# Ecology of Sydney Plant Species Part 1

## Ferns, fern-allies, cycads, conifers and dicotyledon families Acanthaceae to Asclepiadaceae

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### Abstract

*Benson, Doug and McDougall, Lyn (National Herbarium of New South Wales, Royal Botanic Gardens, Sydney, Australia 2000) 1993. Ecology of Sydney Plant Species: part 1 — ferns, fern-allies, cycads, conifers and dicotyledon families Acanthaceae to Asclepiadaceae. Cunninghamia* 3(2) 257–422. Ecological data in tabular form is provided on 350 plant species, both native and 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).

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

Conventional botanical floras and handbooks provide descriptions useful for identifying species, but give relatively little ecological and biological data. Similarly the wide range of illustrated plant books and those aimed at the gardener may give the impression that much is known, but in fact provide mainly plant descriptions with some broader information on plant growth and propagation. Very little of this helps us to understand the plant and its behaviour in its natural habitat. Yet such information is becoming increasingly relevant for natural area managers, who have the task of trying to predict the ecological consequences of different bushland management practices, 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 necessary for environmental impact assessment and predicting the effects of changes in drainage, water movement, wind exposure, nutrient conditions and fire regimes on plant species and communities. For example Leishman *et al.* (1992) argue that greater knowledge of seed and seedling biology will be needed if we are to predict changes in species distribution in response to shifting climatic patterns. Fire ecology is an area in which there has been considerable research, and Gill & Bradstock (1992) have recently proposed a national register for fire responses of plant species.

Peter Myerscough, in his 1990 Linnean Society of New South Wales Presidential Address, suggested that attributes of plants be described and compared over all stages of their life cycles to seek relationships between syndromes of plant attributes and ranges of habitats occupied by them. 'Understanding the Australian flora involves, firstly, knowing what plants make it up and where they occur, secondly, knowing their origins in geographical and evolutionary terms, and, thirdly, knowing how they inhabit their respective habitats and interact with other components of their environment. The first two sets of knowledge are being addressed on an institutional basis in herbaria across Australia. The third has yet to be tackled in any organised institutional way.' (Myerscough 1990).

Through *Ecology of Sydney Plant Species* we hope to provide ecological information on Sydney plants, both native and naturalised, with particular emphasis on data that is relevant to ecologists and land-use or conservation managers. This information will be largely complementary to the descriptive texts in taxonomic handbooks such as the *Flora of New South Wales* (Harden 1990–93), and covers growth form, flowering and fruiting times, longevity and maturity periods, pollination and seed dispersal, distribution, habitat and plant community, as well as response to fire and disturbance if data is available. Such information is often difficult to obtain because it is either scattered through various references, both scientific and general, or simply not available in written form, but held in the capacious memories of field and herbarium botanists. Indeed often no-one has noted whether a species resprouts after fire, or how it is dispersed, and much of this data must be compiled anew from direct field observations.

Many gaps will be evident beside headings such as longevity, fire response, exposure and conservation. This reflects our current lack of basic information for many species and we encourage readers to document their own observations both in the field and under controlled conditions. Information about species for inclusion in future parts would be particularly useful and can be sent to the Ecology Section, Royal Botanic Gardens, Sydney.

## Methods

For *Ecology of Sydney Plant Species*, 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* (Beadle *et al.* 1982), 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

The project was briefly outlined by Benson (1991). For each species (and generally for subspecies) a data sheet is prepared incorporating life history, distribution and habitat data from specimens in the National Herbarium of New South Wales; this information is entered in a database. To this is 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 will then be published in parts in *Cunninghamia* (beginning with this issue), 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. Some slight alterations to categories have been made to reflect the different life cycles of ferns, cycads and conifers, but the general layout is similar to that for other taxa.

Emphasis has been given to understanding the species in its wild habitat. For this reason data on cultivation and artificial propagation, readily available in various 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 plant's ecology.

## Botanical Nomenclature

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

**Common name:** Names currently recognised at the National Herbarium and 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 and growth (diaspore).
**Source:** Flora descriptions, Herbarium specimens, field observations.

**Longevity:** Average potential life-span under natural conditions — range in years where possible, otherwise short <10 years, medium 10–30 years, long 50 years or more, indefinite, where death is not a result of inherent growth e.g. continued rhizomatous growth. Longevity may be shorter in cultivation.
**Source:** literature, authors' assessment from field observations.

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

**Reproduction:** For ferns — nature, time, size etc. of spores; for cycads and conifers — nature of cones, pollination vector, maturation period; for angiosperms, reproduction separated into:

> **Flowers:** Flowering period — range of months and, where possible, peak month based on frequency of herbarium collections. Pollination vectors.
> **Source:** Herbarium specimens, field observations, *Flora of New South Wales*, literature.
>
> **Fruit:** Fruit shape and size, particularly with respect to potential dispersal agents. Maturation period. Seed size and number.
> **Sources:** Various.

**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 inhibition of seed germination].
**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 Census.

**Distribution in Sydney area:** Main geographic regions occupied by species.
**Source:** Herbarium specimen records.

**Selected locations:** Restricted to 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 the 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 1

The majority of Part 1 concerns ferns, gymnosperms and cycads. Many of these species are easily recognised and the ferns in particular have been the subjects of several books (e.g. Jones & Clemesha 1981, Duncan & Isaac 1986). Yet, with the exception of *Pteridium esculentum*, there has been virtually no ecological study of any of these fern species, for

example in regard to dispersal, growth rates or colonising behaviour. Similar comments apply to gymnosperms and cycads and the dicotyledon families. For the latter, data on pollination vectors and dispersal mechanisms are particularly limited. Data on fire responses are available for common, conspicuous species but not for the smaller, less obvious species. Longevity of species, apart from annuals, is rarely noted. The conservation status of many species is unknown. Species where there is most information are generally exotic weeds of concern to agriculture; yet 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.

