Bomaderry, Culoul Range, Grose Vale, Kowmung River.**Habitat****Habitat:** Along roadsides and in grassland.**Altitude:** 0–500 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Grassy open-forest, e.g. with *Eucalyptus crebra*, *E. fibrosa*, *E. eugenioides*, *Syncarpia glomulifera*.**Substrate:** Various — sandy riverbank, clay soil from basalt, shale. Soil very fertile–fertile–infertile. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:** Light shade.**Conservation****Conservation:** Conserved in Western Sydney (Benson & McDougall 1991).

Vittadinia cervicularis* var. *cervicularis

ASTERACEAE

Life history

Growth form: Herb.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White-purple, October.**Fruit/seed:** Achene 8.5-10 mm long, pappus of bristles 6-9 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CT NWS NWP SWP SFWP; Vic., S.A., W.A.**Distribution Sydney area:** Hill End.**Select locations:** Hill End Bridle Track (1965) only record for area.

Habitat

Habitat: Woodland and cleared land.**Altitude:** 600 m**Annual rainfall:** 900 mm**Typical local abundance:** Frequent.**Vegetation:** Eucalypt woodland.**Substrate:** Rocky hillside.**Exposure:**

Conservation

Conservation: Rare in Sydney area. Occurs mainly west of area, Hill End eastern limit; conservation status unknown.***Vittadinia cervicularis* var. *subcervicularis***

ASTERACEAE

Life history

Growth form: Herb.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White-purple, September-October.**Fruit/seed:** Achene 8.5-10 mm long, with pappus of bristles 6-9 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CWS NWP SWP SFWP; W.A.**Distribution Sydney area:** Silverdale.**Select locations:** Silverdale (1964) only Sydney record.

Habitat

Habitat: Pasture, grassland and woodland.**Altitude:** 200 m**Annual rainfall:** 900 mm**Typical local abundance:****Vegetation:** Pasture and grassland.**Substrate:****Exposure:**

Conservation

Conservation: Rare in the Sydney area, Silverdale only record.

Vittadinia cuneata var. **cuneata** forma **cuneata** (Vittadinia form b) **ASTERACEAE**

Fuzzweed

Life history**Growth form:** Woody herb 10–40 cm high.**Vegetative spread:****Longevity:** Annual or perennial.**Primary juvenile period:****Flowers:** Pale blue–mauve, October–March.**Fruit/seed:** Achene 4–7 mm long, with pappus of bristles 4–8 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC NT ST NWS CWS SWS NWP SWP NFWP SFWP; Vic., Tas., S.A.**Distribution Sydney area:** Western Sydney.**Select locations:** Grose Vale, St Marys, Emu Plains, Cobbitty.**Habitat****Habitat:****Altitude:** 0–200 m**Annual rainfall:** 700–1000 mm**Typical local abundance:****Vegetation:** Eucalypt forest and woodland.**Substrate:** Clay soil from Wianamatta Shale.**Exposure:****Conservation****Conservation:** Rare in Western Sydney, conservation status unknown.**Vittadinia cuneata** var. **cuneata** forma **minor** (Vittadinia form a) **ASTERACEAE**

Fuzzweed

Life history**Growth form:** Woody herb 10–40 cm high.**Vegetative spread:****Longevity:** Annual or perennial.**Primary juvenile period:****Flowers:** Pale blue–mauve, most of year, September–May.**Fruit/seed:** Achene 4–7 mm long, with pappus of bristles 4–8 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** CC SC NT CT ST NWS SWS; Vic.**Distribution Sydney area:** Widespread.**Select locations:** Morisset, Barranjoey, Pennant Hills, Bringelly, Doonside, Silverdale, Burragorang Valley, Jenolan Crossing, Bowral.**Habitat****Habitat:****Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Woodland, e.g. with *Eucalyptus fibrosa*, *E. melliodora*, *E. tereticornis* with grassy groundcover.**Substrate:** Clay soil from shale and sandstone.**Exposure:****Conservation****Conservation:** Status unknown.

Vittadinia dissecta* var. *dissecta

ASTERACEAE

Life history

Growth form: Herb 10–35 cm high.**Vegetative spread:****Longevity:** Annual or short-lived perennial.**Primary juvenile period:****Flowers:** White–blue, most of the year.**Fruit/seed:** Achene 5 mm long, with pappus of bristles 5 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC; Qld, Vic.**Distribution Sydney area:** Sporadic, mainly coastal.**Select locations:** Mt Kembla (1889), Kiama (1850), Penrith (1888).

Habitat

Habitat:**Altitude:** 0–300 m**Annual rainfall:** above 800 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Apparently rare, last collected 1889.***Vittadinia gracilis* (Vittadinia sp. E)**

ASTERACEAE

Life history

Growth form: Small shrub 10–40 cm high, with woody base.**Vegetative spread:****Longevity:** 1–5 years.**Primary juvenile period:** Less than 1 year.**Flowers:** Purple, September–December.**Fruit/seed:** Achene 5–6 mm long, with pappus of bristles 5–7 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC CT ST CWS SWS NWP SWP SFWP; Vic., Tas., S.A.**Distribution Sydney area:** Mainly Bathurst–Orange.**Select locations:** Panania, Flemington Saleyards, Bathurst, Orange.

Habitat

Habitat: Roadsides, pastures.**Altitude:** 0–1000 m**Annual rainfall:** 800–1200 mm**Typical local abundance:** Frequent.**Vegetation:****Substrate:** Clay soils from shale, fertile.**Exposure:**

Conservation

Conservation: Few collections, status unknown.

Vittadinia hispidula* var. *hispidula

ASTERACEAE

Growth form: Erect herb. Vegetative spread: No. Longevity: 1 year. Primary juvenile period: Less than 1 year. Flowers: White-purple, August. Fruit/seed: Achene 3 mm long, with pappus of bristles 5 mm long. Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Fire response: Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: NC CC CT NT; Qld. Distribution Sydney area: North of Sydney Select locations: Colo Heights (1958), Ku-ring-gai Chase (1916).	Distribution
Habitat: Altitude: 0-300 m Annual rainfall: above 900 mm Typical local abundance: Rare. Vegetation: Eucalypt forest. Substrate: Gravelly clay. Exposure:	Habitat
Conservation: Apparently rare, Ku-ring-gai Chase is southern limit, conservation status unknown.	Conservation

***Vittadinia hispidula* var. *setosa* (*Vittadinia hispidula*)**

ASTERACEAE

Growth form: Erect herb. Vegetative spread: No. Longevity: 1 year. Primary juvenile period: Less than 1 year. Flowers: White-purple, July. Fruit/seed: Achene 3 mm long, with pappus of bristles 5 mm long. Dispersal, establishment & growth: Diaspore: fruit, wind-dispersed. Fire response: Interaction with other organisms:	Life history
Status/origin: Native. Botanical subregions: NC CC SC; Qld. Distribution Sydney area: Select locations: Como (1896) only Sydney record.	Distribution
Habitat: Roadsides and beach areas. Altitude: 0-100 m Annual rainfall: above 1100 mm Typical local abundance: Vegetation: Substrate: Exposure:	Habitat
Conservation: Apparently rare, conservation status unknown.	Conservation

Vittadinia muelleri (Vittadinia sp. G)

ASTERACEAE

Life history

Growth form: Herb with woody rootstock and tufted stems.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Bluish-purple, September-May.**Fruit/seed:** Achene 5 mm long, with pappus of bristles 7 mm long, mature September-May.**Dispersal, establishment & growth:** Diaspore: fruit, no strong after-ripening requirement, wind-dispersed. Germination promoted by light. Germination promoted by high temperature and cold-stratification, optimum germination regime 25°/15°C. (Willis & Groves 1991).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC NT CT ST NWS CWS SWS; Qld, Vic., Tas.**Distribution Sydney area:** Western Sydney and Southern Highlands.**Select locations:** Windsor, St Marys, Bringelly, The Oaks, Narellan, Berrima (1889), Woodhouselee.

Habitat

Habitat: Grassland.**Altitude:** 0-700 m**Annual rainfall:** 600-900 mm**Typical local abundance:** Rare.**Vegetation:** Grassland. Ground stratum.**Substrate:** Wianamatta Shale. Fertile soil. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:** Full sun.

Conservation

Conservation: Probably now rare. Vulnerable in Western Sydney (Benson & McDougall 1991), conservation status unknown.**Vittadinia pustulata** (Vittadinia sp. H)

ASTERACEAE

Life history

Growth form: Herb or small shrub 10-30 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** September-March.**Fruit/seed:** Achene 3-4 mm long, with pappus of bristles 5-7 mm long.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC CWS NWP; Qld, N.T., S.A., W.A.**Distribution Sydney area:** Western Sydney.**Select locations:** Blacktown, Castlereagh, Penrith, Regentville, Silverdale, Ingleburn, Camden.

Habitat

Habitat: Disturbed sites, roadsides.**Altitude:** 0-300 m**Annual rainfall:** 700-900 mm**Typical local abundance:****Vegetation:** Grassland, Cumberland Plain Woodland, e.g. with *Eucalyptus moluccana*, *E. tereticornis*.**Substrate:** Clay soils from Wianamatta Shale, fertile.**Exposure:**

Conservation

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

Vittadinia sulcata (*Vittadinia* sp. F)

ASTERACEAE

Life history

Growth form: Herb 10–30 cm high.**Vegetative spread:** No.**Longevity:** Annual.**Primary juvenile period:** Less than 1 year.**Flowers:** Purple, August–October.**Fruit/seed:** Achene 5–8 mm long, with pappus of bristles 6–8 mm long, matures March–April, August.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NWS SWS NWP SWP NFWP; all mainland States.**Distribution Sydney area:** South-western Sydney.**Select locations:** Como, Minto, Regentville, Razorback, Douglas Park, Goodmans Ford.

Habitat

Habitat: Open grassy areas.**Altitude:** 0–200 m**Annual rainfall:** 700–1000 mm**Typical local abundance:** Occasional.**Vegetation:** Grassland or grassy woodland, e.g. with *Eucalyptus albens*, *E. melliodora*, *Angophora floribunda*.**Substrate:** Dry sites, probably clay soils.**Exposure:**

Conservation

Conservation: Conservation status unknown.**Vittadinia tenuissima**

ASTERACEAE

Western New Holland Daisy

Life history

Growth form: Slender herb to more than 40 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Spring.**Fruit/seed:** Achene 3–4 mm long, with pappus of bristles 5 mm long, mature March.**Dispersal, establishment & growth:** Diaspore: fruit, wind-dispersed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CWS; Qld, Vic.**Distribution Sydney area:****Select locations:** Wollemi NP (1982), Grose Vale (1910), Grose Vale (1910), Kiama (1850).

Habitat

Habitat: Disturbed sites.**Altitude:** 0–400 m**Annual rainfall:** above 900 mm**Typical local abundance:****Vegetation:****Substrate:** Fertile soils, basalt intrusions (Wollemi).**Exposure:**

Conservation

Conservation: Apparently rare, conservation status unknown.

***Xanthium cavanillesii* ***

ASTERACEAE

South American Burr

Life history**Growth form:** Monoecious herb to 1 m high with scabrous stems.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Summer–autumn.**Fruit/seed:** Burr 15–30 mm long with spines, achenes retained inside, mature December–May.**Dispersal, establishment & growth:** Diaspore: burr, animal-dispersed, also spread in floodwaters and along watercourses.**Fire response:****Interaction with other organisms:** Hybridises with *Xanthium occidentale*.**Distribution****Status/origin:** Naturalised exotic, native of America.**Botanical subregions:** CC CWS;**Distribution Sydney area:** Banks of Hawkesbury River.**Select locations:** Wisemans Ferry, Ebenezer, Windsor (1915), Richmond, Castlereagh.**Habitat****Habitat:** Riverbanks.**Altitude:** 0–100 m**Annual rainfall:** 800–900 mm**Typical local abundance:****Vegetation:****Substrate:** Sandy loam.**Exposure:****Conservation****Conservation:** Naturalised along Hawkesbury-Nepean but has not shown the same ability to spread as other *Xanthium* species (Milvain 1983).***Xanthium occidentale* *** (*Xanthium* chinese, *X. pungens*)

ASTERACEAE

Noogoora Burr, Cockle Burr

Life history**Growth form:** Herb to 2 m high with stout taproot, stems hairy and purplish.**Vegetative spread:** No.**Longevity:** 6–9 months.**Primary juvenile period:** Less than 1 year.**Flowers:** Inconspicuous, flowering determined by day length, late February–April (Milvain 1983).**Fruit/seed:** Hard, woody burr 16–18 mm long, with hooked spines. Each burr with 2 different sized seeds, upper and lower, retained inside. No pappus on achenes. Mature April–June.**Dispersal, establishment & growth:** Diaspore: burr; animal-dispersed, also water-dispersed, float and spread in floodwater and along watercourses. Non-dormant seed will germinate in 2 days, dormant seed may germinate after 3 weeks (Langkamp 1987). Upper seed exhibits innate dormancy, overcome by high temperature and exposure to light; induced dormancy in the lower seed following soil-storage during summer, overcome by storage in soil over winter or by high temperature and exposure to light. Seeds germinate in late spring following favourable weather or along waterways following a rise and fall of water levels when temperatures are high (Milvain 1993). Summer-growing. Plants die off in autumn but burrs remain on the dead plant until next season.**Fire response:** Killed by high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).**Interaction with other organisms:** Toxic to stock if eaten. 3 insects and a fungus have been released since 1932 for control but have been unsuccessful (Milvain 1983). Attacked by gall-forming moth *Epiblema strenuana* recently introduced from Mexico (Common 1990).

Distribution

Status/origin: Naturalised exotic, native to N America. Introduced into Australia with cotton seed from the Mississippi delta and first discovered in Australia in late 1860s at Noogoora Station near Ipswich Qld (Milvain 1983).

Botanical subregions: NC CC NT NWS CWS SWS NWP SWP NFWP SFWP; all mainland States.

Distribution Sydney area: Hawkesbury–Nepean floodplain, Georges River, Cooks River.

Select locations: Pennant Hills, Westmead, Cooks River (1911), Ermington, Casula, Colo River, Richmond, Castlereagh, Cabramatta, Cobbitty, Royal NP.

Habitat

Habitat: Riverbanks, creeks.

Altitude: 0–100 m

Annual rainfall: 700–1200 mm

Typical local abundance: Frequent–occasional.

Vegetation: Ground stratum, with riverbank weed species.

Substrate: Sandy loam, fertile. Watertable mostly high, moisture supply intermittent.

Exposure: Sheltered, light shade–full sun.

Conservation

Conservation: Widespread along rivers and creeks and flats after late spring or summer flooding. Declared noxious weed in all States.

Xanthium spinosum* **ASTERACEAE**

Bathurst Burr

Life history

Growth form: Monoecious herb to 1 m high with taproot, stems pubescent, armed with 3-pronged spines at base of leaves.

Vegetative spread: No.

Longevity: 1–6 months.

Primary juvenile period: 1–4 months.

Flowers: January–March.

Fruit/seed: Burr 10–12 mm long with hooked spines, each with 2 brown seeds, a smaller soft seed that germinates in the first season and a larger, harder seed that does not germinate until the 2nd or 3rd year or later (Milvain 1991). Burr contains an upper and a lower seed (Langkamp 1987). Adheres to hair of stock or wool of sheep causing considerable annoyance (Herbarium note).

Dispersal, establishment & growth: Diaspore: burr, dispersed by animals, humans and water (Ciba-Geigy 1968–). Non-dormant seed will germinate in 2 days, dormant seed may germinate after 3 weeks; this species exhibits enforced dormancy, the burr may restrict gas exchange (Langkamp 1987). Germinates in spring–summer following rain, flowers January–March. Later-establishing plants flower and seed within a few weeks.

Fire response:

Interaction with other organisms: Attacked by gall-forming moth *Epiblema strenuana* recently introduced from Mexico (Common 1990). Plant believed to be toxic at early stages until development of roots (Milvain 1991). A mycoherbicide *Colletotrichum orbiculare* is being developed for biological control (Tanner 1993).

Distribution

Status/origin: Naturalised exotic, native to S America, known from Bathurst in 1840s, considered naturalised by 1850.

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

Distribution Sydney area: Widespread.

Select locations: Lane Cove River, Centennial Park, Cooks River, St Marys, Kangaroo Valley, Goodmans Ford, Wolgan River, Clarence (1900).

Habitat

Habitat: Agricultural ground and disturbed pastures.

Altitude: 0–1000 m

Annual rainfall: above 800 mm

Typical local abundance: Frequent–occasional.

Vegetation:

Substrate: Sandy loam, fertile soils, watertable mostly high. Recorded on saline

sites in western NSW (Semple 1993).

Exposure:

Conservation

Conservation: Widespread and seasonally abundant weed often forming prolific stands after summer rain or flooding. Declared noxious in all Australian states.

Avicennia marina* subsp. *australasica

AVICENNIACEAE

Grey Mangrove

Life history

Growth form: Small tree or shrub to 12 m high with aerating roots or pneumatophores, projecting above the surrounding mud. Secretes salt through glands on leaves (West 1985). Multistemmed forms sometimes found (P. Clarke pers. comm.).

Vegetative spread: Occasionally low-lying branches take root and become independent from the adult plant (P. Clarke pers. comm.).

Longevity: Up to 100 years (Clarke 1992).

Primary juvenile period: 5 years (Clarke 1992).

Flowers: February–March, peak March. Flowering of individual trees varies greatly between years and many trees fail to reproduce each year although the populations remain fecund from year to year. Pollen vector most commonly bees, also ants, wasps, bugs (Lygaeidae, Miridae), flies (Cecidomyiidae), bee flies, Cantherid beetles, moths (Pyrilidae) (Clarke & Myerscough 1991).

Fruit/seed: Compressed capsule about 3 cm diameter with one seed. 'Seed' mass 5–20 g (P. Clarke pers. comm.), mature October–November, peak November. Seed with two large cotyledons folded longitudinally, germinating before fruit falls. Seed supply not stored on plant.