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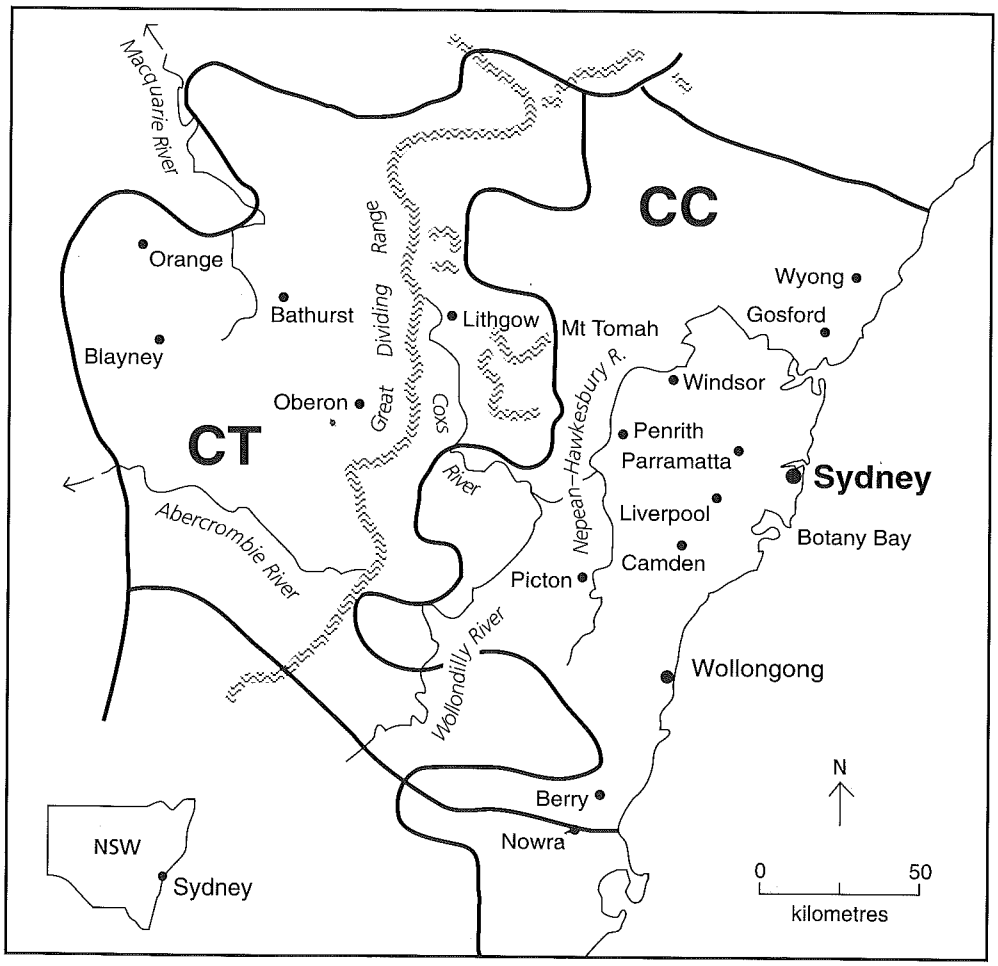
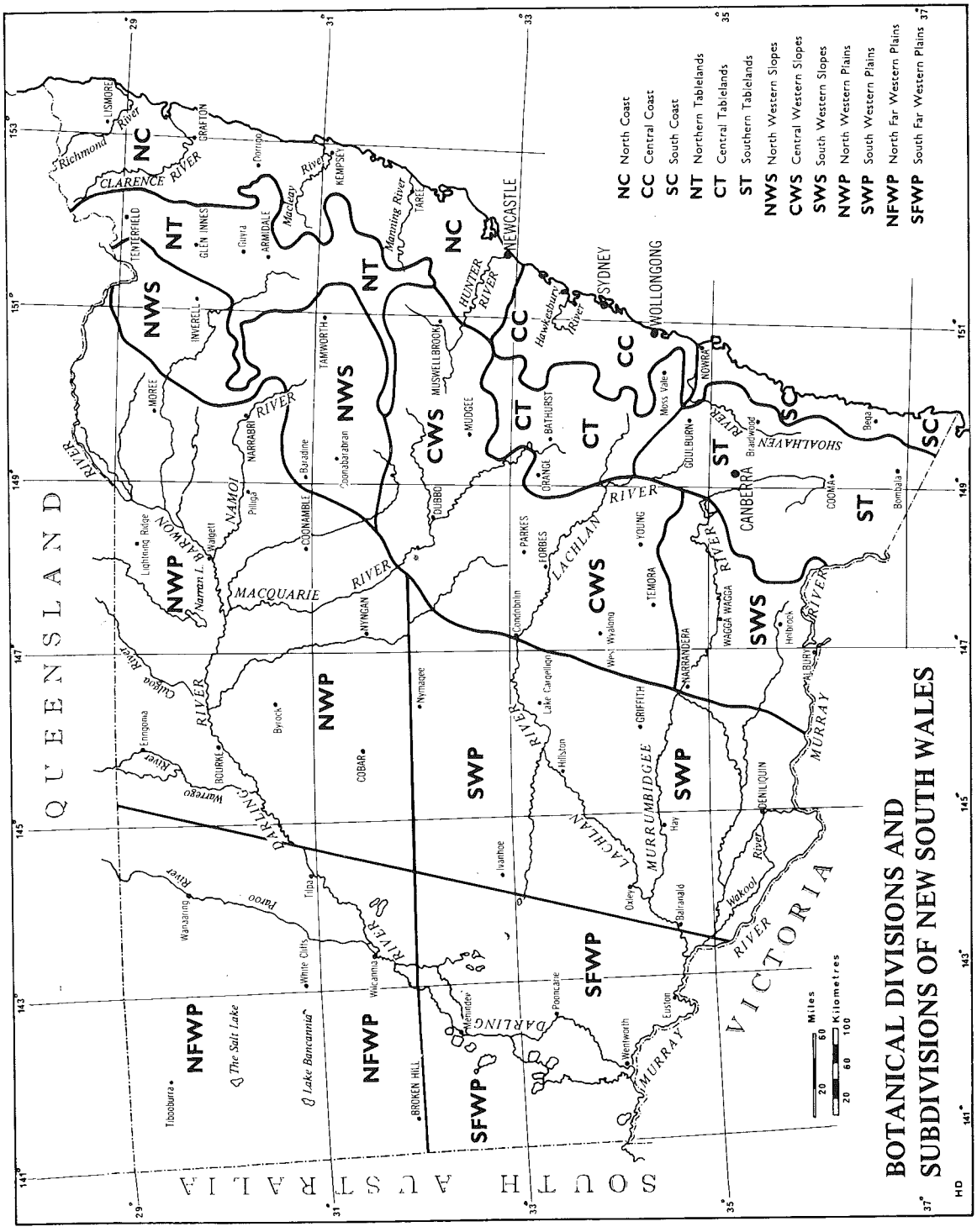



## The Sydney region

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




For explanation and description of the Botanical Divisions and Subdivisions of New South Wales see Anderson, R. H. (1961). Introduction. *Contr. New South Wales Natl. Herb. Fl. New South Wales* Nos 1–18, pp. 1–15.

## Ferns and Fern Allies

### **Adiantum aethiopicum** ADIANTACEAE

Common Maidenhair

#### Life history

**Growth form:** Terrestrial fern with creeping rhizome.
**Vegetative spread:** Suckers profusely from underground rhizomes and quickly spreads to a sizeable clump.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores sporadically throughout the year. Spores 7 months after fire (Bantry Bay, L.McD.). Spore size 30–39 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easy to grow in moist semi-protected position but resents total shade (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level. Would be very fire-sensitive in open situations but probably tolerant when rhizomes are amongst rocks (P. Bostock pers. comm.).
**Interaction with other organisms:**

#### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS; all states cosmop.
**Distribution Sydney area:** Widespread, coast and mountains.
**Select locations:** Gosford, Pennant Hills, Grose Vale, Loftus, Razorback, Mt Wilson, Jenolan Caves, Hill End, Bundanoon.

#### Habitat

**Habitat:** Damp open situations, often along creeks.
**Altitude:** 0–900 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Eucalypt open-forest and scrubland, floodplain in tall open-forest with *Eucalyptus saligna, Eucalyptus deanei, E. elata, E. tereticornis, Angophora floribunda* or in *Casuarina glauca* low closed-forest.
**Substrate:** Clay banks and sheltered rock crevices, at the base of cliffs. On shale, sand, limestone & basalt. Soil fertile–infertile, damp, moist. Water table mostly high, moisture supply intermittent, fresh. Possibly salt tolerant, calcium present (P. Hind pers. comm.).
**Exposure:** Sheltered; light shade (relatively bright, will tolerate full sun if moisture present, P. Hind pers. comm.).

#### Conservation

**Conservation:** Adequately conserved e.g. conserved in Western Sydney (Benson & McDougall 1991).

## Adiantum diaphanum ADIANTACEAE

Filmy Maidenhair

### Life history

**Growth form:** Terrestrial fern with ± erect, condensed rhizome; rootlets with small but prominent tubers (Bostock pers. comm.).
**Vegetative spread:** Clonal colonies formed by proliferation from root buds (Bostock 1992).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
Spore size 27–40 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). Small tubers on the roots store starch (Shinagawa 1962) [Easily grown and will tolerate very dark conditions (Jones & Clemesha 1981).]
**Fire response:** Likely to be killed (P. Bostock pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT**; Qld, Vic., N.Z., Pac. Is, Malesia, China.
**Distribution Sydney area:** Coast & mountains — rare, (though common further north, P. Hind pers. comm.).
**Select locations:** Mosman, Como, Austinmer, Sublime Pt, Cambewarra, Minnamurra, Brogers Ck, Mountain Lagoon, Katoomba.

### Habitat

**Habitat:** Sheltered gullies, along streams or near waterfalls in rock crevices.
**Altitude:** 0–900 m **Annual rainfall:** 1200–1400 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest.
**Substrate:** On wet clay banks and dripping rock faces and ledges, on sandstone or shales, infertile soil. Moisture supply continuous, in seepages (P. Hind pers. comm.).
**Exposure:** Very sheltered, deep shade (P. Hind pers. comm.).

### Conservation

**Conservation:** Rare. Probably not adequately conserved.
Regionally rare in Illawarra region (Mills 1988).

## Adiantum formosum ADIANTACEAE

Giant Maidenhair

### Life history

**Growth form:** Terrestrial fern with fronds 60–120 cm tall.
**Vegetative spread:** Colonies formed by long-creeping rhizome, often deeply buried, down to 30 cm in loamy soil conditions (P. Bostock pers. comm.).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
Spores at any time. Spore size 23–32 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Vigorous & easily grown (Jones & Clemesha 1981) once established, initial establishment difficult (P. Hind pers. comm.).]
**Fire response:** Probably resprouts (P. Bostock pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** CWS; Qld, Vic., N.Z.
**Distribution Sydney area:** Coast and Blue Mountains.
**Select locations:** Ourimbah, Mountain Lagoon, Grose Vale, Ryde, Royal NP, Cambewarra, Minnamurra, Mt Wilson, Blackheath, Bundanoon.

### Habitat

**Habitat:** Moist forest floor, creek banks, hillsides, rocky cliffs.
**Altitude:** 0–1000 m **Annual rainfall:** 1200–1400 mm
**Typical local abundance:** Frequent
**Vegetation:** Rainforest or tall open-forest.
**Substrate:** Alluvial flats, deep rich soil, basalt, sandstone. Soil fertile, water table mostly high, continuous supply of moisture; can tolerate periodic inundation but not found on soggy areas, good drainage (P. Hind pers. comm.). Non-saline.
**Exposure:** Sheltered situations, mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Adiantum hispidulum** var. **hispidulum** ADIANTACEAE

Rough Maidenhair

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome, occasionally or frequently producing stolons (runners).
**Vegetative spread:** Spread by creeping rhizome and stolons.
**Longevity:** Indefinite.
**Reproduction:** Spores any time, peak August. Asexual reproduction (apomixis) leads to ± stable populations from mutation events. Hence numerous 'forms', some described as varieties e.g. var. *hypoglaucum* Domin and var. *whitei* (Bailey) P. Bostock and at least one described as a species (*A. pubescens* Schkuht) (P. Bostock pers. comm.). Spores produced in sori on lower surface of frond. Spore size 30–44 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Spores retain viability 10–15 years (Jones 1987). In the right conditions, rhizomes can stand considerable stress (roots deep in cool crevices etc., fronds shrivelled (P. Bostock pers. comm.). [Easy and hardy species to grow (Jones & Clemesha 1981).]
**Fire response:** Flush of growth from rhizome after fire (P. Hind pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** NWS; Qld, Vic., N.T., N.Z., Pac. Is, Malesia, Afr.
**Distribution Sydney area:** Coast and Blue Mountains.
**Select locations:** Howes Valley, Wheeny Creek, Patonga, Pennant Hills, Razorback, Austinmer, Minnamurra, Jenolan Caves, Wentworth Falls, Capertee.

### Habitat

**Habitat:** Often amongst rocks, in crevices, in locally moist sites.
**Altitude:** 10–1000 m **Annual rainfall:** 700–1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest & tall open-forest. In *Ceratopetalum–Doryphora* rainforest at Bundanoon (P. Bostock pers. comm.).
**Substrate:** Often amongst rocks and in crevices on sandstone and shale soils, fertile or infertile. Water table mostly high, moisture continuous? Non-saline. Drainage good (P. Hind pers. comm.).
**Exposure:** Sheltered; mid shade (tolerates more light than *A. formosum*, P. Hind pers. comm.).

### Conservation

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

## **Adiantum silvaticum** ADIANTACEAE

### Life history

**Growth form:** Terrestrial fern to 1 m high with long-creeping rhizome usually on soil surface.
**Vegetative spread:** Limited spread.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Slow-growing but hardy (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** **CT**; Qld.
**Distribution Sydney area:** North from the Illawarra region, coast & Blue Mountains.
**Select locations:** Gosford, Mountain Lagoon, Kurrajong, Wentworth Falls, Blackheath, Mt Wilson, Royal NP (southern limit).

### Habitat

**Habitat:** Often along streams and moist cliff faces (and in gullies, P. Hind pers. comm.).
**Altitude:** 0–900 m **Annual rainfall:** 1000–1200 mm
**Typical local abundance:**
**Vegetation:** Grows in rainforest; on forest floor with *Lastreopsis* (P. Hind pers. comm.) and *Blechnum*.
**Substrate:** Rocky areas, sandstone and sandy alluvium and basalt, P. Hind pers. comm.). Soil fertile. Moisture supply continuous, seepages, non-saline.
**Exposure:** Sheltered. Deep–mid shade (P. Hind pers. comm.).

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988). Conservation status elsewhere unknown.

## Asplenium aethiopicum ASPLENIACEAE

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Short creeping rhizome perhaps spreading 5–10 cm.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, in July.
**Dispersal, establishment & growth:** Diaspore: spores, dispersed by wind, probably no dormancy mechanism. Drops fronds in response to drought (P. Hind pers. comm.).
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld, Vic., W.A., Afr.
**Distribution Sydney area:** North from Mt Keira (Harden 1990).
**Select locations:** Watagan Mtns, Colo River Gorge, Boorai Creek, Erskine Creek, (not recorded from Illawarra by Mills 1988).