Dispersal, establishment & growth: Diaspore: germinating seed dropped in December (Hamilton 1919). Dispersed by tidal water, floating in saltwater, sinking in fresh (P. Clarke pers. comm.). Seedlings establish in mud and grow vigorously to about 30 cm high; newly silted areas readily colonised. Optimum growth and establishment occurs just above mid-tide level; seedlings in mature forests grow to about 0.6 m and remain at this height for up to 5 years and die through lack of light and space (State Pollution Control Commission n.d.). Pneumatophore damage may result in plant death (West 1985). Plants may be killed by oil spills (Allaway 1982, Grant et al. 1993).

Fire response: Variable response to high-intensity fire (1/1994) at Lane Cove, some killed others resprouted (P. Kubiak pers. comm.). Canopy killed, resprouts from base (at Breakfast Creek 1994). Can resprout from basal stems, but is also killed if small; killed at Jervis Bay (1989); fires possibly keep it out of the upper saltmarsh (P. Clarke pers. comm.).

Interaction with other organisms: One km² of *Avicennia* forest contributes 600 tonnes of leaf litter each year to the detrital food chain (West 1985). Crabs aid the decomposition of leaf litter, 50% eaten (Van der Valk & Attiwill 1984). Flower bud predation by moth larvae (subtribe Phycitina) may be high but had little effect on ovule survival (Clarke 1992).

Distribution

Status/origin: Native.

Botanical subregions: NC CC SC; LHI, all mainland States, NG, Pac Is, SE Asia.

Distribution Sydney area: Saltwater swamps and estuaries.

Select locations: Gosford, Broken Bay, Bantry Bay (L.McD.), Middle Harbour Creek (L.McD.), Parramatta River, Cooks River, Botany Bay, Georges River, Lake Illawarra, Minnamurra River.

Habitat

Habitat: Mudflats with tidal inundation; occasionally on rock platforms in sheltered bays (P. Clarke pers. comm.).

Altitude: Sea level only.

Annual rainfall: Above 1200 mm.

Typical local abundance: Dominant and often monospecific (P. Clarke pers. comm.).

Vegetation: Closed-forest/closed-scrub as sole dominant, occasionally with zones of *Aegiceras corniculata*.

Substrate: In mud, fertile silt and sand deposits below upper tidal limit. Watertable high fluctuating in response to tide, saline.

Exposure: Indifferent to exposure, light. Seedling growth greater in canopy gaps, recruitment to sapling size restricted by light and sediment resources (Clarke & Allaway 1992).

Conservation

Conservation: Extensive reclamation of mangrove areas has destroyed much mangrove habitat, but there has also been some recent expansion of some mangrove areas in response to increased siltation from disturbed catchments. Species adequately conserved, though protection of mangrove forest is important for maintenance of estuarine habitat. Survey estimated 107 km² of mangroves in NSW 'a resource needing careful management in the future' (West 1985).

Impatiens walleriana* **BALSAMINACEAE**

Balsam, Busy Lizzie

Life history

Growth form: Glabrous herb to 1 m high with more or less succulent stems.

Vegetative spread: Can regrow from stem fragments.

Longevity: Short-lived, less than 5 years.

Primary juvenile period: Less than 1 year.

Flowers: Pink-red or white, November-May.

Fruit/seed: Capsule 15 mm long, explosively dehiscent.

Dispersal, establishment & growth: Diaspore: seed, explosively dehiscent, dispersed by gravity or water (Anon 1991). Can regrow from dumped stems.

Fire response: Probably killed, flowered within 18 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to southern Africa, cultivated as ornamental, occasionally naturalised.

Botanical subregions: CC.

Distribution Sydney area: Sydney suburban bushland.

Select locations: Wahroonga (M. Clarke pers. comm.), Beecroft, Lane Cove, Clifton Gardens, Minto (1969).

Habitat

Habitat: Gardens, bushland, rubbish dumps. Especially along stormwater drains and creeks (R. Buchanan per. comm.).

Altitude: 0-200 m

Annual rainfall: above 900 mm

Typical local abundance: Frequent-occasional.

Vegetation: Moist forest, e.g. with *Eucalyptus pilularis*, *E. piperita*, or with *Syñcarpia glomulifera* (M. Clarke pers. comm.).

Substrate: Enriched sandstone soils, alluvial soils, fertile. Watertable mostly high, intermittent, fresh.

Exposure: Sheltered sites; deep shade-mid shade.

Conservation

Conservation: Occasionally found in sheltered bushland, probably mainly spread in garden refuse. Spread by water in creeks and stormwater drains (R. Buchanan & M. Clarke pers. comm.).

Anredera cordifolia* **BASELLACEAE**

Madeira Vine, Lamb's Tail, Jalap

Life history

Growth form: Climber with stems to 30 m long producing tubers on roots and at nodes on aerial stems.

Vegetative spread: Aerial and underground tubers (R. Buchanan pers. comm.).

Longevity:

Primary juvenile period:

Flowers: White, fragrant, March.

Fruit/seed: Fruit not set in Australia.

Dispersal, establishment & growth: Diaspore: large underground tubers or clusters of aerial tubers (up to 10 cm diam. in Sydney area, larger on North Coast (M. Clarke pers. comm.); these may remain viable in the soil for many years before sprouting (McLoughlin & Rawling 1990). Dispersal: gravity or water; tubers washed into creeks in stormwater, rubbish dumping.

Fire response: Rarely burnt (R. Buchanan pers. comm.). Resprouted after high-intensity fire (1/1994) at Narrabeen, one seedling observed (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

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

Botanical subregions: NC CC SC NWS CWS NWP.

Distribution Sydney area: Coast.

Select locations: Cheltenham, Eastwood, Balmoral Beach, Glebe Point (1894), Flemington, Royal National Park, Kurrajong, Kangaroo Valley.

Habitat

Habitat: Roadsides, creekbanks, wasteland — sheltered gullies on margins of rainforests and near old settlements.

Altitude: 0–400 m **Annual rainfall:** above 800 mm

Typical local abundance: Frequent.

Vegetation: Margins of rainforest and moist forests. Canopy stratum.

Substrate: Clay soils from Wianamatta Shale, Alluvium. Enriched sandstone, e.g. at Balmoral Beach (M. Clarke pers. comm.). Soil fertile. Watertable mostly low, moisture supply intermittent, fresh.

Exposure: Dense shade–full sun, stem only elongates rapidly in light shade–full sun (R. Buchanan pers. comm.).

Conservation

Conservation: An invasive weed of bushland margins.

Bauera capitata
BAUERACEAE

Life history

Growth form: Small diffuse shrub to 30 cm with woody rootstock.

Vegetative spread: Probably not.

Longevity:

Primary juvenile period:

Flowers: Pink, September–October.

Fruit/seed: Capsule, mature October.

Dispersal, establishment & growth: Diaspore: seed.

Fire response: Probably resprouts at ground level or below.

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: NC CC; Qld.

Distribution Sydney area: Coast south to La Perouse.

Select locations: Tuggerah (1900), La Perouse (1893–1913).

Habitat

Habitat: Wet heath.

Altitude: 0–30 m **Annual rainfall:** above 1200 mm

Typical local abundance: Now extremely rare or possibly extinct in Sydney region.

Vegetation: Wet heath. Ground stratum.

Substrate: Deep sand, possibly sometimes associated with weathered volcanic dykes?

Exposure:

Conservation

Conservation: Only old records. Probably extinct in the Sydney area, La Perouse is southern limit for the species.

Bauera microphylla

BAUERACEAE

Life history

Growth form: Small trailing shrub to 30 cm high.**Vegetative spread:** May form adventitious roots but not clear whether capable of spread.**Longevity:** ? 25–60 years (D. Keith).**Primary juvenile period:** 3–4 years (D. Keith).**Flowers:** White–pink, August–January, April–May. Flowers visited by birds and insects, but mostly by small beetles, all of which get well dusted by pollen (Sulman 1914).**Fruit/seed:** Capsule which splits lengthwise to release numerous seeds, mature September–November.**Dispersal, establishment & growth:** Diaspore: seed, with ant-adapted food body (Westoby et al. 1990), ant-dispersed.**Fire response:** Resprouts, seedling recruitment mainly after fire (D. Keith).**Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC.**Distribution Sydney area:** Coast and Blue Mountains (rare), Woronora Plateau.**Select locations:** Mangrove Mountain, Gosford, Wahroonga, Centennial Park, Botany, Audley, Heathcote, Appin, Mt Ousley, Lawson (1899), Butlers Swamp.

Habitat

Habitat: Open sandy heath, swamps.**Altitude:** 0–900 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Wet heath, e.g. with *Leptospermum polygalifolium*, *Banksia ericifolia*.

Sedgeland/wet heath, also ecotone area between sedgeland/wet heath and grassland/sclerophyll forest (P. Kodela pers. comm.). Ground stratum.

Substrate: Deep sandy soils on sandstone or dune sand. Peaty soil on wetland, sandy organic soils (P. Kodela pers. comm.). Soil very infertile. Watertable mostly high, moisture supply continuous, fresh.**Exposure:** Light shade–full sun.

Conservation

Conservation: Conservation status unknown.***Bauera rubioides***

BAUERACEAE

Life history

Growth form: Scrambling shrub to 2 m high.**Vegetative spread:** No.**Longevity:****Primary juvenile period:** 4 years.**Flowers:** Pink or white, April–November, peak September.**Fruit/seed:** Capsule which splits lengthwise to release numerous seeds. Mature December.**Dispersal, establishment & growth:** Diaspore: seed. Dispersal: ant-adapted food body (Westoby et al. 1990).**Fire response:** Resprouts at ground level or below. Seedlings can flower within 4 years (after fire, Brisbane Water NP). Killed after high-intensity fire (1/1994) at Lane Cove and Narrabeen, soil-stored seed probably destroyed by high-intensity fire, seedlings in ditches and cliffines where fire intensity lower (P. Kubiak pers. comm.).**Interaction with other organisms:** Flowers visited by birds and insects, but mostly by small beetles, all of which get well dusted by pollen (Sulman 1914).

Distribution

Status/origin: Native.**Botanical subregions:** CC CT ST; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Coast and upper Blue Mountains.**Select locations:** West Head Rd, Asquith, Lindfield, Asquith, Marsfield, Oatley, Kentlyn, Appin, Bargo, Mt Wilson, Mt Victoria, Orange.

Habitat

Habitat: Wet and often shaded situations.

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

Typical local abundance: Frequent.

Vegetation: Creekside scrub in moist eucalypt open-forest, e.g. with *Eucalyptus piperita*, *Angophora costata*. Ground–mid-stratum.

Substrate: Damp sandy soil from sandstone. Soil infertile. Watertable mostly high, moisture supply continuous, fresh.

Exposure: Sheltered, mid–light shade.

Conservation

Conservation: Probably adequately conserved. Conserved in Western Sydney (Benson & McDougall 1991).

Berberis aristata* **BERBERIDACEAE****Life history**

Growth form: Evergreen shrub to 3 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellow, 10 mm diam.

Fruit/seed: Berry 9–11 mm long, bright red to pruinose blue, mature January–March.

Dispersal, establishment & growth: Diaspore: berry, possibly bird-dispersed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Asia. Cultivated as an ornamental, sometimes naturalised.

Botanical subregions: CC CT NT.

Distribution Sydney area: Southern Highlands and Illawarra.

Select locations: Yerranderie (1953), Macquarie Pass, Bowral (1992), Exeter (1937).

Habitat

Habitat: Rural areas.

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

Typical local abundance: Frequent.

Vegetation: Disturbed eucalypt woodland, e.g. with *Acacia melanoxylon*.

Substrate: Probably clay soils, fertile, old silver mine area.

Exposure:

Conservation

Conservation: Probably minor weed.

Berberis darwinii* **BERBERIDACEAE****Life history**

Growth form: Evergreen shrub to 3 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Yellowish–red, May.

Fruit/seed: Blue berry 6–7 mm long, mature May.

Dispersal, establishment & growth: Bird-dispersed (Carr et al. 1992).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to S America. Cultivated in cooler districts, rarely naturalised.

Botanical subregions: CT.

Distribution Sydney area: Blue Mountains.

Select locations: Mt Wilson (1949).

Habitat:

Altitude: 900–1000 m

Annual rainfall: above 1200 mm

Typical local abundance:

Vegetation:

Substrate:

Exposure:

Habitat

Conservation: Rarely naturalised.

Conservation

***Mahonia leschenaultii* ***

BERBERIDACEAE

Growth form: Evergreen shrub.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Bright yellow, October (Yass, only record).

Fruit/seed: Blue berry 7–8 mm long.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Life history

Status/origin: Exotic, native to India, E Asia. Often cultivated as an ornamental occasionally naturalised in gullies in Blue Mountains, or Robertson Plateau (P. Kodela pers. comm.).

Botanical subregions: CT ST.

Distribution Sydney area: Blue Mountains, Southern Highlands.

Select locations: Mt Wilson (1948), Robertson–Wildes Meadow (P. Kodela pers. comm.).

Distribution

Habitat: Gullies.

Altitude: 750–1000 m

Annual rainfall: above 1200 mm

Typical local abundance: Rare.

Vegetation: Disturbed moist *Eucalyptus fastigata* forest with rainforest understorey, growing light in gap (P. Kodela pers. comm.).

Substrate: Fertile soil on basalt (P. Kodela pers. comm.).

Exposure:

Habitat

Conservation: Occasionally naturalised.

Conservation

***Macfadyena unguis-cati* ***

BIGNONIACEAE

Cat's Claw Creeper

Growth form: Woody climber to 30 m, with recurved tendrils; 2 leaflets and terminal leaflet modified into a 3-branched tendril.

Vegetative spread: Underground tuber (R. Buchanan pers. comm.).

Longevity:

Primary juvenile period:

Flowers: Yellow, spring, November.

Fruit/seed: Capsule 14–45 cm long, with winged seeds, 20–40 mm long.

Dispersal, establishment & growth: Diaspore: winged seeds, wind-dispersed (Anon 1991).

Fire response: Resprouts from tubers (R. Buchanan pers. comm.).

Interaction with other organisms:

Life history

Distribution

Status/origin: Naturalised exotic, native to Brazil and Argentina; cultivated as an ornamental.

Botanical subregions: NC CC NT; Qld.

Distribution Sydney area: Ourimbah.

Select locations: Ourimbah (1959); Berowra Waters, Epping (R. Buchanan & M. Clarke pers. comm.), North Richmond, Camden.

Habitat

Habitat: Roadside, water's edge.

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

Typical local abundance:

Vegetation: Disturbed rainforest, tall open-forest (M. Clarke pers. comm.).

Substrate: Alluvial and clay soils, well-drained, very fertile.

Exposure: Deep shade–full sun, stems only elongated rapidly in light shade–full sun (R. Buchanan pers. comm.).

Conservation

Conservation: An aggressive weed in disturbed rainforest and moist eucalypt forest remnants north of Sydney. Localised problem in parts of Sydney, e.g. Berowra Waters (R. Buchanan pers. comm.). Camden Park (M. Clarke pers. comm.).

Pandorea pandorana**BIGNONIACEAE**

Wonga Wonga Vine

Life history

Growth form: Woody, often tall, glabrous climber, with twining branches.

Vegetative spread: No.

Longevity: Medium-long (? 50–100 years).

Primary juvenile period:

Flowers: Cream with mauve-purple markings, June–November, peak August–September. Bird-pollinated.

Fruit/seed: Capsule 4–6 cm long splitting to release numerous, beautifully-packed winged seeds, 10–15 mm diam. (Sulman 1914). Mature November–January.

Dispersal, establishment & growth: Diaspore: winged seed, wind-dispersed (Westoby et al. 1990). Soil-stored seedbank (Fox 1988).

Fire response: Killed by fire (Fox 1988). Resprouted after high-intensity fire (1/1994) at Lane Cove, a few plants flowering within 26–29 weeks (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Widespread

Select locations: Wyong, Avoca Beach, Cheltenham, Oatley, Grose Vale, Genbrook, Kentlyn, Razorback, Macquarie Pass, Barren Grounds, Robertson.

Habitat

Habitat: Moist gullies, rocky sites.

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

Typical local abundance: Frequent.

Vegetation: Coastal rainforest, e.g. with *Ceratopetalum apetalum*, *Doryphora sassafras*, *Cupaniopsis anacardioides*, *Acmena smithii*. Tableland rainforest, e.g. mixed cool temperate/warm rainforest with *Ceratopetalum*, *Doryphora sassafras*, *Acmena smithii*, *Acacia melanoxylon* (P. Kodela pers. comm.). Also a component of dry rainforest vine scrub. Sclerophyll forest and woodland, e.g. with *Syncarpia glomulifera*; often persisting in cleared areas.

Substrate: Medium-high nutrient soils, clay influence, watertable permanently low, moisture supply intermittent.

Exposure: Sheltered sites.

Conservation

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

***Pyrostegia venusta* ***

Flame Vine

BIGNONIACEAE

Life history

Growth form: Woody climber.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Reddish orange, spring-summer.**Fruit/seed:** Capsule 20-30 cm long, but apparently does not set seed in Australia (Harden 1992).**Dispersal, establishment & growth:** Diaspore: probably vegetative.**Fire response:****Interaction with other organisms:****Status/origin:** Exotic, native to Brazil and Paraguay. Cultivated, occasionally naturalised in coastal districts. **Distribution****Botanical subregions:** NC CC.**Distribution Sydney area:** Lane Cove.**Select locations:** Lane Cove (1991) only Sydney record.

Habitat

Habitat: Creekbank.**Altitude:** 0-100 m**Annual rainfall:** 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation:** Occasionally naturalised in coastal districts. **Conservation*****Tecoma capensis* ***

Cape Honeysuckle

BIGNONIACEAE

Life history

Growth form: Rambling shrub to 3 m high.**Vegetative spread:** Spreads by stoloniferous branches (layering) along ground surface.**Longevity:****Primary juvenile period:****Flowers:** Orange to scarlet with much nectar, spring-summer.**Fruit/seed:** Capsule 3 cm long, with winged seed 15 mm long.**Dispersal, establishment & growth:** Diaspore: seed not set here (L. Johnson pers. comm.).**Fire response:****Interaction with other organisms:****Status/origin:** Exotic, native to S Africa. Cultivated as an ornamental, sometimes as a hedge plant. **Distribution****Botanical subregions:** NC CC.**Distribution Sydney area:** Coast.**Select locations:** Muogamarra NR, Eastwood (1978), Harbord (1981).

Habitat

Habitat: Disturbed sites.**Altitude:** 0-200 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Moist eucalypt forest.**Substrate:** Clay soils, fertile.**Exposure:****Conservation:** Probably just persistent remnant of old gardens or dispersed in garden refuse; fruit not set here (L. Johnson pers. comm.). **Conservation**

***Tecoma stans* ***

BIGNONIACEAE

Tecoma

Life history**Growth form:** Shrub to 4 m high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Yellow with reddish lines, spring–summer.**Fruit/seed:** Capsule 10–22 mm long, with winged seeds 20 mm long.**Dispersal, establishment & growth:** Diaspore: winged seeds.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Mexico, Peru & Ecuador. Commonly cultivated as ornamental but rarely naturalised (Harden 1992).**Botanical subregions:** NC CC ?SC; Qld.**Distribution Sydney area:** North Avoca.**Select locations:** Bulbararing Lagoon North Avoca (1990), Lapstone station (1993, P. Kodala pers. comm.).**Habitat****Habitat:****Altitude:** 0–50 m**Annual rainfall:** above 1200 mm**Typical local abundance:****Vegetation:** Disturbed lagoon that previously had *Melaleuca quinquenervia*-*Casuarina glauca* swamp forest with *Baumea juncea* understorey.**Substrate:** Sandy, infertile soil on edge of lagoon. Watertable permanently high, moisture supply continuous, brackish–fresh.**Exposure:****Conservation****Conservation:** Reported to be beginning to invade other parts of the Central Coast on a range of soil types (R. Payne pers. comm.).***Amsinckia calycina* *** (*Amsinckia hispida*)

BORAGINACEAE

Life history**Growth form:** Herb 15–50 cm high.**Vegetative spread:** No.**Longevity:** 6–8 months.**Primary juvenile period:** 4–6 months.**Flowers:** August–January.**Fruit/seed:** Fruit of 4 mericarps, 2–2.5 mm long, November–January. Up to 1600 seeds/plant (Dellow 1989). Seeds remain viable for at least 2 years.**Dispersal, establishment & growth:** Diaspore: mericarp, dispersed by livestock and clothing. Low temperatures favour germination. Seeds germinate after autumn rains and there may be up to 4 germinations in a season. Plants grow in winter and die off in late spring–early summer (Dellow 1989).**Fire response:****Interaction with other organisms:** Plants or seeds can poison stock if they have access for long periods (Dellow 1989).**Distribution****Status/origin:** Naturalised exotic, native to S America.**Botanical subregions:** CC CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Western Sydney, but mainly Bathurst–Orange area.**Select locations:** Flemington, Campbelltown, Bathurst (1925), Mandurama, Freemantle, Orange, Canobolas.**Habitat****Habitat:** Soil dumps, waste and cultivated land.**Altitude:** 0–1400 m**Annual rainfall:** 600–1200 mm

Typical local abundance: Occasional.

Vegetation: Winter cereal crops. Ground stratum.

Substrate: Basalt soil, fertile.

Exposure:

Conservation: Weed of winter cereal crops (Dellow 1989). Weed of waste and cultivated land. **Conservation**

***Amsinckia intermedia* ***

BORAGINACEAE

Common Fiddleneck

Life history

Growth form: Herb 30–100 cm high, with rosette leaves.

Vegetative spread: No.

Longevity: 6–8 months (Dellow 1989).

Primary juvenile period: 4–6 months.

Flowers: Orange-yellow, September–December.

Fruit/seed: Fruit of 4 mericarps, each 3 mm long. Up to 1600 seeds/plant; seeds remain viable for at least 2 years (Dellow 1989).

Dispersal, establishment & growth: Diaspore: mericarp, animal-dispersed on fur and clothing, farm machinery and contaminated grain; probably also bird-dispersed. Farming activities spread the weed over large areas (Parsons 1973). Seeds germinate after autumn rains and there may be up to 4 germinations in a season; low temperatures favour germination but this is not uniform, winter provides ideal conditions; plants grow in winter and die off in late spring–early summer (Dellow 1989).

Fire response:

Interaction with other organisms: Plants or seeds can poison stock if they have access for long periods; seeds can taint and discolour flour made from contaminated seed (Dellow 1989).

Distribution

Status/origin: Naturalised exotic, native to N America. Probably introduced in fodder imported during drought (Parsons 1973). Now spread by contaminated seed wheat.

Botanical subregions: NC CC CT ST NWS CWS SWS NWP SWP; Qld, Vic.

Distribution Sydney area:

Select locations: Concord (1966), Blayney (1903 first record for State), Trunkey, Bathurst, Orange.

Habitat

Habitat: Weed of cultivated land, rubbish tip (Concord).

Altitude: 0–1200 m

Annual rainfall: 600–1200 mm

Typical local abundance: Frequent.

Vegetation: Winter cereal crops. Ground stratum.

Substrate: Agricultural soils, not confined to any particular soil type (Parsons 1973).

Exposure:

Conservation

Conservation: Weed of winter cereal crops (Dellow 1989).

***Achusa arvensis* * (Lycopsis arvensis)**

BORAGINACEAE

Wild Bugloss

Life history

Growth form: Erect herb to 60 cm high.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Blue or rarely whitish, October–December.

Fruit/seed: Mericarp 2 mm long, mature January–May.

Dispersal, establishment & growth: Diaspore: fruit. Seedling recruitment possibly related to disturbance.

Fire response:

Interaction with other organisms:

	Distribution
Status/origin: Naturalised exotic, native to Europe.	
Botanical subregions: NT CT ST NWS CWS SWP; Vic., Tas., S.A.	
Distribution Sydney area: Bathurst–Orange.	
Select locations: Jenolan Caves (1899), Oberon, Blayney, Orange, Mt Canobolas summit.	
	Habitat
Habitat: Disturbed sites, e.g. roadsides.	
Altitude: 800–1400 m	Annual rainfall: 800–1200 mm
Typical local abundance: Frequent.	
Vegetation: Ruderal weeds, e.g. <i>Echium</i> , <i>Verbena</i> , <i>Oenothera</i> . Ground stratum.	
Substrate: Agricultural soils, basalt, fertile. Watertable mostly low, moisture supply intermittent, fresh.	
Exposure:	
	Conservation
Conservation: Weed of disturbed sites.	

Austrocynoglossum latifolium (Cynoglossum latifolium)

BORAGINACEAE

	Life history
Growth form: Decumbent herb with trailing stems to 1 m long. Stems cling to neighbouring vegetation by means of prickly-like setules (Mill 1989).	
Vegetative spread:	
Longevity:	
Primary juvenile period:	
Flowers: White, November–May.	
Fruit/seed: Fruit of 4 spiny mericarps, 3.5 mm long, densely prickly, November–June.	
Dispersal, establishment & growth: Diaspore: mericarp.	
Fire response:	
Interaction with other organisms:	
	Distribution
Status/origin: Native.	
Botanical subregions: NC CC SC NT CT ST; Qld, Vic.	
Distribution Sydney area: Illawarra and Western Blue Mountains.	
Select locations: Bulli Pass, Macquarie Rivulet, Cambewarra, Robertson, Bilpin, Mt Wilson, Kanangra Deep, Jenolan Caves.	
	Habitat
Habitat: Typically in rainforest, on damp soil of creek banks, near waterfalls; frequently near or in caves (Mill 1989).	
Altitude: 0–1000 m	Annual rainfall: above 900 mm
Typical local abundance: Frequent–occasional.	
Vegetation: Moist eucalypt forest and margins of rainforest. Also within rainforest (P. Kodala pers. comm.).	
Substrate: Basalt and shale soil, very fertile–fertile. Watertable mostly high, moisture supply intermittent, fresh. Seems to prefer well-drained limestone or basaltic soils (Mill 1989).	
Exposure: Sheltered; deep shade.	
	Conservation
Conservation: Rare close to Sydney area, but more common elsewhere, e.g. in Kowmung area (L. Johnson pers. comm.).	

***Borago officinalis* ***

BORAGINACEAE

Borage

Life history**Growth form:** Herb 30–80 cm high.**Vegetative spread:** No.**Longevity:** Annual.**Primary juvenile period:** Less than 1 year.**Flowers:** White, spring.**Fruit/seed:** Mericarp, 6 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to S Europe. Cultivated, rarely naturalised. Re-establishes from seed in gardens, not seen doing so elsewhere (L. Johnson pers. comm.).**Botanical subregions:** CC ST; Vic., S.A., W.A.**Distribution Sydney area:****Select locations:** Beecroft, North Sydney (1915), Campbelltown.**Habitat****Habitat:** Old gardens, pasture.**Altitude:** 0–1000 m**Annual rainfall:** above 700 mm**Typical local abundance:** Rare.**Vegetation:** Old gardens, ground stratum.**Substrate:** Probably clay soils, fertile. Watertable permanently low, moisture supply intermittent, fresh.**Exposure:****Conservation****Conservation:** Rarely naturalised.***Buglossoides arvensis* *** (*Lithospermum arvense*)

BORAGINACEAE

Sheepweed

Life history**Growth form:** Erect herb to 45 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White–cream, August–October.**Fruit/seed:** Fruit of 2 mericarps, 4 mm long.**Dispersal, establishment & growth:** Diaspore: mericarp.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** CC NT CT ST NWS CWS SWS NWP SWP NFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Sydney, Orange.**Select locations:** Royal Botanic Gardens (1902), Centennial Park, Richmond, Flemington, Casula, Orange (1911), Rylstone.**Habitat****Habitat:** Weed of disturbed places, e.g. railway lines.**Altitude:** 0–1000 m**Annual rainfall:** above 600 mm**Typical local abundance:** Rare.**Vegetation:** Ground stratum.**Substrate:****Exposure:****Conservation****Conservation:** Weed of disturbed places.

Cynoglossum australe

BORAGINACEAE

Life history

Growth form: Erect herb 30–75 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** Blue–whitish, September–March.**Fruit/seed:** Fruit of 4 spiny mericarps, densely prickly, mature November–July, peak November.**Dispersal, establishment & growth:** Diaspore: mericarp. Seedling recruitment possibly related to soil disturbance.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Coast and Blue Mountains.**Select locations:** Howes Valley, Mt Tomah, Sans Souci, Razorback, Douglas Park, Mt Toinhingy, Glanmire, Orange, Abercrombie Caves, Bullio.

Habitat

Habitat: Sites with disturbed soil, e.g. roadside.**Altitude:** 0–1000 m**Annual rainfall:** above 600 mm**Typical local abundance:** Occasional.**Vegetation:** Margins of rainforest, wet eucalypt forest in grassy sites, e.g. with *Eucalyptus deanei*. Ground stratum.**Substrate:** Mainly on basalt soil but also on sandy soil and skeletal slate soils, fertile–infertile. Waterable mostly low, moisture supply intermittent, fresh.**Exposure:**

Conservation

Conservation: Vulnerable in Western Sydney (Benson & McDougall 1991). Conservation status elsewhere unknown.**Cynoglossum suaveolens**

BORAGINACEAE

Life history

Growth form: Erect herb to 50 cm high.**Vegetative spread:****Longevity:****Primary juvenile period:****Flowers:** White or sometimes blue, October–May.**Fruit/seed:** Fruit of 4 spiny mericarps, densely prickly, mature November–December.**Dispersal, establishment & growth:** Diaspore: mericarp.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., S.A.**Distribution Sydney area:** Coast and western Blue Mountains.**Select locations:** Colo, Middle Harbour, Georges River, Menangle Park, Mt Victoria, Jenolan Caves, Cullen Bullen, Orange, Bowral.

Habitat

Habitat: Damp places.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Eucalypt open-forest and grassland; ground stratum.

Substrate: Shaley sandstone or clay soils, infertile, damp.

Exposure:

Conservation: Not common, probably not well conserved, mostly old records. Vulnerable in Western Sydney (Benson & McDougall 1991). **Conservation**

***Echium plantagineum* *** (*Echium lycopsis*)

BORAGINACEAE

Paterson's Curse, Salvation Jane

Life history

Growth form: Herb to 150 cm high, usually multi-stemmed, with short, stout taproot and numerous laterals, overwinters as rosettes (Parsons & Cuthbertson 1992).

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period: Usually less than 1 year (Parson 1973).

Flowers: Purple, pinkish or white, September–April, peak November.

Fruit/seed: Fruit of 4 mericarps, mature December–January, April. Plants produce large amount of seed, most of which falls to ground within a few feet of plant (Parsons 1973). Can produce more than 30,000 seeds per m² (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: mericarp. Dispersed by animals, water, and as a contaminant of grain (Parsons & Cuthbertson 1992). Seed coat is roughened and seeds can adhere to wool and fur; seeds retain viability after passing through the alimentary tract of animals; seed viability for at least 5 years; cultivation stimulates germination of dormant seed (Parsons 1973). Seed shows considerable innate and temperature enforced dormancy that appears to permit sporadic germination over several seasons (Piggin 1976). Recruitment probably related to moisture availability and temperature. Can germinate at any time, especially autumn; can be found at any time of year in all stages of growth (Parsons 1973). Favoured by Mediterranean-type climate especially in years with early seasonal breaks (Piggin 1976).

Fire response:

Interaction with other organisms: Foodplant of tiger moth caterpillars *Spilosoma glatignyi* and *Utetheisa pulchelloides* (Coupar & Coupar 1992). Used by beekeepers as a source of nectar and pollen (Harden 1991). Seeds eaten by birds, Richard's Pipit *Anthus novaeseelandiae* (Barker & Vestjens 1989, 1990). Roots eaten by Sulphur-crested Cockatoo *Cacatua galerita* (Lepschi 1993). Stiff, sharp hairs on stems and leaves are abrasive to skin of humans (Southcott & Haegi 1992). Pollen known to cause allergic rhinitis in humans (Bass 1987). Cattle and horses usually avoid the plant; particularly poisonous to pigs and horses, causes liver damage, it is also mutagenic and possibly carcinogenic (Parsons & Cuthbertson 1992). Biological control using Echium Leaf-miner *Dialectica sculariella* since 1988, other control agents being released are root feeding Echium Weevils *Ceutorhynchus geographicus* and *C. larvatus* (Tanner 1993).

Distribution

Status/origin: Naturalised exotic, native to Europe. Recorded at Camden in 1843, introduced by John Macarthur as an ornamental (Parsons & Cuthbertson 1992).

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

Distribution Sydney area: Widespread.

Select locations: Terrigal, Pennant Hills, Richmond, Doonside, Glenfield, Mt Annan, Bomaderry, Carcoar (1915), Rockley, Orange, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Roadsides and pastoral land.

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

Typical local abundance: Frequent.

Vegetation: Woodland, grassland.

Substrate: Shale, basalt — fertile soil. Recorded on saline sites in western NSW (Semple 1993).

Exposure: Full sun.

Conservation

Conservation: Regarded as a weed in cultivated and pastoral land.

***Echium vulgare* ***

BORAGINACEAE

Viper's Bugloss

Life history**Growth form:** Herb, to 90 cm high.**Vegetative spread:** No.**Longevity:** 2 years, but sometimes perennial (Parsons 1873).**Primary juvenile period:****Flowers:** Blue, November–April.**Fruit/seed:** Fruit of 4 mericarps, mature April.**Dispersal, establishment & growth:** Diaspore: mericarp. Large amounts of seed produced, most falls to ground within a few feet of plant. Seeds spread by movement of stock and fodder, can pass through alimentary tract of animals and remain viable, can adhere to wool and fur. 80% germination for 1–2 years but can lie dormant for at least 5 years. Seedling recruitment from soil-stored seed possibly related to disturbance (Parsons 1973).**Fire response:****Interaction with other organisms:** Causes liver damage in stock. Important throughout history in herbal medicine, used as a diuretic and treatment for fevers, headaches etc. (Parsons & Cuthbertson 1992).**Distribution****Status/origin:** Naturalised exotic, native to Europe. Introduced to Australia in 1820 (Parsons & Cuthbertson 1992).**Botanical subregions:** NC NT CT ST NWS SWS NWP; Vic., Tas., S.A.**Distribution Sydney area:** Bathurst–Lithgow area, Southern Highlands.**Select locations:** Glen Alice, Portland, Lithgow, Cox River (1909), Raglan, Tarana, Oberon, Rockley, Robertson (P. Kodela pers. comm.).**Habitat****Habitat:** Disturbed sites, roadsides, pastoral land, wasteland.**Altitude:** above 800 m**Annual rainfall:** 800–1200 mm**Typical local abundance:** Frequent.**Vegetation:** Eucalypt woodland, e.g. *Eucalyptus bridgesiana*, *E. polyanthemos*, *E. albens*, *E. melliodora* with ruderal weeds, e.g. *Echium plantagineum*, *Cirsium vulgare*. Ground stratum.**Substrate:** Loamy soils from granite. Wide variety of soils (Parsons & Cuthbertson 1992).**Exposure:****Conservation****Conservation:** Weed of pastoral land.***Ehretia acuminata* var. *acuminata***

BORAGINACEAE

Koda

Life history**Growth form:** Tree to 30 m high with creamy-brown bark, often more or less deciduous, with new growth in spring.**Vegetative spread:** No.**Longevity:****Primary juvenile period:****Flowers:** White, strongly scented, October–January, peak December.**Fruit/seed:** Orange-yellow drupe 5–7 mm diam., breaking into pyrenes at maturity, February–March.**Dispersal, establishment & growth:** Diaspore: fruit, probably bird-dispersed.