### Habitat

**Habitat:** On or amongst rocks in sheltered gullies.
**Altitude:** 0–400 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Rare.
**Vegetation:** Closed-forest with *Backhousia myrtifolia* and *Ceratopetalum apetalum* with *Pyrrosia rupestris* (P. Hind pers. comm.).
**Substrate:** On or amongst sandstone rocks, soil infertile, water table mostly high, moisture supply intermittent.
**Exposure:** Mid shade (P. Hind pers. comm.).

### Conservation

**Conservation:** Rare, but most sites are in conservation areas.

## Asplenium attenuatum ASPLENIACEAE

Simple Spleenwort

### Life history

**Growth form:** Terrestrial fern with erect, tufted rhizome.
**Vegetative spread:** Plantlet produced on frond ends and large bunches of plants may be linked together (Jones & Clemesha 1981).
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Spores March, May (limited data).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [In cultivation easily grown and hardy, but slow growing (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld.
**Distribution Sydney area:** Coast, lower Blue Mountains.
**Select locations:** Gosford (1888), Burralow Creek, Mountain Lagoon, Illawarra–Wongawilli (Mills 1988).

### Habitat

**Habitat:** Usually on damp rocks in shady places or gullies.
**Altitude:** 0–500 m **Annual rainfall:** above 900 mm
**Typical local abundance:**
**Vegetation:** Rainforest along creeks e.g. with *Blechnum ambiguum, Blechnum patersonii, Microsorium scandens.*
**Substrate:** Sandstone rocks. Soil infertile. Non-saline conditions.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988) and elsewhere.

## **Asplenium australasicum** ASPLENIACEAE

Bird's Nest Fern

### Life history

**Growth form:** Epiphytic or lithophytic with erect, stout rhizome.
**Vegetative spread:** No vegetative spread.
**Longevity:** Long-lived.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period August.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind; no special morphology (Westoby *et al.* 1990). Probably no dormancy mechanism. [Easily cultivated, easily raised from spores (Jones & Clemesha 1981).]
**Fire response:** Probably killed by fire.
**Interaction with other organisms:** Host to Leaf Nematodes (*Aphelenchoides* spp.) (Jones & Elliot 1986).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** CWS; Qld, Vic., Pac. Is.
**Distribution Sydney area:** Widespread — Coast and Blue Mountains.
**Select locations:** Calga, Cordeaux Dam, Illawarra (Mills 1988), Albion Park, Blackheath.

### Habitat

**Habitat:** On rocks or as large epiphytes in trees.
**Altitude:** 0–900 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Gully rainforest.
**Substrate:** Growing in trees sometimes in the crown and on rocks on shale or basalt soils, fertile–very fertile. Moisture supply intermittent, fresh.
**Exposure:** Sheltered; mid–light shade.

### Conservation

**Conservation:** Abundance reduced by plant collectors, current conservation status unknown.

## **Asplenium bulbiferum** subsp. **gracillimum** ASPLENIACEAE

Mother Spleenwort

### Life history

**Growth form:** Clumped terrestrial or epiphytic fern.
**Vegetative spread:** Develops bulbils on the fronds to form new plants.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period November–August, spore size 20–28 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily propagated and hardy (Jones & Clemesha 1981).]
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:** Host to Leaf Nematodes (*Aphelenchoides* spp.) (Jones & Elliot 1986).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST; Qld, Vic., Tas., S.A., N.Z.
**Distribution Sydney area:** Mainly Upper Blue Mountains.
**Select locations:** Mt. Coricudgy, Mt Tomah, Mt Wilson, Mt Irvine, Pennant Hills (1921), Cambewarra (1886).

### Habitat

**Habitat:** Terrestrial or growing on rocks, trees or treefern trunks.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Warm temperate rainforest e.g. *Sassafras–Quintinia* with little ground cover except ferns — *Leptopteris fraseri, Blechnum patersonii, Polystichum formosum, Lastreopsis acuminata.*
**Substrate:** Base of steep rocks or steep banks on basaltic soil, may be sandstone, rarely epiphytic on trunks or *Dicksonia antarctica.* Very fertile soil, well drained. Moisture supply intermittent, fresh.
**Exposure:** Sheltered situations in deep shade.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988) and probably elsewhere.

## Asplenium difforme ASPLENIACEAE

### Life history

**Growth form:** Terrestrial fern with stout, erect rhizome
**Vegetative spread:** Probably none.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing time August–December.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NC; Qld, N.I.
**Distribution Sydney area:** Headlands — Broken Bay to La Perouse.
**Select locations:** Barrenjoey Peninsula, Watsons Bay, Bondi/Tamarama, La Perouse.

### Habitat

**Habitat:** In rocky crevices on headlands near the sea.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare–occasional.
**Vegetation:** Ferns in rock crevices e.g. with *Cyrtomium*.
**Substrate:** Crevices in sandstone cliff faces, permanent moisture.
**Exposure:**

### Conservation

**Conservation:** La Perouse southern limit, probably inadequately conserved.

## Asplenium flabellifolium ASPLENIACEAE

Necklace Fern

### Life history

**Growth form:** Trailing, terrestrial fern with short, erect rhizome.
**Vegetative spread:** A trailing species that forms colonies by rooting and proliferating from the tips of the fronds.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time. Spore size 45–60 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:** Fronds shown to have significant concentrations of poisonous cyanogenetic glucosides (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS; Qld, Vic., Tas., N.Z.
**Distribution Sydney area:** Coast and Blue Mountains.
**Select locations:** Gosford, Neutral Bay, Eastwood, Waterfall, Razorback, Jamberoo, Springwood, Blackheath, Jenolan Caves, Mt Bindo, Robertson.

### Habitat

**Habitat:** Chiefly in damp rock crevices.
**Altitude:** 0–1100 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Rare–frequent.
**Vegetation:** Rainforest, including littoral rainforest, or open-forest.
**Substrate:** Chiefly found in damp rock crevices on sandstone or shale lenses, or basalt or limestone or granite. Skeletal–sandy loam–brown clay soil, infertile–very fertile. Water table mostly high, moisture supply continuous, fresh. Seepages.
**Exposure:** Sheltered situations in deep–light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## **Asplenium flaccidum** subsp. **flaccidum** ASPLENIACEAE

Weeping Spleenwort

### Life history

**Growth form:** Terrestrial or epiphyte.
**Vegetative spread:** Often forming large, pendent clumps.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond.
Spore size 21–35 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores, dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., N.Z., Pac Is.
**Distribution Sydney area:** Blue Mountains and Illawarra.
**Select locations:** Mt Coricudgy, Kurrajong, Mt Tomah, Mt Wilson, Lawson, Jenolan Caves, Mt Kembla, Macquarie Pass, Cambewarra.

### Habitat

**Habitat:** Epiphytic on trees, logs or rocks.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:** Rainforest or *Nothofagus* forest e.g. with *Microsorium scandens, Pyrrosia rupestris.*
**Substrate:** Epiphytic or growing on rocks.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## **Asplenium obtusatum** ASPLENIACEAE

Shore Spleenwort

### Life history

**Growth form:** Terrestrial fern
**Vegetative spread:** Stout, erect, short-creeping rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, in August.
Spore size 25–35 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:** Very susceptible to slugs and snails in cultivation.