Germination of sown fresh seed very rapid, 28% germination after 20 days (Floyd 1989).

Fire response:**Interaction with other organisms:** Fruit eaten by Brown Cuckoo-Dove, Figbird, Green Catbird, Lewin's Honeyeater, Rose-crowned Fruit-dove, Wompoo Fruit-dove (Floyd 1989). Timber used for furniture, resembles English Elm (Floyd 1983).**Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT CWS; Qld.**Distribution Sydney area:** Coast and coastal ranges.

Select locations: Ourimbah Creek, Grose Vale, Cobbitty, Razorback, Kowmung, Barrengarry, Saddleback, Minnamurra Falls, Kangaroo Valley.

Habitat

Habitat: Rainforest along creeks.

Altitude: 0–300 m

Annual rainfall: above 800 mm

Typical local abundance: Occasional–rare.

Vegetation: Warmer rainforest, especially near the margins or in disturbed areas, e.g. with *Doryphora sassafras*, *Toona ciliata*, *Acmena smithii*, *Cryptocarya glaucescens*. Canopy stratum.

Substrate: Deep sandy alluvium along creeks, sometimes on basalt. Fertile soil. Watertable mostly high, non-saline.

Exposure: Sheltered situations.

Conservation

Conservation: Conservation status unknown. Fairly common in marginal rainforest area (L. Johnson pers. comm.).

Halgania brachyrhyncha**BORAGINACEAE****Life history**

Growth form: Spreading–semi-prostrate subshrub 0.3–0.6 m high.

Vegetative spread:

Longevity:

Primary juvenile period:

Flowers: Deep blue, September–February.

Fruit/seed: Leathery drupe 4–5 mm long, with 1–2 seeds.

Dispersal, establishment & growth: Diaspore: drupe.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

Botanical subregions: CC SC CWS; Qld.

Distribution Sydney area: Burragorang Valley.

Select locations: Burragorang Valley (The Sheepwalk 1967) only record for area.

Habitat

Habitat: Rocky sites particularly ridges or hillsides.

Altitude: 200 m

Annual rainfall: 800 mm

Typical local abundance:

Vegetation: Tall shrubland to woodland and open-forest. Ground stratum.

Substrate: Sandstone or conglomerate. Infertile soil.

Exposure:

Conservation

Conservation: Rare, only known from a few localities (Wilson 1990), conservation status unknown.

Heliotropium amplexicaule* **BORAGINACEAE**

Blue Heliotrope

Life history

Growth form: Perennial herb to 15 cm high with deep taproot.

Vegetative spread: No.

Longevity:

Primary juvenile period:

Flowers: Purple or lilac, November–March.

Fruit/seed: Fruit of 2 mericarps, succulent at first, becoming wrinkled and falling at maturity, November–March.

Dispersal, establishment & growth: Diaspore: mericarp, shed at maturity. A summer-growing perennial that dies back in winter and regrows from the taproot in spring.

Fire response:

Interaction with other organisms: Contains toxic alkaloids, suspected of causing jaundice in sheep (Mitchell 1988).

Status/origin: Naturalised exotic, native to S America. Probably introduced as a garden plant.

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

Distribution Sydney area: Widespread.

Select locations: Barrenjoey, Ermington, Summer Hill (1913), Agnes Banks, Penrith, Ingleburn, Mt Annan, Bathurst.

Habitat: Roadsides, creekbanks, degraded and overstocked pastures.

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

Typical local abundance: Occasional.

Vegetation: Ephemeral weeds or woodland, e.g. with *Eucalyptus tereticornis*. Ground stratum.

Substrate: Generally restricted to well drained alluviums and medium to sandy soils (Mitchell 1988), fertile–infertile.

Exposure:

Conservation: Major agricultural weed in upper reaches of Macquarie River, but not an invader of bushland. Declared noxious weed in some shires of NSW.

Heliotropium europaeum

BORAGINACEAE

Common Heliotrope, Potato Weed

Growth form: Herb, erect, to 30 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: White, February–March.

Fruit/seed: Fruit of mericarps 4, shed at maturity, March–April.

Dispersal, establishment & growth: Diaspore: mericarp. Spring and summer-growing annual.

Fire response:

Interaction with other organisms: May cause jaundice in sheep, cumulative effects resulting in death (Mitchell 1988). Foodplant of tiger moth caterpillar *Utetheisa pulchelloides* (Coupar & Coupar 1992). Rust Fungus *Uromyces heliotropii* has been released for biological control (Keech & Tanner 1993).

Status/origin: Cosmopolitan. Has been regarded as introduced and naturalised in Australia, but is now considered to be cosmopolitan (Harden 1992).

Botanical subregions: NC CC CT ST NWS CWS SWS NWP SWP NFWP SFWP; Vic., S.A., W.A., SW Asia & Europe.

Distribution Sydney area:

Select locations: Royal Botanic Gardens, Flemington (1969), Glenfield (1969).

Habitat: Earthworks and garden beds.

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

Typical local abundance: Rare.

Vegetation: Disturbed sites.

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

Exposure:

Conservation: Rare, conservation status unknown.

It is

Myosotis australis

BORAGINACEAE

Australian Forget-me-not

Life history

Growth form: Herb 20–40 cm high.**Vegetative spread:****Longevity:** Annual or perennial.**Primary juvenile period:****Flowers:** White or yellowish or rarely bluish, November–December.**Fruit/seed:** Fruit of 4 mericarps.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC SC NT CT ST NWS CWS SWS; Vic., Tas., S.A., W.A.**Distribution Sydney area:** Blue Mountains and westward. Southern Highlands (P. Kodela pers. comm.).**Select locations:** Mt Tomah, Jenolan Caves, Mt Shivering, Mt Canobolas, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Rocky hillsides.**Altitude:** 800–1400 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Open-forest, e.g. *Eucalyptus fastigata*, *E. viminalis*, *Pellaea falcata*. Ground stratum.**Substrate:** Basalt soil, fertile. Watertable mostly low, non-saline.**Exposure:**

Conservation

Conservation: Rare, conservation status unknown.***Myosotis caespitosa* ***

BORAGINACEAE

Life history

Growth form: Herb 10–35 cm high.**Vegetative spread:****Longevity:** Annual.**Primary juvenile period:** 1 year.**Flowers:** Pale blue changing to pink, spring–summer.**Fruit/seed:** Fruit of 4 mericarps.**Dispersal, establishment & growth:** Diaspore: mericarp.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic (P. Kodela pers. comm.), native to Europe.**Botanical subregions:** NC NT CT ST CWS.**Distribution Sydney area:** Southern Highlands.**Select locations:** Burrawang–Robertson (1992).

Habitat

Habitat: Disturbed roadside.**Altitude:** 700 m**Annual rainfall:** 1600 mm**Typical local abundance:** Occasional.**Vegetation:** With grasses and other herbs, near pastures.**Substrate:****Exposure:**

Conservation

Conservation: Localised minor weed of roadsides.

***Myosotis discolor* ***

BORAGINACEAE

Forget-me-not

_____ **Life history**
Growth form: Herb 10–20 cm high.
Vegetative spread: No.
Longevity: 1–2 years.
Primary juvenile period:
Flowers: Yellowish–blue, October–November.
Fruit/seed: Fruit of 4 mericarps.
Dispersal, establishment & growth:
Fire response:
Interaction with other organisms:

_____ **Distribution**
Status/origin: Naturalised exotic, native to Europe. *Myosotis caespitosa* and *M. sylvatica* also naturalised in Sydney area at Robertson (P. Kodala pers. comm.).
Botanical subregions: CT ST NWS SWS; Vic., Tas.
Distribution Sydney area:
Select locations: Jenolan Caves, Abercrombie Caves, Mt Jellore, Canobolas SF.

_____ **Habitat**
Habitat: Rocky crevices.
Altitude: 700–1000 m **Annual rainfall:** 800–1000 mm
Typical local abundance: Frequent.
Vegetation: Open-woodland, e.g. with *Eucalyptus dives* and *Cassinia* understorey. Ground stratum.
Substrate: Rocky crevices on limestone, occasionally volcanic rocks. Soil fertile.
Exposure: Sheltered.

_____ **Conservation**

***Myosotis exarrhena* (*Myosotis suaveolens*)**

BORAGINACEAE

_____ **Life history**
Growth form: Herb 30–50 cm high.
Vegetative spread:
Longevity: Perennial.
Primary juvenile period:
Flowers: Pale blue or white, October.
Fruit/seed: Fruit of 4 mericarps.
Dispersal, establishment & growth: Diaspore: mericarp.
Fire response:
Interaction with other organisms:

_____ **Distribution**
Status/origin: Native.
Botanical subregions: NT CT ST; Vic., Tas.
Distribution Sydney area: Jenolan Caves.
Select locations: Jenolan Caves (1899) only Sydney record.

_____ **Habitat**
Habitat:
Altitude: 800 m **Annual rainfall:** 900 mm
Typical local abundance:
Vegetation: Ground stratum.
Substrate: Probably on limestone soil.
Exposure:

_____ **Conservation**

Conservation: Rare, conservation status unknown.

***Myosotis sylvatica* ***

BORAGINACEAE

Wood Forget-me-not

Life history**Growth form:** Herb to 40 cm high, with hairs on stems and leaves.**Vegetative spread:****Longevity:** 2 years, biennial or perennial.**Primary juvenile period:****Flowers:** Bright blue with yellow throat, spring–summer.**Fruit/seed:** Fruit of 4 mericarps.**Dispersal, establishment & growth:** Diaspore: mericarp.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to Europe, introduced as garden plant, sometimes naturalised.**Botanical subregions:** CT ST; Vic., Tas., S.A.**Distribution Sydney area:** Southern Highlands.**Select locations:** Kangaloon (1993).**Habitat****Habitat:** Roadside.**Altitude:** 800 m**Annual rainfall:** 1600 mm**Typical local abundance:** Frequent.**Vegetation:** With roadside weeds, e.g. *Holcus lanatus*, *Dactylis glomerata*, *Bromus catharticus* etc.**Substrate:****Exposure:** Mid shade.**Conservation****Conservation:** Rare in Sydney area, probably only localised garden escape (P.

Kodala pers. comm.).

***Barbarea verna* ***

BRASSICACEAE

Wintercress

Life history**Growth form:** Erect herb to 75 cm high.**Vegetative spread:****Longevity:** 2 years.**Primary juvenile period:****Flowers:** Yellow.**Fruit/seed:** Capsule (siliqua) 3–7 cm long, with row of seeds, mature February.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to Europe. Garden escape, rarely naturalised.**Botanical subregions:** CC; Vic., Tas., S.A.**Distribution Sydney area:****Select locations:** Wahroonga (1917). (Only one specimen available.)**Habitat****Habitat:****Altitude:** 200 m**Annual rainfall:** 1300 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** Garden escape, rarely naturalised. Not recorded in the last 75 years.

***Brassica fruticulosa* ***

BRASSICACEAE

Twiggy Turnip

Life history
Growth form: Herb, erect, to 50 cm high.
Vegetative spread: No.
Longevity: Less than 5 years.
Primary juvenile period:
Flowers: Pale yellow-white, April–November.
Fruit/seed: Capsule (siliqua) 2–4 cm long, with small seeds, mature April–November.
Dispersal, establishment & growth: Diaspore: seed.
Fire response: Probably killed, flowering within 12 weeks, seeds released within 28 weeks of high-intensity fire (1/1994) at Lane Cove (P. Kubiak pers. comm.).
Interaction with other organisms:

Distribution
Status/origin: Naturalised exotic. Native to S Europe and N Africa. Supposedly originally introduced from Italy as a vegetable (note with Herbarium specimen).
Botanical subregions: NC CC CT; Vic.
Distribution Sydney area: Sydney suburbs, Katoomba.
Select locations: Beecroft, West Ryde (1949), Northbridge, Dobroyd Point, La Perouse, Mortdale, Liverpool, Echo Point (1966).

Habitat
Habitat: Disturbed sites, roadsides, creek banks, embankments, railway edges.
Altitude: 0–1000 m **Annual rainfall:** above 800 mm
Typical local abundance: Frequent.
Vegetation: Herbaceous weeds. Ground stratum.
Substrate: Various — sandy soil, reclaimed sites; also on highly disturbed Wianamatta Shale around Marsfield (L. Johnson pers. comm.).
Exposure:

Conservation
Conservation: Appears mainly confined to suburban areas, often in soil-fill.

***Brassica juncea* ***

BRASSICACEAE

Indian Mustard

Life history
Growth form: Herb to 1 m high, with slender taproot (Häfliger 1988).
Vegetative spread: No.
Longevity: 1 year.
Primary juvenile period: Less than 1 year.
Flowers: Pale yellow, spring.
Fruit/seed: Capsule (siliqua), 2–6 cm long, 2–4 mm wide, with 16–24 seeds, 1.3–1.6 mm long, dark reddish brown to yellowish (Häfliger 1988), mature October.
Dispersal, establishment & growth: Diaspore: seed. Winter-growing annual.
Fire response:
Interaction with other organisms:

Distribution
Status/origin: Naturalised exotic, native to Europe and Asia.
Botanical subregions: CC NT ST CWS SWP; Qld, S.A., W.A.
Distribution Sydney area: Hornsby.
Select locations: Hornsby (1924), Casula (1967), Belrose (P. Kodela pers. comm.).

Habitat
Habitat: Agricultural lands, railway line, roadsides.
Altitude: 0–100 m **Annual rainfall:** 1200 mm
Typical local abundance:
Vegetation:
Substrate:
Exposure:

Conservation
Conservation: Weed of agricultural lands and roadsides.

***Brassica rapa* subsp. *silvestris* ***

BRASSICACEAE

Turnip

Life history**Growth form:** Herb to 1 m high; tap root sleek, often tuberous (Lamp & Collet 1989).**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** Bright yellow, April–November.**Fruit/seed:** Capsule 4–7 cm long, with small seeds, mature April–November.**Dispersal, establishment & growth:** Diaspore: probably seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe. Introduced as food plant.**Botanical subregions:** NC CC NT CT ST CWS SWS SWP NFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Coastal.**Select locations:** Wondabyne, Glenorie, Hornsby (1909), Mosman, La Perouse, Glenfield, Albion Park, Meadow Flat Creek.**Habitat****Habitat:** Disturbed sites and roadsides.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional.**Vegetation:** Roadside weed species. Ground stratum.**Substrate:** Alluvial and clay soils, fertile.**Exposure:****Conservation****Conservation:** Widely cultivated and established as minor weed of disturbed sites.***Brassica tournefortii* ***

BRASSICACEAE

Mediterranean Turnip

Life history**Growth form:** Herb with mostly basal leaves, to 60 cm high; long taproot (Häfliger 1988).**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Pale yellow–white, August–October.**Fruit/seed:** Capsule (silique), 3–7 cm long, 3 mm wide, splitting at maturity, August–October. Seeds reddish-brown, 2 mm diam, about 16 per capsule.**Dispersal, establishment & growth:** Diaspore: seed. Possibly wind-dispersed (Carr et al. 1992).**Fire response:****Interaction with other organisms:** Rarely grazed by stock (Cunningham et al. 1981).**Distribution****Status/origin:** Naturalised exotic, native to Mediterranean.**Botanical subregions:** NC CC ST SWS NWP SWP NFWP SFWP; all mainland States.**Distribution Sydney area:** Coast.**Select locations:** Tuggerah Beach, Richmond, Woolooware Bay, Wollongong (1948).**Habitat****Habitat:** Coastal dunes.**Altitude:** 0–100 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Scrub with *Leptospermum laevigatum*, *Acacia longifolia* var. *sophorae*.**Substrate:** Sandy coastal dune soils — unstable. Soil infertile. Watertable permanently low, moisture supply intermittent.**Exposure:****Conservation****Conservation:** Widespread aggressive weed. Also occurs on sand in inland regions, e.g. Western Plains (L. Johnson pers. comm.).

***Cakile edentula* ***

BRASSICACEAE

American Sea Rocket

Life history**Growth form:** Herb to 80 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, pink or lavender, all year.**Fruit/seed:** Capsule (silicula) 12–24 mm long, corky, breaking into two segments (usually 1 seed in each) and capable of floating in seawater for 10 weeks with encased seeds remaining viable (Rodman 1986). Mature March–June.**Dispersal, establishment & growth:** Diaspore: silicula segments, local and widespread dispersal by water, local wind dispersal of plant as tumbleweed. Germination 59%, 1 week from sowing after scarification (Rodman 1986). Seeds not viable after burial (Clarke 1989). Seedlings sun-tolerant (Clarke 1989).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to N America. Probably introduced to Australia in ship ballast.**Botanical subregions:** NC CC SC; LHI, Qld, Vic., Tas., W.A.**Distribution Sydney area:** Coastline.**Select locations:** Wyong, Palm Beach, Manly (1870), Bondi (1884), La Perouse, Lady Robinson Beach, Kurnell, Wollongong, Austinmer, Seven Mile Beach.**Habitat****Habitat:** Beach dunes and lake foreshores.**Altitude:** 0–50 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Occasional.**Vegetation:** Strand zones.**Substrate:** Sand dunes, infertile soil.**Exposure:****Conservation****Conservation:** First recording for NSW at Manly Beach in 1870 after being introduced in Victoria (Rodman 1986).***Cakile maritima* ***

BRASSICACEAE

Sea Rocket

Life history**Growth form:** Herb with ascending or decumbent branches to 80 cm long.**Vegetative spread:** No.**Longevity:** Annual.**Primary juvenile period:****Flowers:** White–purple, August–September.**Fruit/seed:** Capsule (silicula) 12–27 mm long, corky. Upper fruit segment capable of floating in seawater for 2 weeks and encased seeds remain viable even after 10 weeks' exposure to seawater (Rodman 1986).**Dispersal, establishment & growth:** Diaspore: silicula segments, local and widespread dispersed by water; local wind dispersal of plant as tumbleweed. Germination 95%, 1 week from sowing after scarification (Rodman 1986).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe and Africa. Probably introduced to Australia in ships' ballast (Rodman 1986).**Botanical subregions:** CC SC NFWP; Vic., Bass Strait Is, S.A., W.A.**Distribution Sydney area:** Coastline: Broken Bay–Botany Bay.**Select locations:** Ettalong Beach (1969), Palm Beach, Belrose (P. Kodella), Towra Point (1977).