### Distribution

**Status/origin:** Native.
**Botanical subregions:** **CC** SC; Vic., Tas., N.Z.
**Distribution Sydney area:** South from La Perouse (Harden 1990).
**Select locations:** Kiama (1886) only record.

### Habitat

**Habitat:** Sheltered sites close to the sea.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:** Usually in windswept areas amongst rocks close enough to the sea to be covered by saltspray (Jones & Clemesha 1981).

### Conservation

**Conservation:** Northern limit is La Perouse (Harden 1990) but only Sydney Herbarium record for CC is Kiama (1886). Very rare in the area.

## Asplenium polyodon ASPLENIACEAE

### Life history

**Growth form:** Epiphytic fern, forms with shallowly lobed and deeply incised pinnae.
**Vegetative spread:** Medium-creeping rhizome.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period March, August–November. Spore size 21–31 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Hardy but slow growing in cultivation (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, N.Z., Asia, Malesia, Pac Is.
**Distribution Sydney area:** Widespread — Coast and Blue Mountains, rare.
**Select locations:** Watagan Mtns, Pittwater, Lilyvale, Albion Park, Minnamurra Falls, Mt Wilson.

### Habitat

**Habitat:** Epiphytic or growing on rocks.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest.
**Substrate:** On rocks, logs or epiphytic on tree fern trunks on basalt soils but also probably sandstone and shale. Soil fertile, non-saline.
**Exposure:** Sometimes exposed sites.

### Conservation

**Conservation:** Rarely collected, conservation status unknown.

## Asplenium trichomanes subsp. quadrivalens ASPLENIACEAE

### Life history

**Growth form:** Terrestrial fern.
**Vegetative spread:** Stout, erect rhizome.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period March–September. Spore size 31–45 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Difficult to maintain in cultivation, seems to need lime (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NT **CT** ST; Vic., Tas., SA, W.A., N.Z., cosmop.
**Distribution Sydney area:** Western Blue Mountains.
**Select locations:** Jenolan Caves, Wombeyan Caves, Abercrombie Caves, Tuglow Caves.

### Habitat

**Habitat:** Limestone rock crevices.
**Altitude:** above 500 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Rare–frequent.
**Vegetation:**
**Substrate:** On limestone, in crevices of rocks, often near rivers or creeks probably indicating locally moist conditions. Fresh water.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Pleurosorus rutifolius — ASPLENIACEAE

### Life history

**Growth form:** Terrestrial fern with short rhizome covered with purplish brown scales.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
Spore size 29–48 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT** ST NWS CWS SWS NWP SWP NFWP SFWP; all States, N.Z.
**Distribution Sydney area:**
**Select locations:** Brooklyn (1991, new record for CC).

### Habitat

**Habitat:** Cliffs.
**Altitude:** 0–500 m (limited data) **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Cliff-ledge species e.g. *Calandrinia, Cheilanthes sieberi, Crassula.*
**Substrate:** Sandstone rock overhang.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Pleurosorus subglandulosus — ASPLENIACEAE

### Life history

**Growth form:** Terrestrial fern with short rhizome covered with purplish brown scales.
**Vegetative spread:**
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in open ground, resents over-watering and high humidity. Drought resistant fronds shrivel but revive with rain (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CT** ST NWS CWS SWS NWP SWP SFWP; all states.
**Distribution Sydney area:** Jenolan Caves.
**Select locations:** (Herbarium specimens not available.)

### Habitat

**Habitat:** On hillsides, often growing in the shelter of rocks.
**Altitude:** **Annual rainfall:**
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:** Exposed

### Conservation

**Conservation:** Conservation status unknown.

## **Diplazium australe** (Athyrium australe) ATHYRIACEAE

Austral Lady Fern

### Life history

**Growth form:** Terrestrial fern, tufted, or with a small trunk.
**Vegetative spread:** Limited vegetative spread.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing December–May, peak May. Spore size 27–53 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown but needs protection from slugs & snails (Duncan & Isaac 1986).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC CT ST CWS; Qld, Vic., Tas.
**Distribution Sydney area:** Coast South of Sydney & Upper Blue Mtns.
**Select locations:** Otford, Thirroul, Cambewarra, Mt Tomah, Mt Wilson, Jenolan Caves.

### Habitat

**Habitat:** Moist sites.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest (Blackwood–Sassafras) and wet eucalypt tall open-forest.
**Substrate:** Basalt, soil very fertile, damp. Moisture supply intermittent, fresh.
**Exposure:** Sheltered; deep–mid shade.

### Conservation

**Conservation:** Restricted, conservation status unknown.

## **Lunathyrium petersenii** (L. japonicum) ATHYRIACEAE

Japanese Lady Fern

### Life history

**Growth form:** Terrestrial fern wtih short-creeping rhizome.
**Vegetative spread:**
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores tend to mature all at once on each frond, but the fronds are at different stages so the plant would probably have spores over most of late spring–summer (E. Brown pers. comm.).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Becomes naturalized readily, easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld, Vic., N.Z.*, Pac, Malesia, Asia.
**Distribution Sydney area:** Coastal and lower Blue Mountains, rare.
**Select locations:** Springwood (St Helena), Thornleigh, Minnamurra Falls.

### Habitat

**Habitat:** Rocky places near creeks.
**Altitude:** 0–500 m **Annual rainfall:** above 1100 mm
**Typical local abundance:** Occasional–rare.
**Vegetation:** Rainforest and tall open-forest.
**Substrate:** Probably sandstone. Infertile soil. Moisture supply intermittent, fresh.
**Exposure:** Sheltered.

### Conservation

**Conservation:** Rare. Regionally rare in Illawarra region (Mills 1988).

## **Azolla filiculoides** var. **rubra** AZOLLACEAE

### Life history

**Growth form:** Small free-floating aquatic fern. Fronds 2-lobed, the upper lobe thick and photosynthetic with a central cavity containing a colony of nitrogen-fixing blue green alga *(Anabaena azollae).*
**Vegetative spread:**
**Longevity:** Indefinite. Plants present throughout the year (P. Hind pers. comm.).
**Reproduction:** Spores in sporocarps. Plants rarely fertile. Spore size 18–27 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: sporocarps, rare — plants usually multiplying by fragmentation. During the spring or in shaded situations the upper parts of the plant are green, whilst in summer and autumn and when exposed to full sunlight they usually become dark red. Plants can double leaf area in 7 days, dense growth usually indicating high nutrient levels (Sainty & Jacobs 1981). [Grows readily in aquaria particularly with a little fertilizer (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:** In Vietnam rice yields have been increased by cultivating *Azolla* in paddy fields. The blue-green alga *Anabaena azollae* in the leaves, fixes nitrogen from the air, which is released as the *Azolla* decays (Sainty & Jacobs 1981).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC CT** ST NWS CWS SWS NWP SWP SFWP; Qld, Vic., Tas., S.A., N.Z., Amer., Eur.
**Distribution Sydney area:** Widespread.
**Select locations:** Kogarah, Macquarie Fields, Gerringong, Wallerawang.

### Habitat

**Habitat:** Mostly found covering the surface of still or slowly moving water.
**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-water wetlands, where there is little wave action.
**Substrate:** Water table permanently high — mostly found covering the surface of still or slowly moving fresh water.
**Exposure:** Not in shade.