Habitat: Beaches and foreshores. Rarely away from coast, e.g. Belrose (P. Kodela pers. comm.). **Habitat**

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

Typical local abundance: Rare.

Vegetation: Strand zone. Ground stratum.

Substrate: Beach sand, infertile. Rarely sandy soil on sandstone (P. Kodela pers. comm.).

Exposure: Exposed situations.

Conservation: Ettalong Beach is current northern limit and first record for NSW. It was first collected near Perth at the turn of the century, giving an estimated migration rate of 95 km per year (Rodman 1986). **Conservation**

***Camelina alyssum* ***

BRASSICACEAE

Stinking Flaxweed

Growth form: Slender herb with flowers in racemes. **Life history**

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Pale yellow.

Fruit/seed: Capsule (silicula) 6–12 mm long, with small seeds, mucilaginous when wet.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Status/origin: Naturalised exotic, native to Europe. **Distribution**

Botanical subregions: NC CC; Tas., S.A.

Distribution Sydney area: Parramatta.

Select locations: Parramatta (von Mueller, 19th century), no recent records.

Habitat: Pasture weed. **Habitat**

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

Typical local abundance:

Vegetation: Pasture. Ground stratum.

Substrate:

Exposure:

Conservation: Pasture weed, rare. **Conservation**

***Capsella bursa-pastoris* ***

BRASSICACEAE

Shepherd's Purse

Growth form: Erect herb 8–40 cm high, basal leaves in a rosette; taproot, becoming woody (Häfliger 1988). **Life history**

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: White, May–December, peak September.

Fruit/seed: Capsule (silicula) 6–9 mm long, with small seeds, mature July–November.

Dispersal, establishment & growth: Diaspore: seed, animal and possibly wind-dispersed (Carr et al. 1992). Seedling: dark green, cotyledons petiolate, elliptical to oblong, 2–4 mm long (Häfliger 1988).

Fire response: Probably killed, seedlings seen, 1 plant flowering and fruiting within 20 weeks of high-intensity fire 1/1994 at Narrabeen (P. Kubiak pers. comm.).

Interaction with other organisms: Seed eaten by Galah *Cacatua roseicapilla* (Lepschi 1993).

	Distribution
Status/origin: Naturalised exotic, native to Europe.	
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: Sydney suburban area, Bathurst–Orange, Southern Highlands (P. Kodela pers. comm.).	
Select locations: Curl Curl, Wollstonecraft, Technical College (1893), Flemington, Glenfield, Narellan, Wollongong, Bathurst, Orange, Robertson (P. Kodela pers. comm.).	
	Habitat
Habitat: Roadsides and footpaths, pastures.	
Altitude: 0–1000 m	Annual rainfall: above 600 mm
Typical local abundance: Frequent.	
Vegetation: Amongst other wasteland weeds. Ground stratum.	
Substrate: Fertile soil. Watertable permanently low, moisture supply intermittent, fresh. Recorded on saline sites in western NSW (Semple 1993).	
Exposure:	
	Conservation
Conservation: Common weed of roadsides and footpaths, does not invade bushland.	

***Cardamine flexuosa* ***

BRASSICACEAE

Wood Bittercress

	Life history
Growth form: Herb to 50 cm high.	
Vegetative spread: No.	
Longevity: 1 year (rarely perennial in Australia).	
Primary juvenile period: Less than 1 year.	
Flowers: White, sepals green–violet, March–September.	
Fruit/seed: Capsule (siliqua) 10–25 mm long, with small seeds ejected suddenly at maturity, March–September.	
Dispersal, establishment & growth: Diaspore: seed, ejected mechanically.	
Fire response: Probably killed, fruiting within 15 weeks of high-intensity fire 1/1994 at Lane Cove, seedlings observed (P. Kubiak pers. comm.).	
Interaction with other organisms:	
	Distribution
Status/origin: Naturalised exotic, native to Europe.	
Botanical subregions: CC.	
Distribution Sydney area: Sydney suburban areas.	
Select locations: Royal Botanic Gardens (1964), Padstow, Glenfield.	
	Habitat
Habitat: Garden beds.	
Altitude: 0–300 m	Annual rainfall: above 700 mm
Typical local abundance:	
Vegetation:	
Substrate: Moist garden beds, fertile.	
Exposure:	
	Conservation
Conservation: Weed in moist garden sites, not invasive of bushland. Has increased greatly in past 30 years in moist garden sites; first appeared in nurseries (L. Johnson pers. comm.).	

Cardamine gunnii

BRASSICACEAE

	Life history
Growth form: Robust herb, variable leaves entire–pinnatisect.	
Vegetative spread:	
Longevity: Perennial.	
Primary juvenile period:	

Flowers: White, August–October.

Fruit/seed: Capsule (silicula) 15–30 mm long, with small seeds ejected suddenly at maturity.

Dispersal, establishment & growth: Diaspore: seed, ejected mechanically. Seedling recruitment possibly related to disturbance.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area: Northern Blue Mountains.

Select locations: Mt Coricudgy, Mt Durambang, Mt Tayar, Gosling Creek, McKeons Creek (Jenolan Caves).

Habitat

Habitat: Moist forest.

Altitude: 500–1000 m **Annual rainfall:** above 900 mm

Typical local abundance: Frequent.

Vegetation: Moist eucalypt forest, e.g. *Eucalyptus blaxlandii*, *E. viminalis*. Ground stratum.

Substrate: Clay loam on basalt, limestone, very fertile. Watertable mostly high, moisture supply intermittent, fresh.

Exposure:

Conservation

Conservation: Conservation status unknown.

Cardamine hirsuta *

BRASSICACEAE

Common Bittercress, Hairy Woodcress

Life history

Growth form: Slender herb to 30 cm high; taproot slender, much branched, yellowish (Häfliger 1988).

Vegetative spread: No (M. Clarke pers. comm.).

Longevity: 1 year.

Primary juvenile period: 6 months (P. Kubiak pers. comm.).

Flowers: White, sepals green to violet, August–November.

Fruit/seed: Capsule (siliqua) 15–20 mm long, with small seeds ejected suddenly at maturity, August–November.

Dispersal, establishment & growth: Diaspore: seed, ejected mechanically, animal and possibly wind-dispersed (Carr et al. 1992). Water-dispersed (M. Clarke pers. comm.).

Fire response: Probably killed, flowering and fruiting within 24 weeks of high-intensity fire 1/1994 at Lane Cove (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

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

Distribution Sydney area: Suburban areas.

Select locations: Cheltenham, Willoughby, Cremorne, Woolwich (1984), Centennial Park, Croydon Park.

Habitat

Habitat: Lawns and gardens, or disturbed sites, nurseries.

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

Typical local abundance: Frequent.

Vegetation: Lawns and gardens. Ground stratum.

Substrate: Garden soils, sandy, clay/shales, fertile–infertile, damp, non-saline.

Exposure: Dense–light shade (M. Clarke pers. comm.).

Conservation

Conservation: Confined to gardens and lawns. Watercourses, and stormwater outlets, invades bushland creeks.

Cardamine lilacina

BRASSICACEAE

Life history

Growth form: Herb to 50 cm high.**Vegetative spread:** No.**Longevity:** 1–5 years.**Primary juvenile period:****Flowers:** Pink–purple, sepals purple with white margins, October–November.**Fruit/seed:** Capsule (siliqua) 10–40 mm long, with small seeds ejected suddenly at maturity.**Dispersal, establishment & growth:** Diaspore: seed, ejected mechanically.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NT CT ST; Vic., Tas.**Distribution Sydney area:** Western Blue Mountains, Southern Highlands.**Select locations:** Mt Coricudgy, Coxs River (1904), Oberon, Wombeyan, Wingecarribee Swamp (1966).

Habitat

Habitat: Swamp, grassland, forest understorey.**Altitude:** 650–800 m**Annual rainfall:** above 800 mm**Typical local abundance:****Vegetation:** *Epacris paludosa*–*Sphagnum* bog and adjacent grassland, and forest, e.g. with *Eucalyptus dabrympleana* in herbaceous understorey. Ground stratum.**Substrate:** Granite, basalt, clay-loam, fertile–infertile soil. Watertable mostly high, moisture supply intermittent, fresh.**Exposure:** Light shade–full sun.

Conservation

Conservation: Probably rare and poorly conserved.***Cardamine paucijuga***

BRASSICACEAE

Life history

Growth form: Weak herb to 40 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White or rarely pink, August–December.**Fruit/seed:** Capsule (siliqua) 10–30 mm long, with small seeds ejected suddenly at maturity, October.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT CT ST NWS SWS; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Western Blue Mountains, Southern Highlands.**Select locations:** Cheltenham, Maldon, Yerranderie, Mt Cameron, Little Hartley, Hill Top, Robertson (P. Kodala pers. comm.), Marulan.

Habitat

Habitat: Moist areas near creek banks.**Altitude:** 0–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Moist eucalypt forest, e.g. *Eucalyptus viminalis*, or with *Persicaria* spp. Ground stratum.**Substrate:** River gravels, river flat alluvium, granite and basalt. Soil very fertile–fertile.

Watertable mostly high, moisture supply intermittent, fresh.

Exposure: Sheltered situations.

Conservation: Probably becoming rare, conservation status unknown.

Conservation

***Cardamine* species Y**

BRASSICACEAE

Life history

Growth form: Herb to 40 cm high.

Vegetative spread:

Longevity: Perennial.

Primary juvenile period:

Flowers: White or pink, September–November.

Fruit/seed: Capsule (siliqua) 15–30 mm long, with small seeds ejected suddenly at maturity.

Dispersal, establishment & growth: Diaspore: seed, ejected mechanically.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Native.

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

Distribution Sydney area:

Select locations: Rylstone, Coxs River, Orange, Oberon, Wombeyan.

Habitat

Habitat: Wet places, creeks.

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

Typical local abundance: Frequent.

Vegetation: Undisturbed swamp vegetation and grassland. Ground stratum.

Substrate: Basalt, granite soils, fertile–infertile. Watertable mostly high, moisture supply intermittent, fresh.

Exposure:

Conservation

Conservation: Probably now rare, conservation status unknown.

***Cardaria draba* * (Lepidium draba)**

BRASSICACEAE

Hoary Cress, White Weed

Life history

Growth form: Herb 15–cm high with extensive and deep root system; taproot and horizontal creeping roots with adventitious buds (Häfliger 1988). Erect, branching near the top, covered with fine downy hairs; main root 2 m deep (Parsons & Cuthbertson 1992).

Vegetative spread: Capable of vegetative spread; severed portions of the root system readily bud to form new plants Scurfield 1962). Horizontal roots produce aerial shoots (Parsons & Cuthbertson 1992).

Longevity: Perennial.

Primary juvenile period: 2 years.

Flowers: Not usually produced until 2nd year, white, October–November.

Fruit/seed: Capsule (silicula) 3–4 mm long separating into 1 or 2-seeded units (nutlets), red-brown, 2.2 mm long. Single plant can produce 1000–5000 seeds (Parsons & Cuthbertson 1992).

Dispersal, establishment & growth: Diaspore: 1 or 2-seeded nutlets. High seed production and germination percentages. Non-dormant fraction 93% with germination decreasing with age, and zero after 3 years (Scurfield 1962 in Cunningham et al. 1981). Germinates in autumn to form rosettes in winter and spring. Flowering does not usually occur in the first year but older plants flower in spring after which the above-ground parts die off (Cunningham et al. 1981).

Fire response:**Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic. Native to S Europe.**Botanical subregions:** CC NT CT ST NWS CWS SWS SWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Campbelltown, Bathurst-Orange area.**Select locations:** Campbelltown, Bathurst (1901), Orange.**Habitat****Habitat:** Roadsides, gardens and waste land.**Altitude:** 0-1000 m **Annual rainfall:** above 400 mm (Parsons & Cuthbertson 1992)**Typical local abundance:****Vegetation:** Ground stratum.**Substrate:** Dry, uncultivated, heavy, fertile soils (Parsons & Cuthbertson 1992).**Exposure:** Would appear to be able to withstand prolonged cold (Scurfield 1962).

Unshaded (Parsons & Cuthbertson 1992).

Conservation**Conservation:** Widespread agricultural weed — not common.***Conringia orientalis* *****BRASSICACEAE**

Hare's Ear, Treacle Mustard

Life history**Growth form:** Erect herb 10-50 cm high, glabrous and glaucous; short whitish taproot (Häfliger 1988).**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** Yellow or greenish white, October.**Fruit/seed:** Capsule (silique) 4-14 mm long, with small seeds, mature November.**Dispersal, establishment & growth:** Diaspore: seed. Seedling: cotyledons petiolate, elliptical to ovate (Häfliger 1988).**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Exotic, native to Europe.**Botanical subregions:** CC NWS CWS; Qld, Vic., S.A.**Distribution Sydney area:****Select locations:** Royal Botanic Gardens (1896) only record.**Habitat****Habitat:** Weed of agricultural land.**Altitude:** 0-50 m **Annual rainfall:** 1200 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:****Conservation****Conservation:** No records since 1896, not naturalised in the Sydney area.***Coronopus didymus* *****BRASSICACEAE**

Lesser Swinecress

Life history**Growth form:** Herb to 30 cm high; with taproot (Häfliger 1988).**Vegetative spread:** No.**Longevity:** 1-2 years.**Primary juvenile period:****Flowers:** White, less than 2 mm long, September.

Fruit/seed: Capsule (silicula) 1.5 mm long, separating at maturity into 2 1-seeded nutlets 1–2 mm diam., mature any time of year.

Dispersal, establishment & growth: Diaspore: nutlet. Seedling: cotyledons petiolate, club-shaped (Häfliger 1988). Late winter–early spring growing.

Fire response: Probably killed, fruiting within 15 weeks of high-intensity fire 1/1994 at Lane Cove, seedlings observed (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic. Native to America and Europe.

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

Distribution Sydney area: Sydney suburbs and Western Sydney.

Select locations: Woy Woy, Cheltenham, Homebush (1893), Neutral Bay, Royal Botanic Gardens, Shane Park, Richmond, Leuhmeah, Wollongong, Albion Park.

Habitat

Habitat: Lawns, gardens, roadsides, wasteland.

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

Typical local abundance: Frequent–occasional.

Vegetation: With other weeds of wasteland. Ground stratum.

Substrate: Mainly fertile clay soils from Wianamatta Shale but also sandy soils.

Exposure:

Conservation

Conservation: Weed of disturbed sites, unlikely to invade bushland.

Diplotaxis muralis *

BRASSICACEAE

Wall Rocket

Life history

Growth form: Herb to 60 cm high, with taproot.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Lemon-yellow sometimes becoming violet after flowering, September.

Fruit/seed: Cylindrical capsule (siliqua) 3–4 cm long, opening when ripe, September. Numerous seeds, yellow brown 1.2 mm long.

Dispersal, establishment & growth: Diaspore: seed. Seedling: light green, cotyledons petiolate, roundish-elliptical, apex emarginate (Häfliger 1988).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic. Native to Europe.

Botanical subregions: CC CWS NFWP SFWP; Vic., Tas., S.A., W.A.

Distribution Sydney area: Campbelltown.

Select locations: Campbelltown (1954) only record.

Habitat

Habitat: Roadside gravel dump.

Altitude: 0–50 m **Annual rainfall:** 750 mm

Typical local abundance:

Vegetation: Ground stratum.

Substrate: Roadside gravel dump.

Exposure:

Conservation

Conservation: Widespread weed, only Sydney record Campbelltown (1954).

Drabastrum alpestre

BRASSICACEAE

Mountain Cress

Life history

Growth form: Herb or subshrub 10–30 cm high, woody base and rhizome.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White or lavender.**Fruit/seed:** Capsule (siliqua) 4–10 mm long, with small seeds.**Dispersal, establishment & growth:** Diaspore: seed, mucilaginous when wet.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CT ST; Vic.**Distribution Sydney area:** Bathurst (Harden 1990).**Select locations:** No specimens in NSW Herbarium.

Habitat

Habitat:**Altitude:** Probably above 1000 m **Annual rainfall:** 600–1000 mm**Typical local abundance:****Vegetation:** Ground stratum.**Substrate:****Exposure:**

Conservation

Conservation: Rare, coded 3RC- (Briggs & Leigh 1988), Bathurst district is northern limit, conservation status unknown.***Erophila verna* subsp. *praecox* ***

BRASSICACEAE

Whitlow Grass

Life history

Growth form: Herb 3–20 cm high; taproot slender, much branched, yellowish (Häfliger 1988).**Vegetative spread:** No.**Longevity:** Annual.**Primary juvenile period:****Flowers:** White or pink, September.**Fruit/seed:** Capsule (silicula) 3–6 mm long, with numerous minute seeds, mature September.**Dispersal, establishment & growth:** Diaspore: seed. Seedling: cotyledons petiolate, elliptical to roundish, c. 1 mm long (Häfliger 1988).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to S Europe.**Botanical subregions:** CT ST CWS SWS; Vic., Tas., S.A.**Distribution Sydney area:** Bathurst–Orange.**Select locations:** Mt Tayar (1964), Kandos, Bathurst, Lucknow.

Habitat

Habitat: Wet ground.**Altitude:** 700–100 m **Annual rainfall:** above 600 mm**Typical local abundance:** Frequent.**Vegetation:** Grassland. Ground stratum.**Substrate:** Basalt soil or stonework of old mine workings. Soil fertile. Watertable mostly high, moisture supply continuous, fresh.**Exposure:**

Conservation

Conservation:

***Erophila verna* subsp. *verna* ***

BRASSICACEAE

Whitlow Grass

Life history**Growth form:** Annual herb 3–20 cm high.**Vegetative spread:** No.**Longevity:** Annual.**Primary juvenile period:****Flowers:** White or pink, August–October.**Fruit/seed:** Capsule (silicula) 6–10 mm long, with numerous minute seeds, mature October.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to S Europe.**Botanical subregions:** CC SC NT CT ST CWS SWS; Vic., Tas., S.A.**Distribution Sydney area:** Bathurst–Oberon.**Select locations:** Wolgan Valley (1953), Bathurst, Hampton.**Habitat****Habitat:** Seepage areas.**Altitude:** 600–1000 m **Annual rainfall:** above 600 mm**Typical local abundance:** Occasional.**Vegetation:** Open-grassland. Ground stratum.**Substrate:** Grey clay, fertile. Watertable mostly high, moisture supply continuous, fresh.**Exposure:****Conservation****Conservation:*****Hirschfeldia incana* ***

BRASSICACEAE

Hairy Brassica, Buchan Weed

Life history**Growth form:** Herb to 1 m high.**Vegetative spread:** No.**Longevity:** Less than 5 years.**Primary juvenile period:****Flowers:** Yellow, often purple-veined, all year.**Fruit/seed:** Capsule 8–15 mm long, opening when ripe, February–May, 3–9 cells per cell.

Seed reddish brown 1 mm diam.

Dispersal, establishment & growth: Diaspore: seed, winter-spring growing.**Fire response:****Interaction with other organisms:** Seed eaten by Crimson Rosella *Platyercus elegans* (Lepschi 1993).**Distribution****Status/origin:** Naturalised exotic, native to Mediterranean.**Botanical subregions:** CC SC NT CT ST NWS CWS SWS NWP SWP; S.A., Qld, Vic., Tas.**Distribution Sydney area:** Western Sydney, Bathurst area.**Select locations:** Mascot, Liverpool, Bents Basin, Camden, Campbelltown, Douglas Park, Picton, Bathurst (1903), Marrangaroo, Moss Vale.**Habitat****Habitat:** Disturbed sites, embankments, along roads, railways and riverbanks.**Altitude:** 0–1000 m **Annual rainfall:** 700–1200 mm**Typical local abundance:** Occasional–rare.**Vegetation:** Roadside herbaceous weeds, e.g. *Cirsium vulgare*, *Rumex*, *Senecio madagascariensis* also grassland.**Substrate:** Sandy and stony soil, disturbed, infertile. Watertable permanently low, intermittent, fresh.**Exposure:****Conservation****Conservation:** Weed of disturbed sites, not invasive of bushland.

Irenepharsus trypherus

BRASSICACEAE

Life history

Growth form: Herb to 1 m high, spreading to erect.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, February–April.**Fruit/seed:** Capsule (siliqua) 5–20 mm long, mature February. Seeds sticky when wet.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC.**Distribution Sydney area:** Between Minnamurra Falls and Nowra area.**Select locations:** Minnamurra Falls, Upper Kangaroo Valley, Barrengarry Creek.

Habitat

Habitat: Moist sheltered gullies. Moist rock walls of the gorge and gullies (Mills 1988).**Altitude:** 0–600 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Rare to occasional.**Vegetation:** Rainforest. Ground stratum.**Substrate:** Rocky cliff face.**Exposure:**

Conservation

Conservation: Endemic to Illawarra region, rare. Minnamurra Falls is northern limit, last collected 1959 (Mills 1988). Coded 2RC by Briggs & Leigh (1988).*Lepidium africanum* *

BRASSICACEAE

Life history

Growth form: Herb to 70 cm high.**Vegetative spread:** No.**Longevity:** Annual or perennial.**Primary juvenile period:****Flowers:** Petals less than 0.8 mm long.**Fruit/seed:** Dehiscent (silicula) 2–3 mm long, with small seeds, mature April–December.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to Africa.**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP SWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Putty Road, Mt Colah, Cheltenham, Rockdale (1903), Mt Annan, Picton, Dapto, Albion Park, Orange, Hilltop.

Habitat

Habitat: Roadside, wasteland, regrowth woodland.**Altitude:** 0–300 m**Annual rainfall:** above 800 mm**Typical local abundance:** Frequent.**Vegetation:** Roadside weeds, grassland, shrubland — *Olea europea* subsp. *africana*. Ground stratum.**Substrate:** Clay soils from Wianamatta Shale, also disturbed sandstone sites. Soil fertile–infertile. Recorded on saline sites in western NSW (Semple 1993).**Exposure:**

Conservation

Conservation: Common weed, not invasive of bushland.

***Lepidium bonariense* ***

BRASSICACEAE

Life history

Growth form: Herb to 50 cm high.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** White, March–December.**Fruit/seed:** Capsule (silicula) 2–4 mm long, opening when ripe, at any time of year. Seeds 1.5 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to S America.**Botanical subregions:** NC CC NT NWS CWS SWS NWP SWP NFWP; Qld, Vic., S.A., W.A.**Distribution Sydney area:** Widespread on coast and western Sydney.**Select locations:** Swansea (1938), Cowan, Belrose (P. Kodala pers. comm.), Roseville, Centennial Park, Bankstown, Richmond, Austral, Campbelltown, Wollongong, Albion Park.

Habitat

Habitat: Roadside, wet places near creeks and salt water.**Altitude:** 0–100 m **Annual rainfall:** above 700 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** With grass, roadside weeds, fresh wetland and estuarine, e.g. *Casuarina glauca*. Ground stratum.**Substrate:** Sand, sandstone boulders and muddy alluvium. Soil fertile–infertile–very infertile. Watertable mostly high, moisture supply intermittent, brackish–fresh. Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Mid shade.

Conservation

Conservation: A common weed, probably not invasive of bushland.***Lepidium campestre* ***

BRASSICACEAE

Field Cress

Life history

Growth form: Herb to 60 cm high.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** White.**Fruit/seed:** Capsule (silicula) 5–6 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to Europe.**Botanical subregions:** CC SC NT CT ST NWS; Vic., Tas.**Distribution Sydney area:****Select locations:** Campbelltown (1903), Taralga (1914).

Habitat

Habitat:**Altitude:** 0–900 m **Annual rainfall:** 700–800 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Rare weed.

Lepidium fasciculatum

BRASSICACEAE

Life history

Growth form: Herb to 60 cm high.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:****Flowers:** Petals very small or absent, August–December.**Fruit/seed:** Capsule (silicula) 3–4 mm long, opening when ripe, August–December. Seed 1.25 mm long.**Dispersal, establishment & growth:** Diaspore: seed. A cool season annual, abundant only in occasional years (Cunningham et al. 1981).**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC NT NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., W.A.**Distribution Sydney area:** Coast, scattered, probably introduced by stock.**Select locations:** Wondabyne (1922), Flemington Saleyards.

Habitat

Habitat: Saleyards ?**Altitude:** 0–100 m**Annual rainfall:** above 800 mm**Typical local abundance:** Rare.**Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: An inland species; occurrences near Sydney would certainly be casual introductions along rail or road (L. Johnson pers. comm.).*Lepidium hyssopifolium*

BRASSICACEAE

Peppergrass

Life history

Growth form: Herb to 50 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** Petals very small or absent, February.**Fruit/seed:** Capsule (silicula) 3–5 mm long, opening when ripe, February. Seed 1.5 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:** Foodplant of Black Swan *Cygnus atratus* (Barker & Vestjens 1989, 1990).

Distribution

Status/origin: Native.**Botanical subregions:** NT CT ?ST; Qld, Vic., Tas., S.A., N.Z.**Distribution Sydney area:** Bathurst–Carcoar.**Select locations:** Bathurst, Peelwood.

Habitat

Habitat:**Altitude:** 700 m**Annual rainfall:** 600–700 mm**Typical local abundance:****Vegetation:** Ground stratum.**Substrate:****Exposure:**

Conservation

Conservation: Rare, coded 3ECA+ by Briggs & Leigh (1988), but not conserved in Sydney area.

Lepidium peregrinum

BRASSICACEAE

Life history

Growth form: Herb to 40 cm high.**Vegetative spread:****Longevity:** 1 year.**Primary juvenile period:****Flowers:****Fruit/seed:** Capsule (silicula) 2.7 mm long.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NT CT.**Distribution Sydney area:** Blue Mountains.**Select locations:** No locations known.

Habitat

Habitat:**Altitude:****Annual rainfall:****Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Regarded as extinct, probably due to heavy grazing, and coded 3X by Briggs & Leigh (1988).*Lepidium perfoliatum* *

BRASSICACEAE

Life history

Growth form: Herb 20–40 cm high.**Vegetative spread:** No.**Longevity:** Less than 5 years.**Primary juvenile period:****Flowers:** Yellow.**Fruit/seed:** Capsule (silicula) 3–4 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Exotic, native to Europe.**Botanical subregions:** CT ST; Qld, S.A.**Distribution Sydney area:** Campbelltown.**Select locations:** Campbelltown district (1903) only record for Sydney area.

Habitat

Habitat:**Altitude:** 0–100 m**Annual rainfall:** 750 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Not naturalised in the Sydney area.

Lepidium pseudohyssopifolium

BRASSICACEAE

Peppergrass

Life history

Growth form: Herb to 60 cm high.**Vegetative spread:****Longevity:** Annual or perennial.**Primary juvenile period:****Flowers:** Petals very small or absent.**Fruit/seed:** Capsule (silicula) 3 mm long, mature, February and July.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC ST CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., S.A., W.A., N.Z.**Distribution Sydney area:** Illawarra coast.**Select locations:** Five Islands, Shellharbour, Kiama.

Habitat

Habitat:**Altitude:** 0–100 m**Annual rainfall:** above 1200 mm**Typical local abundance:** Frequent.**Vegetation:** Ground stratum.**Substrate:****Exposure:**

Conservation

Conservation: Rare, last specimen collected Shellharbour (1949), conservation status not known.*Lepidium pseudotasmanicum*

BRASSICACEAE

Life history

Growth form: Herb 20–40 cm high.**Vegetative spread:** No.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:****Fruit/seed:** Dehiscent (silicula) 3 mm long, mature, January.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** CC SC; Qld, Vic., Tas., W.A., N.Z.**Distribution Sydney area:** Coast.**Select locations:** Como, Emu Plains, Offord.

Habitat

Habitat:**Altitude:** 0–100 m**Annual rainfall:** above 700 mm**Typical local abundance:****Vegetation:****Substrate:****Exposure:**

Conservation

Conservation: Rare, last recorded Emu Plains (1915), conservation status not known.

***Lobularia maritima* ***

BRASSICACEAE

Sweet Alyssum

Life history

Growth form: Herb 5–40 cm high.**Vegetative spread:****Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, pink or purple, at any time of year.**Fruit/seed:** Capsule (silicula) 2–3 mm wide, 1-seeded, mature March–June.**Dispersal, establishment & growth:****Fire response:** Probably killed, flowering within 23 weeks of high-intensity fire 1/1994 at Lane Cove (P. Kubiak pers. comm.).**Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to Mediterranean. Introduced as garden plant.**Botanical subregions:** CC SC CT; Qld, Vic., S.A., W.A.**Distribution Sydney area:** Mainly coastal.**Select locations:** Paddington, Tamarama, Ashfield (1887), Little Bay, Wollongong, Albion Park, Kiama, Minnamurra River, Leura.

Habitat

Habitat: Grassy area generally near sea. Found on old homestead site at Leura after fire.**Altitude:** 0–1000 m**Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Grassy areas. Ground stratum.**Substrate:** Beach, roadsides, remnant gardens, sandy soils.**Exposure:**

Conservation

Conservation: Garden escape, not invasive of bushland.***Lunaria annua* ***

BRASSICACEAE

Honesty

Life history

Growth form: Herb 50–100 cm high.**Vegetative spread:** No.**Longevity:** 2 years.**Primary juvenile period:****Flowers:** Bluish purple, September.**Fruit/seed:** Capsule (silicula) circular, 30–40 mm long, with seeds 7 mm diam.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Exotic, native to Europe. Introduced as ornamental, rarely naturalised.**Botanical subregions:** NT CT ST SWS; Vic.**Distribution Sydney area:** Oberon.**Select locations:** Oberon (1936).

Habitat

Habitat:**Altitude:** 1100 m**Annual rainfall:** 850 mm**Typical local abundance:****Vegetation:** Ground stratum.**Substrate:****Exposure:**

Conservation

Conservation: Widely cultivated as an ornamental, especially for dried arrangements of the silvery septa of the fruit, very rarely naturalised.

***Raphanus raphanistrum* ***

BRASSICACEAE

Wild Radish, Jointed Charlock

Life history

Growth form: Slender herb 15–50 cm high, much branched, with long rosette leaves, taproot wiry to stout but not fleshy.

Vegetative spread: No.

Longevity: Generally 1 year.

Primary juvenile period: 3–6 months.

Flowers: White or yellow, at any time. Insect-pollinated, syrphids and white butterflies showed strong preference for yellow flowers (Armstrong et al. 1982).

Fruit/seed: Indehiscent pod (siliqua) 1–5 cm long, breaking into one-seeded capsules during harvest, mature October–November. Seeds ovoid 1.5–4 mm long. Can produce up to 17 000 seeds per square metre (Dellow 1987).

Dispersal, establishment & growth: Diaspore: 1-seeded capsule. Dispersed by wind, water, animals and humans in mud, but principally through agriculture (Parsons & Cuthbertson 1992), mixed with cereal grain (Dellow 1987). Germination of above 1000 seeds per square metre recorded, throughout year, over a wide range of temperatures but germinates best with widely fluctuating temperatures (Dellow 1987). Emergence is greatly increased by cultivation, the buried seed stimulated by darkness and higher moisture. Soil-stored seedbank, 20–40% of seeds produced in any one year remain viable in the soil after 12 months (Dellow 1987), buried seed remains viable longer, some remain viable for up to 20 years (Parsons & Cuthbertson 1992). Generally a winter and spring-growing annual but with suitable conditions can grow and mature throughout the year (Dellow 1987).

Fire response:

Interaction with other organisms: Host to thrips, flea beetles, and other plant pests and diseases; can cause death of cattle and lambs (Parsons & Cuthbertson 1992).

Distribution

Status/origin: Naturalised exotic, native to Europe. Reported naturalised in Sydney by 1867 (Parsons & Cuthbertson 1992).

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

Distribution Sydney area: Widespread.

Select locations: Wondabyne, Terrey Hills, Royal Botanic Gardens (1902), Glenfield, Elderslie, Campbelltown, Shellharbour, Robertson (P. Kodela pers. comm.).

Habitat

Habitat: Margins of cultivated areas, roadsides, winter cereal crops; pastures (P. Kodela pers. comm.).

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

Typical local abundance: Frequent.

Vegetation: Weeds of waste areas. Ground stratum.

Substrate: Sandy-clay soils, basalt (P. Kodela pers. comm.). Principally on highly fertile, acid, nitrogenous soils (Parsons & Cuthbertson 1992).

Exposure: Full sun.

Conservation

Conservation: Major weed of winter cereal crops reducing crop yields, probably not invasive of bushland.

***Raphanus sativus* ***

BRASSICACEAE

Radish

Life history

Growth form: Herb 20–100 cm high, with fleshy edible taproot.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period: Less than 1 year.

Flowers: White–purple, October–November.

Fruit/seed: Capsule (siliqua) 2–6 cm long, not breaking into 1-seeded units at maturity like *R. raphanistrum*, mature October–November.

Dispersal, establishment & growth: Diaspore: seed, dispersed by humans; germinates readily in cultivation, within 7 days.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Exotic, native to Europe. Introduced as crop plant and cultivated for its edible taproot, doubtfully naturalised.

Botanical subregions: CC CWS; Qld, Vic., Tas., S.A.

Distribution Sydney area:

Select locations: Cheltenham, Dundas, North Sydney (1916), Richmond (1916).

Habitat

Habitat: Self-sown in garden.

Altitude: 0–100 m

Annual rainfall: above 700 mm

Typical local abundance: Rare.

Vegetation: Ground stratum.

Substrate: Garden soil.

Exposure:

Conservation

Conservation: Self-sown in gardens and wasteland, unlikely to persist.

***Rapistrum rugosum* ***

BRASSICACEAE

Turnip Weed, Giant Mustard

Life history

Growth form: Herb 15–60 cm high.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Yellow, dark-veined, April–November.

Fruit/seed: Capsule (silicula) 5–10 mm long, breaking into upper segment 3–6 mm long with 1 large seed, and lower segment 3 mm long with 0–2 small seeds, mature November.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: NC CC NT CT NWS CWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas.

Distribution Sydney area: Western Sydney.

Select locations: Liverpool (1964), Glenfield, Menangle, Razorback, Meadow Flat Creek.

Habitat

Habitat: Roadside and earthworks.

Altitude: 0–800 m

Annual rainfall: 600–900 mm

Typical local abundance: Frequent.

Vegetation: With other wasteland weeds. Ground stratum.

Substrate: Clay soils from Wianamatta Shale, fertile. Watertable permanently low, moisture supply intermittent, fresh.

Exposure:

Conservation

Conservation:

Rorippa dictyosperma

BRASSICACEAE

Life history

Growth form: Herb 30–90 cm high.

Vegetative spread: Probably not.

Longevity: Perennial.