### Conservation

**Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991).
*A. filiculoides* more common in NSW than *A. pinnata* (Sainty & Jacobs 1981).

## Azolla pinnata AZOLLACEAE

### Life history

**Growth form:** Small free-floating aquatic fern in colonies.
Fronds 2-lobed, the upper lobe thick and photosynthetic with a central cavity containing a colony of nitrogen-fixing blue green alga *(Anabaena azollae).* Morphological characters modified by degree of spacing of individuals in the population (Loyal *et al.* 1982).
**Vegetative spread:** Spreads by fragmentation.
**Longevity:** Less than 1 year (Loyal *et al.* 1982). Dies off periodically (P. Hind pers. comm.).
**Reproduction:** Spores in sporocarps. Plants rarely fertile. Vegetative phase last for nearly 2 months, sporocarp formed before recession of water, sporocarp-bearing plant buried in dry cracking soil or through agricultural practices, life-span of sporophyte 5–6 months, population breeds freely for as many generations as is permitted by inundation (Loyal *et al.* 1982).
**Dispersal, establishment & growth:** Diaspore: sporocarps, rare. Plants usually multiplying by fragmentation. During the spring or in shaded situations the upper parts of the plant are green, whilst in summer and autumn and when exposed to full sunlight they usually become dark red. Plants can double leaf area in 7 days, dense growth usually indicating high nutrient levels (Sainty & Jacobs 1981). [Grows readily in aquaria particularly with a little fertilizer (Jones & Clemesha 1981).] Plants on periphery of population dispersed by wind currents and action of water birds (Loyal *et al.* 1982).
**Fire response:**
**Interaction with other organisms:** In Vietnam rice yields have been increased by cultivating *Azolla* in paddy fields. The blue-green alga *Anabaena azollae* in the leaves, fixes nitrogen from the air, which is released as the *Azolla* decays (Sainty & Jacobs 1981). Blocks pump inlets of dams and deters stock from watering (Auld & Medd 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC ST NWS SWS NWP SWP; Qld, Vic., N.T., S.A., trop. Asia.
**Distribution Sydney area:** Mainly coastal, not common.
**Select locations:** Richmond, Hoxton Park, Albion Park, Bathurst (P. Hind pers. comm.).

### Habitat

**Habitat:** Mostly found covering the surface of still or slowly moving water.
**Altitude:** 0–700 m **Annual rainfall:** 800–900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-water.
**Substrate:** Water table permanently high — mostly found covering the surface of still or slowly moving fresh water.
**Exposure:** Not in shade.

### Conservation

**Conservation:** Vulnerable in Western Sydney (Benson & McDougall 1991).
*A. pinnata* less common in NSW than *A. filiculoides* (Sainty & Jacobs 1981).

## Blechnum ambiguum BLECHNACEAE

Lance Water Fern

### Life history

**Growth form:** Terrestrial fern with short to medium creeping rhizome.
**Vegetative spread:** Limited spread.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period May– November, peak May. Most blechnums would probaly peak late summer–early autumn with whole frond maturing at same time (E. Brown pers. comm.).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Difficult to keep growing (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC CT; Qld.
**Distribution Sydney area:** Coast, Blue Mountains.
**Select locations:** Woy Woy, Narrabeen, Royal NP, Minnamurra Falls, Glen Davis, Blackheath, Bundanoon.

### Habitat

**Habitat:** Common on wet rocks, usually on rock ledges below caves, near waterfalls or wet cliff-faces.
**Altitude:** 0–1100 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:**
**Vegetation:** Usually found in open-forest.
**Substrate:** Sandstone. Infertile soil. Moisture supply continuous, water table permanently high.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Blechnum camfieldii BLECHNACEAE

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome, trunk often forming on older plants. (Can be confused with *Blechnum wattsii*, P. Hind pers. comm.).
**Vegetative spread:** In swampy situations it reproduces by long stolons, but these are quite short in dry situations.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period peak June, otherwise sporadic.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown and will tolerate a bit of sun and dryness (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld.
**Distribution Sydney area:** Low-lying areas near the coast.
**Select locations:** Colo River below Boorai Ridge, Gosford, Watagan Mtns, Somersby Falls, Gosford, Erina (P. Hind pers. comm.). Bayview, Kurnell, Oatley, Royal NP, Bulli, Milton.

### Habitat

**Habitat:** Low-lying saline swampy sites near the sea or along the margins of saltwater rivers, lakes and swamp.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** *Melaleuca quinquenervia* swamp, also near rainforest.
**Substrate:** Swampy ground, brackish or fresh water. Common in but not restricted to saline situations (P. Hind pers. comm.).
**Exposure:**

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988).
Probably also rare in other regions.

## Blechnum cartilagineum BLECHNACEAE

Gristle Fern

### Life history

**Growth form:** Erect, tufted terrestrial fern to 1 m high with short-creeping rhizome.
**Vegetative spread:** Limited, forming groves.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period peak April, August.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown, hardy in a dry situation (Jones & Clemesha 1981).]
**Fire response:** Vigorous regrowth from rhizome after high intensity fire, fertile fronds after fire in less than 5 mths at Killarney Hts (L.McD.).
**Interaction with other organisms:** Host to Leaf Nematodes (*Aphelenchoides* spp.) (Jones & Elliot 1986).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CT ST CWS; Qld, Vic., Tas., Malesia.
**Distribution Sydney area:** Widespread, Coast and Blue Mountains.
**Select locations:** Olney, Kurrajong, Hornsby, Killarney Heights (L.McD.), Manly, Wollongong, Kiama, Mt Wilson, Springwood, Bundanoon.

### Habitat

**Habitat:** On hillsides often amongst rocks, or stream banks.
**Altitude:** 0–1000 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** Moist open-forest (e.g. with *Eucalyptus saligna, Angophora floribunda*) and rainforest.
**Substrate:** Sandstone, basalt; sandy alluvium, sandy loam to red loam. Fertile soil. No salinity.
**Exposure:** In sheltered, mid-shade situations.

### Conservation

**Conservation:** Common and adequately conserved.

## Blechnum chambersii BLECHNACEAE

### Life history

**Growth form:** Terrestrial fern with short creeping to erect rhizome.
**Vegetative spread:** Probably limited, very slow growing.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores late summer–early autumn in N.Z. (E. Brown pers. comm.). Spore size 27–35 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in a cool moist situation in Victoria but apparently difficult further north (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC ST; Vic., Tas., S.A., N.Z., Fiji.
**Distribution Sydney area:** Localized.
**Select locations:** Mt Tomah (P. Hind pers. comm.), Minnamurra Falls.

### Habitat

**Habitat:** Near creeks in shady areas where moisture is plentiful, in caves near waterfall. Cool, shaded, moist gullies and rock walls (P. Hind pers. comm.).
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest.
**Substrate:** Fertile soil. Commonly associated with flowing water (in Tasmania) (Jarman *et al.* 1986).
**Exposure:** Shade-loving, rarely present in direct sunlight (Jarman *et al.* 1986).

### Conservation

**Conservation:** Rare in the Sydney area and regionally rare in Illawarra region (Mills 1988). Conservation status unknown.