Primary juvenile period:**Flowers:** White.**Fruit/seed:** Capsule (siliqua) 25–60 mm long, mature January–February. Seeds not mucilaginous when wet.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CT ST; Qld, Vic., Tas., W.A.**Distribution Sydney area:** Upper Blue Mountains.**Select locations:** Mt Wilson, Jenolan Caves (1900), Barbers Creek.**Habitat****Habitat:** Edge of track.**Altitude:** 800–1000 m **Annual rainfall:** above 1000 mm**Typical local abundance:** Rare.**Vegetation:** Rainforest. Ground stratum.**Substrate:** Probably basalt soil, fertile. Fertile soil, but not always basalt (L. Johnson pers. comm.). Watertable mostly high, moisture supply intermittent, fresh.**Exposure:****Conservation****Conservation:** Conservation status unknown.***Rorippa gigantea*****BRASSICACEAE****Life history****Growth form:** Decumbent to erect herb to 120 cm high with sessile leaves.**Vegetative spread:** No.**Longevity:** 1 year.**Primary juvenile period:** Less than 1 year.**Flowers:** White, September–January.**Fruit/seed:** Capsule (siliqua) 15–40 mm long, mature December–February. Seeds sticky.**Dispersal, establishment & growth:** Diaspore: seed, probably animal/bird-dispersed.

Seedling recruitment after disturbance, possibly fire related.

Fire response: Probably killed.**Interaction with other organisms:****Distribution****Status/origin:** Native.**Botanical subregions:** NC CC SC NT CT ST; Qld, Vic., Tas., N.Z.**Distribution Sydney area:** Widespread but localised.**Select locations:** Culoul Range, Blacksmiths Creek, Mt Warrawolong, Patonga, Waterfall, Cataract Creek, Cambewarra, Blackheath, Bundanoon.**Habitat****Habitat:** Edge of creeks, tracks, hillsides, disturbed sites.**Altitude:** 0–700 m **Annual rainfall:** above 1000 mm**Typical local abundance:** Frequent.**Vegetation:** Edge of rainforest, e.g. found with *Solanum* spp. Ground stratum.**Substrate:** Moist sandy alluvial soils, possibly with clay influence, fertile. Not on the usual highly infertile sandstone soils (L. Johnson pers. comm.).**Exposure:** Sheltered situations, light shade–full sun.**Conservation****Conservation:** Conservation status unknown.

Rorippa laciniata

BRASSICACEAE

Life history

Growth form: Herb to 40 cm high.**Vegetative spread:** Probably not.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, August–March.**Fruit/seed:** Capsule (siliqua) 15–40 mm long, opening when ripe, October–April. Seeds brown.**Dispersal, establishment & growth:** Diaspore: seed.**Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Native.**Botanical subregions:** NC CC SC NT ST NWS CWS SWS NWP SWP; Qld, Vic., S.A.**Distribution Sydney area:** Sydney and South Coast.**Select locations:** Cowan, Cheltenham, Cooks River, Austral, Mt Kembla, Whispering Gallery (Albion Park), Minnamurra Falls, Cambewarra.

Habitat

Habitat: Rocky creeks.**Altitude:** 0–500 m**Annual rainfall:** above 800 mm**Typical local abundance:** Rare.**Vegetation:** Light break in rainforest, open-forest. Ground stratum.**Substrate:** Sandstone, shale derived soil, fertile–infertile. Watertable mostly high, moisture supply intermittent, fresh.**Exposure:** Sheltered situations; light shade.

Conservation

Conservation: Rare, probably not well conserved. Vulnerable in Western Sydney (Benson & McDougall 1991).**Rorippa microphylla ***

BRASSICACEAE

One-rowed Watercress

Life history

Growth form: Decumbent aquatic or semi-aquatic, stems to 40 cm long.**Vegetative spread:** Stoloniferous.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, November–January.**Fruit/seed:** Capsule (siliqua) 15–30 mm long.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:**

Distribution

Status/origin: Naturalised exotic, native to Europe, W Asia.**Botanical subregions:** CC NT CT ST; Vic., Tas., S.A.**Distribution Sydney area:** Sporadic.**Select locations:** Kiama (1955), Oberon (1955), Taralga, Berrima.

Habitat

Habitat: Creekbed.**Altitude:** 500–1000 m**Annual rainfall:** above 800 mm**Typical local abundance:** Occasional–rare.**Vegetation:****Substrate:** Mud or shallow water. Watertable permanently high, moisture supply continuous, fresh.**Exposure:**

Conservation

Conservation:

Rorippa nasturtium-aquaticum *

BRASSICACEAE

Watercress

Life history**Growth form:** Decumbent aquatic or semi-aquatic herb, stems hollow, to 60 cm long.**Vegetative spread:** Stoloniferous, stems root at nodes and spread.**Longevity:** Perennial.**Primary juvenile period:****Flowers:** White, November.**Fruit/seed:** Capsule (siliqua) 10–18 mm long, mature November–February.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:** Eaten by humans but may contain toxins if growing on edges of polluted waterways (e.g. pesticides and fertilisers) (P. Kodela pers. comm.).**Distribution****Status/origin:** Naturalised exotic, native to W Asia, Europe, N Africa. Cultivated for edible leaves.**Botanical subregions:** NC CC NT CT ST NWS CWS; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Sydney suburban areas and Western Blue Mountains. Southern Highlands (P. Kodela pers. comm.).**Select locations:** Cheltenham, Bondi, Kogarah, Menangle Park, Glenquarry, Wombeyan Caves, Abercrombie Caves, Tuena Creek (1918).**Habitat****Habitat:** Creek banks and in slow-moving water.**Altitude:** 0–800 m**Annual rainfall:** above 700 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Wetland vegetation.**Substrate:** Sandy alluvium, infertile. Watertable permanently high, moisture supply continuous, fresh. Margins of Wingecarribee swamp in fertile conditions (P. Kodela pers. comm.). Recorded on saline sites in western NSW (Semple 1993).**Exposure:** Sheltered situations.**Conservation****Conservation:** Weed in some urban bushland creeks.**Rorippa palustris ***

BRASSICACEAE

Yellow Cress, Marsh Watercress

Life history**Growth form:** Herb 20–100 cm high.**Vegetative spread:** Sometimes stoloniferous.**Longevity:** 1–2 years.**Primary juvenile period:****Flowers:** Yellow, December–January.**Fruit/seed:** Capsule (siliqua) 5–9 mm long, mature December–March, peak December.**Dispersal, establishment & growth:****Fire response:****Interaction with other organisms:****Distribution****Status/origin:** Naturalised exotic, native to Europe.**Botanical subregions:** NC CC SC CT ST NWS SWS NWP SWP NFWP SFWP; Qld, Vic., Tas., N.T., S.A., W.A.**Distribution Sydney area:** Widespread.**Select locations:** Broadwater Swamp, Windsor, Shane Park, Nepean River (Menangle), Jenolan Caves (1899), Kowmung River, Macquarie River, Fitzroy Falls Reservoir (P. Kodela pers. comm.).**Habitat****Habitat:** River banks and in water.**Altitude:** 0–1000 m**Annual rainfall:** above 600 mm**Typical local abundance:** Frequent–occasional.**Vegetation:** Wetland and creekbank vegetation, e.g. with *Persicaria*, *Ranunculus*, *Juncus*, *Lythrum*.

Substrate: Water or wet sand, fertile–infertile. Watertable permanently high, moisture supply continuous, fresh.

Exposure: Sheltered situations.

Conservation:

Conservation

***Sinapis alba* ***

BRASSICACEAE

White Mustard

Life history

Growth form: Herb, stems 30–80 cm high.

Vegetative spread: No.

Longevity: 1 year.

Primary juvenile period: Less than 1 year.

Flowers: Yellow, February.

Fruit/seed: Capsule (silique) 20–40 mm long, mature February. Seeds spherical, 1.7–2.3 mm diam., 1–4 per cell, pungent-tasting.

Dispersal, establishment & growth:

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Mediterranean and W Asia.

Introduced to Australia as a cultivated crop for its pungent-tasting seeds.

Botanical subregions: CC ST CWS SWP; Qld, Tas.

Distribution Sydney area: Razorback.

Select locations: Razorback (1968).

Habitat

Habitat: Roadmaking earthworks.

Altitude: 300 m

Annual rainfall: 700 mm

Typical local abundance: Rare.

Vegetation:

Substrate: Roadmaking earthworks, clay soil, fertile.

Exposure:

Conservation

Conservation: Rare weed of cultivation.

***Sinapis arvensis* ***

BRASSICACEAE

Charlock

Life history

Growth form: Herb 30–80 cm high, stems often purplish.

Vegetative spread: No.

Longevity: Annual.

Primary juvenile period:

Flowers: Yellow, September.

Fruit/seed: Capsule (silique) 20–60 mm long, opening when ripe. Seeds globular, 1–2 mm diam., 6–12 per cell.

Dispersal, establishment & growth: Diaspore: seed.

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Europe, Asia and N Africa.

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

Distribution Sydney area: Glenfield.

Select locations: Glenfield (1954) only record.

Habitat

Habitat: Isolated patch in oat crop.

Altitude: 30 m

Annual rainfall: 800 mm

Typical local abundance: Rare.
Vegetation: Patch in oat crop.
Substrate: Probably clay soils, fertile.
Exposure: No shade.

Conservation: Occurs in more inland regions, accidental introductions near Sydney. **Conservation**

Sisymbrium irio

London Rocket

BRASSICACEAE

Growth form: Herb 25–60 cm high. **Life history**

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Yellow–pale yellow, August–September.

Fruit/seed: Capsule (silique) 2.5–6.5 cm long, opening when ripe. Seeds ovoid, 1 mm diam., about 40 per cell.

Dispersal, establishment & growth: Dispersal: seed, winter–spring-growing.

Fire response:

Interaction with other organisms:

Status/origin: Native NSW species, possibly introduced from western NSW by stock, first recorded 1963. **Distribution**

Botanical subregions: NC CC NWS CWS SWS NWP SWP NFWP SFWP; all mainland States, Europe.

Distribution Sydney area: Flemington Saleyards, sporadic.

Select locations: Narara Creek, Glenfield (1963), Narellan.

Habitat: Rubbish tip, saleyards, very disturbed sites. **Habitat**

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

Typical local abundance: Frequent.

Vegetation: With *Alternanthera philoxeroides*, for example. Ground stratum.

Substrate: Watertable mostly high.

Exposure:

Conservation: Occasionally apparently naturalised in very disturbed places. **Conservation**

Sisymbrium officinale *

Hedge Mustard

BRASSICACEAE

Growth form: Herb to 90 cm high. **Life history**

Vegetative spread: No.

Longevity: Less than 5 years.

Primary juvenile period:

Flowers: Yellow–pale yellow. October–November.

Fruit/seed: Capsule (silique) 1–2 cm long, opening when ripe, mature December. Seeds ellipsoid–ovoid, 1.5 mm long.

Dispersal, establishment & growth: Diaspore: seed, autumn–winter-growing weed.

Fire response:

Interaction with other organisms:

Status/origin: Naturalised exotic, native to Europe. **Distribution**

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

Distribution Sydney area:

Select locations: Epping, Flemington, Campbelltown, Picton, Jenolan Caves (1899), Mt Cameron, Orange, East Kangaloon (P. Kodela pers. comm.).

Habitat

Habitat: Various — disturbed sites, rubbish tips, pastures, moist forest.

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

Typical local abundance: Frequent.

Vegetation: Moist eucalypt forest, e.g. *Eucalyptus viminalis*–*E. radiata*. Ground stratum.

Substrate: Basalt, shale soils, fertile.

Exposure:

Conservation

Conservation: Widespread occasional weed; not in bushland except where severely disturbed (L. Johnson pers. comm.).

Sisymbrium orientale* **BRASSICACEAE**

Indian Hedge Mustard

Life history

Growth form: Herb 25–90 cm high.

Vegetative spread: No.

Longevity: 1–2 years.

Primary juvenile period:

Flowers: Yellow–pale yellow at any time, peak October.

Fruit/seed: Capsule (siliqua) 4–10 cm long, opening when ripe, mature January. Seed ovoid, 1 mm long, about 60 per cell.

Dispersal, establishment & growth: Diaspore: seed; an autumn–spring weed, prevalent in years of high winter–spring rainfall (Cunningham et al. 1981).

Fire response:

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to W Asia, Mediterranean.

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

Distribution Sydney area: Western Sydney, Bathurst. Southern Highlands (P. Kodela pers. comm.).

Select locations: Wondabyne, Royal Botanic Gardens (1902), Flemington Saleyards, Glenfield, Camden, Picton, Shellharbour, Bathurst, Meadow Flat, Moss Vale.

Habitat

Habitat: Stock pens, roadside, rubbish tip.

Altitude: 0–800 m **Annual rainfall:** above 600 mm

Typical local abundance: Occasional.

Vegetation: Ground stratum, e.g. with pasture grasses and other herbs.

Substrate: Disturbed sites. Fertile soil.

Exposure:

Conservation

Conservation: Weed of disturbed soil, not invasive of bushland.

Turritis glabra* **BRASSICACEAE**

Tower Mustard

Life history

Growth form: Biennial herb 60–120 cm high.

Vegetative spread:

Longevity: 2 years.

Primary juvenile period:

Flowers: Pale yellow, October.

Fruit/seed: Capsule (siliqua) 3–7 cm long.

Dispersal, establishment & growth: Diaspore: seeds.

Fire response:

Interaction with other organisms:

Status/origin: Naturalised exotic, native to Europe.

Botanical subregions: NT CT ST; Vic.

Distribution Sydney area: Jenolan Caves.

Select locations: Jenolan Caves (1899), only record for Sydney area.

Distribution

Habitat:

Altitude: 1000 m

Annual rainfall: 900 mm

Typical local abundance:

Vegetation: Ground stratum.

Substrate:

Exposure:

Habitat

Conservation: Rarely naturalised.

Conservation

***Buddleja davidii* ***

BUDDLEJACEAE

Butterfly Bush

Growth form: Shrub 1.5–3 m high.

Vegetative spread: No.

Longevity: 10–20 years.

Primary juvenile period: 2 years.

Flowers: White to lilac-purple, May–October, probably butterfly-pollinated.

Fruit/seed: Brownish capsule 5–10 mm long, 2-valved with many seeds.

Dispersal, establishment & growth: Diaspore: seed, wind-dispersed locally, establishes in moist rocky crevices. Possibly also water-dispersed (Carr et al. 1992).

Fire response: Possibly killed after high-intensity fire (P. Kubiak pers. comm.).

Interaction with other organisms:

Life history

Status/origin: Exotic, native to China and Japan, introduced as ornamental. Widely cultivated, persists in old gardens, naturalised in Blue Mountains.

Botanical subregions: NT CT ST.

Distribution Sydney area: Upper Blue Mountains.

Select locations: Lithgow (1979), also Katoomba, Leura (1993).

Distribution

Habitat: Naturalised on cliffs, railway cuttings, disturbed sites.

Altitude: 0–1000 m

Annual rainfall: above 1200 mm

Typical local abundance: Frequent.

Vegetation: Eucalypt open-forest, e.g. *Eucalyptus radiata*, *E. cypellocarpa*.

Substrate: Cliffs and cuttings, sandstone, infertile soil. Watertable mostly high, moisture supply intermittent, fresh.

Exposure: Full sun–mid shade.

Habitat

Conservation: Naturalised in upper Blue Mountains, possibly increasing in abundance, potential problem in urban bushland and bushland margins.

Conservation

***Buddleja madagascariensis* *** (*Nicodemia madagascariensis*)

BUDDLEJACEAE

Butterfly Bush

Growth form: Straggly shrub 1.5–4 m high.

Vegetative spread: Vegetative (anon 1991).

Longevity:

Primary juvenile period:

Flowers: Orange, May–October.

Life history

Fruit/seed: Globose berry, 5 mm long, blue-violet, with many seeds.

Dispersal, establishment & growth: Diaspore: berry, dispersal of fruit not known. Vegetative fragments dispersed in garden refuse or dispersed by gravity or water (Anon 1991).

Fire response: Resprouted from base after high-intensity fire 1/1994 at Narrabeen (P. Kubiak pers. comm.).

Interaction with other organisms:

Distribution

Status/origin: Naturalised exotic, native to Madagascar. Introduced as an ornamental, widely cultivated, persisting in old gardens, more or less naturalised in a few disturbed areas.

Botanical subregions: NC CC SC.

Distribution Sydney area: Sydney suburbs.

Select locations: Wisemans Ferry, Cheltenham, Narrabeen, Ermington, Nowra (1920).

Habitat

Habitat: Disturbed sites in moist forest, urban bush.

Altitude: 0–200 m **Annual rainfall:** above 750 mm

Typical local abundance: Occasional.

Vegetation: Moist eucalypt forest, e.g. with *Syncarpia glomulifera*, *Angophora costata*, *Eucalyptus pilularis*.

Substrate: Shale, laterite soils, fertile, watertable mostly high.

Exposure: Full sun.

Conservation

Conservation: Minor weed.

Index to Ecology of Sydney plant species 2

Scientific names are in bold type, synonyms or misapplied names are in italics and family names are in upper case. Common names are in roman type.

- A**
- Acanthospermum**
australe * 800
- Achillea**
distans
 subsp. *tanacetifolia* * 800
millefolium * 801
- Actites**
megalocarpa 801
- Adenostemma**
lavenia var. *lavenia* 802
- Ageratina**
adenophora * 802
riparia * 803
- Ageratum**
houstonianum * 804
- Ambrosia**
artemisiifolia * 804
confertifolia 806
psilostachya * 805
tenuifolia * 806
- Ammobium**
alatum 806
- Amsinckia**
calycina * 956
hispida 956
intermedia * 957
- Anchusa**
arvensis * 957
- Anredera**
cordifolia * 949
- Anthemis**
arvensis * 807
cotula * 807
- Arctium**
lappa * 808
minus * 808
- Arctotheca**
calendula * 809
nivca 809
populifolia * 809
- Arctotis**
australiensis 860
stoechadifolia * 810
 White 810
- Arrhenechthites**
mixta 811
- Artemisia**
verlotiorum * 811
- Artichoke**
 Globe 861
 Jerusalem 876
- Aster**
novi-belgii * 812
subulatus * 812
 ASTERACEAE 800-947
Austrocynoglossum
latifolium 958
- Avicennia**
marina subsp. *australasica* 948
 AVICENNIACEAE 948
- B**
- Baccharis**
halimifolia * 813
- Balsam 949
 BALSAMINACEAE 949
- Barbarea**
verna * 967
 BASELLACEAE 949
- Bauera**
capitata 950
microphylla 951
rubioides 951
 BAUERACEAE 950-951
 Bears-car 860
 Beauty-heads
 Lemon 827
 BERBERIDACEAE 952-953
- Berberis**
aristata * 952
darwinii * 952
- Bidens**
pilosa * 813
subalternans * 814
tripartita * 814
 BIGNONIACEAE 953-956
- Bindyi 931
 Bitou Bush 846
 Bittercress
 Common 973
 Wood 972
- Bogan Flea 829
 Boneseed 847
 Borage 959
 BORAGINACEAE 956-967
- Borago**
officinalis * 959

- Bottle-daisy
 Blue 885
- Brachycome**
 aculeata 815
 angustifolia
 var. *angustifolia* 816
 var. *heterophylla* 816
 decipiens 817
 diversifolia
 var. *dissecta* 817
 var. *diversifolia* 818
 formosa 818
 graminea 819
 heterodonta var. *heterodonta* 819
 microcarpa 820
 multifida
 var. *dilatata* 820
 var. *multifida* 821
 procumbens 821
 ptychocarpa 822
 rigidula 822
 scapiformis 823
 scapigera 823
 spathulata 823
 stuartii 824
- Bracteantha**
 bracteata 824
 viscosa 825
- Brassica**
 fruticulosa * 968
 juncea * 968
 rapa subsp. *silvestris* * 969
 tournefortii * 969
- BRASSICACEAE 968-994
 Buchan Weed 979
- Buddleja**
 davidii * 994
 madagascariensis * 994
- BUDDLEJACEAE 994-995
- Bugloss
 Viper's 962
 Wild 957
- Buglossoides**
 arvensis * 959
- Burdock
 Common 808
 Greater 808
- Burr
 Bathurst 947
 Cockle 946
 Noogoora 946
 South American 946
 White Daisy 828
- Burr-daisy
 Purple 828
 Rough 831
 Tufted 831
 Yellow 830
- Burweed
 Lawn 931
 Bushy Starwort 812
 Busy Lizzie 949
 Butterfly Bush 994
 Button Weed 930
- Buttons
 Scaly 888
 Water 856
 Yellow 848
- C**
- Cakile**
 edentula * 970
 maritima * 970
- Calendula**
 *arvensis** 825
 officinalis * 826
 palaestina * 826
- Calocephalus**
 citreus 827
- Calomeria**
 amaranthoides 827
- Calotis**
 cuneifolia 828
 dentex 828
 glandulosa 829
 hispidula 829
 lappulacea 830
 scabiosifolia var. *integrifolia* 831
 scapigera 831
- Camelina**
 alyssum * 971
- Cape Weed 809
- Capsella**
 bursa-pastoris * 971
- Cardamine**
 flexuosa * 972
 gunnii 972
 hirsuta * 973
 lilacina 974
 paucijuga 974
 species Y 975
- Cardaria**
 draba * 975
- Carduus**
 nutans subsp. *nutans* * 832
 pycnocephalus * 832
 pycnocephalus 833
 tenuiflorus * 833
- Carrot Weed 855
- Carthamus**
 lanatus * 833
 tinctorius * 834

- Cassinia**
aculeata 835
arcuata 835
aureonitens 836
compacta 837
cunninghamii 837
denticulata 838
laevis 838
leptocephala subsp. *leptocephala* 839
longifolia 839
quinquefaria 840
species D 840
 Sticky 841
trinerva 841
uncata 841
 Cat's Claw Creeper 953
 Catsear 882
 Smooth 881
Celmisia
longifolia species complex 842
Centaurea
australis 933
calcitrapa * 842
melitensis * 843
solstitialis * 843
Centipeda
cunninghamii 844
minima var. *minima* 845
 Chamomile
 Corn 807
Chamomilla
 suaveolens 891
 Charlock 991
 Jointed 986
 Chicory 849
 Chinese Shrub 835
Chondrilla
juncea * 845
Chrysanthemoides
monilifera
 subsp. *rotundata* * 846
monilifera *
 subsp. *monilifera* 847
Chrysocephalum
apiculatum 848
semipapposum 848
Cichorium
intybus * 849
Cirsium
vulgare * 850
 Cobblers Pegs 813
 Cobbler's Tack 869
Conringia
orientalis * 976
Conyza
albida * 851
bilbaoana * 851
bonariensis * 852
canadensis var. *canadensis* * 853
parva * 853
 Coreopsis 854
 lanccolata * 854
 Coronopus
 didymus * 976
 Cosmos 854
 bipinnatus * 854
Cotula
 alpina 855
 Alpine 855
 australis 855
 Common 855
 coronopifolia * 856
 longipes 886
 Cough Bush 838
Craspedia
 canens 857
 variabilis 857
Crassocephalum
crepidioides * 858
Crepis
 capillaris * 858
 foetida subsp. *vulgare* * 859
 setosa * 859
Cress
 Field 981
 Hoary 975
 Mountain 978
 Yellow 990
 Cretan Weed 875
 Crofton Weed 802
 Crownbeard 939
Cryptostemma
 calendula 809
 Cudweed
 Creeping 866
 Jersey 910
 Purplish 871
 Spoon 933
 Star 867
 White 938
Cymbonotus
 lawsonianus 860
 lawsonianus 860
 preissianus 860
Cynara
 scolymus * 861
Cynoglossum
 australe 960
 latifolium 958
 suaveolens 960
D
Daisy
 Beach 809
 Cut-leaved 820, 821

Field 817
 Hill 815
 Large Copper-wire 909
 Large-headed 817, 818
 Michaelmas 812
 Oxeye 888
 Showy Copper-wire 910
 Snow 842
 Sticky 802
 Western New Holland 945
 White Paper 878

Daisy Bush
 Blush 898
 Rough 893
 Silky 896
 Sticky 895
 Dandelion 935
 Cape 809

Delairea
odorata * 861

Dimorphotheca
pluvialis * 862

Diplotaxis
muralis * 977

Dittrichia
graveolens * 862

Dogwood
 White 906

Dolly Bush 835

Drabastrum
alpestre 978

E

Echinops
sphaerocephalus * 863

Echium
lycopsis 961
plantagineum * 961
vulgare * 962

Eclipta
platyglossa 863

Ehretia
acuminata var. *acuminata* 962

Enydra
fluctuans 864

Epaltes
australis 864

Erechtites
valerianifolia * 865

Erigeron
karvinskianus * 866

Erophila
verna
 subsp. *praecox* * 978
 subsp. *verna* * 979

Euchiton
gymnocephalus 866

involutcratus 867

Euryops
chrysanthemoides * 867

Everlasting
 Button 879
 Clustered 848
 Common 848
 Golden 824
 Pale 879
 Satin 878
 Sticky 825
 Tree 907

F

Facelis
retusa * 868

Feverfew 934

Fiddleneck
 Common 957

Fireweed 921
 Brazilian 865

Cotton 923

Hill 917

Purple 811

Flame Vine 955

Flatweed 882
 White 881

Flaxweed
 Stinking 972

Fleabane
 Bony-tip 866
 Canadian 851, 853
 Flaxleaf 852
 Tall 851

Forget-me-not 966
 Australian 965

Wood 967

Fuzzweed 941

G

Galinsoga
parviflora * 868

Gamolepis
chrysanthemoides 867

Gazania
rigens * 869

Glossogyne
tannensis 869
tennifolia 869

Gnaphalium
americanum * 870
calviceps * 871
candidissimum 938
coarctatum 871
gymnocephalum 866
involutcratum 867
luteo-album 910

- pensylvanicum* * 872
polycaulon 872
sphaericum 873
 Goldenrod 929
 Grass Cushion 883
 Greater Beggar's Ticks 814
Grindelia
 camporum var. *australis* * 873
 Groundsel 926
 Variable 918, 919
 Groundsel Bush 813
Guizotia
 abyssinica * 874
Gymnocoronis
 spilanthoides * 874
H
 Hairy Brassica 979
Halgania
 brachyrhyncha 963
 Hare's Ear 976
 Hawkbit
 Lesser 886
 Hawksbeard
 Smooth 858
 Stinking 859
 Hawkweed
 Yellow 936
 Hawkweed Picris 908
Hedypnois
 rhagadioloides subsp. *cretica* * 875
Helianthus
 annuus * 875
 tuberosus * 876
Helichrysum
 adenophorum var. *waddelliae* 876
 adnatum 905
 apiculatum 848
 argophyllum 906
 bracteatum 824
 calvertianum 877
 collinum 877
 dendroideum 907
 diosmifolium 906
 elatum 878
 leucopsideum 878
 rosmarinifolium 908
 rutidolepis 879
 scorpioides 879
 semipapposum 848
 viscosum 825
 Heliotrope
 Blue 963
 Common 964
Heliotropium
 amplexicaule * 963
 europaeum 964
Helipterum
 albicans var. *graminifolium* 890
 albicans 889
 anthemoides 911
 australe 938
 pygmaeum 911
Helminthotheca
 echioides * 880
Hemizonia
 pungens * 880
Hirschfeldia
 incana * 979
 Honesty 985
 Honeysuckle
 Cape 955
Humea
 elegans 827
Hypochoeris
 glabra * 881
 microcephala var. *albiflora* * 881
 radicata * 882
I
Impatiens
 walleriana * 949
 Incense Plant 827
 Indian Weed 927
Ireneparsus
 trypherus 980
Isoetopsis
 graminifolia 883
 Ivy
 Cape 861
J
 Jalap 949
 Jo-jo 931
 Dwarf 930
K
 Koda 963
L
Lactuca
 saligna * 883
 serriola * 884
Lagenifera
 bellioides 928
 gracilis 884
 sp. *A* var. *B* 929
 sp. *B* 928
 stipitata 885
Lagenophora
 Common 885
 Slender 884
 Lamb's Tail 949
Leontodon
 taraxacoides subsp. *taraxacoides* * 886

Lepidium

- africanum* * 980
- bonariense* * 981
- campestre* * 981
- draba* 975
- fasciculatum* 982
- hysopifolium* 982
- peregrinum* 983
- perfoliatum* * 983
- pseudohysopifolium* 984
- pseudotasmanicum* 984

Leptinella

- longipes* 886

Leptorhynchus

- elongatus* 887
- nitidulus* 887
- squamatus* subsp. A 888

Lettuce

- Prickly 884
- Willow-leaved 883

Leucanthemum

- vulgare* subsp. *maximum* * 888

Leucochrysum

- albicans*
 - subsp. *albicans* var. *albicans* 889
 - subsp. *albicans* var. *tricolor* 889
- graminifolium* 890

Leuzea

- australis* 933

Lithospermum

- arvense* 959

Lobularia

- maritima* * 985

Lunaria

- annua* * 985

Lycopsis

- arvensis* 957

M**Macfadyena**

- unguis-cati* * 953

Madeira Vine 949**Madia**

- sativa* * 890

Mahonia

- leschenaultii* * 953

Maltese Cockspur 843**Mangrove**

- Grey 948

Marigold

- Burr 814
- Cape 862
- Dwarf 912
- Field 825
- Palestine 826

Matricaria

- matricarioides* * 891
- perforata* 937

Mayweed

- Scentless 937
- Stinking 807

Melanthera

- biflora* 891

Microseris

- lanceolata* 892

Mist Flower 803**Mugwort** 811**Musk**

- Native 893

Mustard

- Giant 987
- Hedge 992
- Indian 968
- Indian Hedge 993
- Tower 993
- Treacle 976
- White 991

Myosotis

- australis* 965
- caespitosa* * 965
- discolor* * 966
- exarrhena* 966
- suavcolens* 966
- sylvatica* * 967

N**Nicodemia**

- madagascariensis* 994

Niger Seed 874**Nut-heads**

- Spreading 864

O**Olearia**

- argophylla* 893
- asterotricha* 893
- burgessii* 894
- chrysophylla* 894
- cordata* 895
- elliptica* 895
- erubescens* 896
- glandulosa* 896
- lirata* 902
- megalophylla* 897
- microphylla* 897
- myrsinoides* 898
- nernstii* 898
- oliganthema* 899
- phlogopappa* 899
- quercifolia* 900
- ramosissima* 900
- ramulosa* 901
- rosmarinifolia* 901
- stellulata* 902
- suffruticosa* 902

- tenuifolia* 903
- tomentosa* 903
- viscidula* 904
- Onopordum**
- acanthium* subsp. *acanthium* * 904
- Osteospermum**
- ecklonis* * 905
- Ox-tongue 880
- Ozothamnus**
- adnatus* 905
- argophyllus* 906
- diosmifolius* 906
- ferrugineus* 907
- rosmarinifolius* 908

P

- Pandorea**
- pandorana* 954
- Peppercress 982, 984
- Picris**
- echioides* 880
- hieracioides* * 908
- Pigny Sunray 911
- Pilliga Posy 818
- Pineapple Weed 891
- Pitch-forks 813
- Pitchweed 890
- Podolepis**
- canescens* 909
- hieracioides* 909
- jaceoides* 910
- Potato Weed 868, 964
- Pseudognaphalium**
- luteoalbum* 910
- Pyrostegia**
- venusta* * 955

R

- Radish 987
- Wild 986
- Ragweed
- Annual 804
- Lacy 806
- Perennial 805
- Ragwort 918
- Rantil 874
- Raphanus**
- raphanistrum* * 986
- sativus* * 986
- Rapistrum**
- rugosum* * 987
- Rhodanthe**
- anthemoides* 911
- pygmaea* 911
- Rocket
- London 992
- Sea 970
- Wall 977

- Roldana**
- petasitis* * 912
- Rorippa**
- dictyosperma* 987
- gigantea* 988
- laciniata* 989
- microphylla* * 989
- nasturtium-aquaticum* * 990
- palustris* * 990

S

- Safflower 834
- Salsify 937
- Schkuhria
- pinnata* var. *abrotanoides** 912
- Sea Rocket 970
- American 970
- Senecio**
- amygdalifolius* 913
- anacampserotis* 913
- bipinnatisectus* 914
- biserratus* 914
- crassiflorus* * 915
- diaschides* 915
- glomeratus* 916
- hispidulus*
- var. *dissectus* 916
- var. *hispidulus* 917
- jacobaea* * 918
- lautus*
- subsp. *dissectifolius* 918
- subsp. *lanceolatus* 919
- subsp. *maritimus* 919
- linearifolius* 920
- macranthus* 920
- madagascariensis* * 921
- mikanioides* 861
- minimus* 922
- petasitis* 912
- pterophorus* * 922
- quadridentatus* 923
- species E* 923
- tamioides* * 924
- tenuiflorus* 924
- vagus*
- subsp. *eglandulosus* 925
- velleioides* 926
- vulgaris* * 926
- Sheepweed 960
- Shepherd's Purse 971
- Sifton Bush 835
- Sigesbeckia**
- orientalis* subsp. *orientalis* 927
- Silver Shrub 893
- Silybum**
- marianum* * 927

- Sinapis*
alba * 991
arvensis * 992
Sisymbrium
irio 992
officinale * 992
orientale * 993
 Skeleton Weed 845
 Sneeze Weed
 Common 844
 Spreading 845
 Snow Bush 897
Solenogyne
bellioides 928
dominii 928
gunnii 929
Solidago
canadensis var. *scabra* * 929
Soliva
anthemifolia * 930
pterosperma 931
sessilis * 931
Sonchus
asper
 subsp. *glaucescens* * 931
hydrophilus 932
megalocarpus 801
oleraceus * 932
 Sowthistle
 Common 932
 Native 932
 Prickly 931
Sphaeromorpha
australis 864
 Spikeweed 880
Stemmacantha
australis 933
 Stinking Roger 934
 Stinkwort 862
Stuartina
muelleri 933
 Sunflower
 Common 875
 Sweet Alyssum 985
 Swinecress
 Lesser 976
- T**
- Tagetes*
minuta * 934
Tanacetum
parthenium * 934
vulgare * 935
 Tansy 935
 Tansyleaf Milfoil 800
Taraxacum
officinale * 935
- Tarweed 890
 Tea
 Senegal 874
Tecoma 956
 capensis * 955
 stans * 956
 Temple Plant 874
 Thickhead 858
 Thistle
 Cockspur 843
 Dune 801
 Globe 863
 Nodding 832
 Saffron 833
 Scotch 904
 Slender 832
 Spear 850
 St Barnaby's 843
 Star 842
 Variegated 927
 Winged Slender 833
Tolpis
umbellata * 936
Tragopogon
porrifolius * 937
Tripleurospermum
inodorum * 937
Triptilodiscus
pygmaeus 938
 Turnip 969
 Mediterranean 970
 Twiggy 968
 Turnip Weed 987
Turritis
glabra * 993
 Twin-heads 863
- V**
- Vellereophyton*
dealbatum * 938
Verbesina
encelioides subsp. *encelioides* * 939
Vernonia
cinerea
 var. *cinera* 939
Vittadinia
cervicularis
 var. *cervicularis* 940
 var. *subcervicularis* 940
cuneata
 var. *cuneata* forma *cuneata* 941
 var. *cuneata* forma *minor* 941
dissecta var. *dissecta* 942
 form *a* 941
 form *b* 941
 gracilis 942

hispidula
var. *hispidula* 943
var. *setosa* 943
hispidula 943
muelleri 944
pustulata 944
sp. E 942
sp. F 945
sp. G 944
sp. H 944
sulcata 945
tenuissima 945

W

Wallaby Weed 904
Watercress 990
Marsh 990
One-rowed 989
Wedelia
biflora 891
White Weed 975
Whitlow Grass 978
Wild Aster 812
Wintercress 967, 968
Wonga Wonga Vine 954
Woodcress
Hairy 973
Wormwood
Chinese 811

X

Xanthium
cavanillesii * 946
chinese 946
occidentale * 946
pungens 946
spinosum * 947

Y

Yarrow 801