## Blechnum gregsonii BLECHNACEAE

Broad Water Fern

### Life history

**Growth form:** Terrestrial or lithophytic fern with short-creeping rhizome.
**Vegetative spread:** Probably limited.
**Longevity:** Probably indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period April–May.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Difficult to keep growing (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC CT.
**Distribution Sydney area:** Blue Mountains and Minnamurra.
**Select locations:** Mt Wilson, Mt Victoria (P. Hind), Blackheath, Lawson (P. Hind), Minnamurra Falls.

### Habitat

**Habitat:** Wet sandstone cliff faces.
**Altitude:** 600–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent, where found (P. Hind pers. comm.).
**Vegetation:** Rainforest.
**Substrate:** Pendent clumps found in damp places on rock ledges, under caves or near waterfalls. Walls of cave at Mt Victoria (P. Hind pers. comm.), often with *Blechnum ambiguum*. Infertile soil. Continuous moisture supply, fresh. Found where there is running water rather than on banks of creeks (P. Hind pers. comm.).
**Exposure:** Sheltered.

### Conservation

**Conservation:** Rare, nationally coded 2 RC- (Briggs & Leigh 1988), only 3 Herbarium records for area, though known areas probably within National Parks.

## Blechnum indicum BLECHNACEAE

Swamp Water Fern

### Life history

**Growth form:** Terrestrial fern with erect rhizome.
**Vegetative spread:**
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond.
Sporing period range January–August, peak February–April.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:** Rhizomes roasted and eaten by Aborigines (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, N.T., Malesia, Polynesia, Cent. Amer.
**Distribution Sydney area:** Coastal areas north from Jervis Bay.
**Select locations:** Cooranbong (P. Hind pers. comm.). Narrabeen (in Deep Creek. L.McD.), Ramsgate (1899), Kurnell, Cronulla, Berry, Jervis Bay, Bundanoon (1897).

### Habitat

**Habitat:** Edge of brackish swamps or lakes.
**Altitude:** 0–500 m **Annual rainfall:** above 1200 m
**Typical local abundance:** Frequent.
**Vegetation:** Swamp forest. Found with *Melaleuca quinquenervia, Casuarina glauca, Phragmites, Eucalyptus robusta.*
**Substrate:** Sandy loam, infertile. Water table permanently high, brackish or fresh. Will tolerate saline conditions (P. Hind pers. comm.).
**Exposure:** Very easily grown exposed to some sun. [Resents complete shade (Jones & Clemesha 1981).]

### Conservation

**Conservation:** Conservation status unknown.

## Blechnum minus BLECHNACEAE

Soft Water Fern

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome.
**Vegetative spread:** Individuals multiply very freely from offsets and build up into a large dense clump. Often forming masses (P. Hind pers. comm.).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period peak March–April. Spore size 33–45 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown and hardy in most situations, will tolerate full sun (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST SWS; Qld, Vic., Tas., S.A., N.Z.
**Distribution Sydney area:** Blue Mountains, Moss Vale. Mostly at high altitudes, but may come down to lower Blue Mountains (Peter Hind pers. comm.).
**Select locations:** Ilford, Spring Creek (Bathurst), Mt Victoria, Hazelbrook, Macquarie Pass, Kangaloon, Long Swamp (Kodela 1992), Minnamurra.

### Habitat

**Habitat:** Variety of moist habitats, narrow mountain gorges edge of waterfalls, or foot of falls, or swampy creeks. Upland mire (Kodela 1992).
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Moist open-forest and rainforest. Banks of mountain streams with *Sphagnum*.
**Substrate:** Amongst rocks, gravelly clay, sandstones. Fertile soils. Water table permanently high. No salinity. In damp areas liable to flood (P. Hind pers. comm.). Commonly associated with flowing water (in Tasmania) (Jarman *et al.* 1986).
**Exposure:** Sheltered; light shade. Can tolerate more open sites than *B. wattsii* (Duncan & Isaac 1986). Will tolerate full sun (Jones & Clemesha 1981).

### Conservation

**Conservation:** Conservation status unknown.

## Blechnum nudum — BLECHNACEAE

Fishbone Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping or erect rhizome sometimes forming a sturdy trunk.
**Vegetative spread:** Short-creeping rhizome forms dense colonies and excludes other ferns.
**Longevity:** Infinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing sporadic — March, August.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Recruitment mainly after fire (D. Keith pers. comm.). [Transplants easily and is very easily grown in moist, sheltered situations (Jones & Clemesha 1981).]
**Fire response:** New fronds often sprout from short burnt trunks (Duncan & Isaac 1986, D. Keith pers. comm.).
**Interaction with other organisms:** Host to Leaf Nematodes (*Aphelenchoides* spp.) (Jones & Elliot 1986).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., S.A.
**Distribution Sydney area:** Coast (Calga–Cataract), Tablelands. Not found on the Cumberland Plain because creeks are ephemeral (P. Hind pers. comm.).
**Select locations:** Calga, Otford, Ilford, Wheeney Creek, Mt Wilson, Blackheath, Wentworth Falls, Mt Werong. Newnes Plateau, Mt Tomah (P. Hind), Yerrinbool.

### Habitat

**Habitat:** Creek banks.
**Altitude:** 0–1200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Dominant–frequent.
**Vegetation:** Rainforest and open-forest or edges of forest and in heathland. Bottom of wet sclerophyll valleys, at base of cliffs (P. Hind pers. comm.).
**Substrate:** Sandstone, shale, granite, basalt — colluvial or alluvial soils. Fertile soils. Water supply continuous, fresh. More drought tolerant than *Todea barbara* (P. Hind pers. comm.).
**Exposure:** Requires light (P. Hind pers. comm.).

### Conservation

**Conservation:** A widespread species that is probably adequately conserved.

## Blechnum patersonii — BLECHNACEAE

Strap Fern

### Life history

**Growth form:** Terrestrial fern with erect rhizome.
**Vegetative spread:** Clump forming.
**Longevity:** Probably indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, peak March–April, August–September.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Probably no dormancy mechanism. [Very easily grown in protected situations (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST CWS; Qld, Vic., Tas., SW Pac., Malesia.
**Distribution Sydney area:** Coast & Blue Mountains — widespread.
**Select locations:** Watagan Mtns, Bilpin, Bola Creek (P. Hind), Bulli, Macquarie Pass, Nowra, Mt Coricudgy, Mt Wilson, Blackheath, Fitzroy Falls, Bundanoon.

### Habitat

**Habitat:** Below waterfalls and rock faces, earth bank on creeks and in moist forests (P. Hind pers. comm.).
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest and moist gullies.
**Substrate:** Sloping banks near creeks or in rocky crevices on sandstone, shale, basalt, granite. Water supply continuous, fresh. Not normally in flowing water (P. Hind pers. comm.).
**Exposure:** Sheltered; deep shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Blechnum penna-marina BLECHNACEAE

Alpine Water Fern

### Life history

**Growth form:** Terrestrial fern with wiry, branched, mostly long-creeping rhizome.
**Vegetative spread:** Grows as low matted ground cover spreading by rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak probably November–December. Spore size 23–29 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Fertile fronds produced only in cool climates. [Grows during warmer months & dormant during winter (Jones & Clemesha 1981.] After winter dormancy the young bronze-pink fronds are conspicuous.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NT **CT** ST; Vic., Tas., N.Z., S America.
**Distribution Sydney area:** Cooler mountain regions, rare.
**Select locations:** Jenolan Caves, Lowther Creek, Oberon, Kanangra Tops (P. Hind).

### Habitat

**Habitat:** Creek banks.
**Altitude:** c. 1000 m **Annual rainfall:** c. 1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** In *Sphagnum* bogs and amongst rocks (P. Hind pers. comm.).
**Substrate:** Granite, infertile soil. Moisture supply continuous, fresh. Not on sandstone, possibly on limestone (P. Hind pers. comm.).
**Exposure:** Will tolerate full sun and low light level (P. Hind pers. comm.).

### Conservation

**Conservation:** Rare (only 3 Herbarium collections). Conservation status unknown.

## Blechnum wattsii BLECHNACEAE

Hard Water Fern

### Life history

**Growth form:** Terrestrial fern with medium to long-creeping rhizome, sometimes mat-forming (P. Hind pers. comm.), (can be confused with *B. ambiguum* when fronds are sterile.).
**Vegetative spread:** Forms extensive colonies by creeping rhizomes.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period March, August. Often spores prolifically (Duncan & Isaac 1986).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown in semi-protected positions (Jones & Clemesha 1981).]
**Fire response:** Resprouts, produces flush of new fronds after fire (P. Hind pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., S.A.
**Distribution Sydney area:** Upper Blue Mountains, Barren Grounds.
**Select locations:** Mt Wilson, Mt Victoria, Blackheath, Lawson, Hazelbrook, Barren Grounds.

### Habitat

**Habitat:** Usually on the banks of creeks.
**Altitude:** 500–1000 m **Annual rainfall:** 1200–1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** In rainforest and less commonly along creeks in open-forests.
**Substrate:** Soil very fertile–fertile. Basalt, sandstone. Moisture supply continuous, fresh.
**Exposure:** Sheltered; mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Doodia aspera** BLECHNACEAE

Rasp Fern

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome and underground runners (stolons).
**Vegetative spread:** Spreads vegetatively by stolons, perhaps 5–10 cm/year to form large colonies, 5–10 m across.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, peak May, July (coastal), August (CT). Spore size 18–29 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). [Very easily grown in a variety of situations from shade to sun, hardy and tolerant of root competition (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS; Qld, Vic.
**Distribution Sydney area:** Coast & Blue Mountains. Widespread particularly on Blue Mountains (P. Hind pers. comm.).
**Select locations:** Ourimbah, Gosford, Wisemans Ferry, Pennant Hills, Otford, Razorback, Minnamurra Falls, Shoalhaven, Mt Wilson, Capertee, Mittagong, Bundanoon.

### Habitat

**Habitat:** Forested stream banks and among rocks in drier situations.
**Altitude:** 0–900 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Tall eucalypt open-forest and rainforest margins, floodplain tall open-forest e.g. *Eucalyptus saligna, E. deanei, E. elata, E. tereticornis* (Scholer 1974). Also grows in dry eucalypt forest (P. Hind pers. comm.).
**Substrate:** Sandy, and gravelly soils or richer loams; sandstone, basalt, volcanic necks, granite. Soil fertile–infertile. Water table mostly high, fresh. Not as water-dependent as many other ferns, will tolerate drought if not prolonged (P. Hind pers. comm.). In rock crevices and at the base of rocks, associated with creek lines.
**Exposure:** Sheltered; mid shade but will tolerate full sun (P. Hind pers. comm.).

### Conservation

**Conservation:** Widespread and adequately conserved.

## **Doodia caudata** var. **caudata** BLECHNACEAE

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome.
**Vegetative spread:** Limited vegetative spread.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing February–September, peak March–April.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in sheltered position (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., N.T., S.A., N.I., N.Z., N.Cal.
**Distribution Sydney area:** Coast and Upper Blue Mountains.
**Select locations:** Somersby, Berowra (P. Hind), Ku-ring-gai Chase NP, Kenthurst, Kogarah, Maldon, Razorback, Mt Kembla, Whispering Gallery, Minnamurra Falls, Wentworth Falls, Jenolan Caves, Wombeyan Caves.

### Habitat

**Habitat:** Various, moist creek banks to open rocky sites. Rock crevices in sheltered gullies (P. Hind pers. comm.).
**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent–occasional–rare.
**Vegetation:** Rainforest or tall open-forest.
**Substrate:** Sandy soil, alluvial soil, sandstone, basalt, fertile–infertile. On vertical rock faces and also on benches; moisture supply continuous, fresh. (P. Hind pers. comm.).
**Exposure:** Sheltered, mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Doodia caudata** var. **laminosa** BLECHNACEAE

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome.
**Vegetative spread:** Limited vegetative spread.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, in April.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [In cultivation easily grown but very slow with little inclination to form stolons (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:** Cannot stand competition (P. Hind pers. comm.).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld.
**Distribution Sydney area:** Rare, mainly Gosford-Hawkesbury area, also Minnamurra Falls.
**Select locations:** Killcare, Wondabyne, Upper Colo (P. Hind), Wisemans Ferry, Ku-ring-gai Chase NP, Kurrajong Hts, Wheeney Creek, Minnamurra Falls.

### Habitat

**Habitat:** Protected sites, wet rock crevices.
**Altitude:** 0–500 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Locally common (P. Hind pers. comm.).
**Vegetation:** Rainforest & open-forest.
**Substrate:** Sandstone, rock crevices. Soil infertile. Water table mostly high, fresh. Well drained, vertical dwelling species on rock face and sometimes earth banks (P. Hind pers. comm.).
**Exposure:** Sheltered (P. Hind pers. comm.). Mid–light shade.

### Conservation

**Conservation:** Rare, Minnamurra Falls southern limit (P. Hind pers. comm.).

## **Doodia media** subsp. **media** BLECHNACEAE

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome.
**Vegetative spread:** Spread rapidly by the production of runners (Duncan & Isaac 1986).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown in a variety of situations from shade to sun, hardy and tolerant of root competition (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:** Cannot stand competition (P. Hind pers. comm.).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT ST NWS; Qld, Vic., Tas.
**Distribution Sydney area:**
**Select locations:** Goodmans Ford (P. Hind pers. comm.). Herbarium records not available.

### Habitat

**Habitat:** In gullies, in shady or exposed places, often amongst rocks.
**Altitude:** **Annual rainfall:** 800 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:** On slates, mainly metamorphics, generally not on sandstone; found in wet places but tolerates periodic dryness; rocky sites, edge of creeks (P. Hind pers. comm.).
**Exposure:** Shady situations (P. Hind pers. comm.).

### Conservation

**Conservation:** Conservation status unknown.

## Cyathea australis — CYATHEACEAE

Rough Treefern

### Life history

**Growth form:** Terrestrial arborescent fern with erect trunk to 20 m high and up to 40 cm diam.
**Vegetative spread:** No vegetative spread.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond; peak February–May; Oct–Dec.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Spores retain viability 10–15 years (Jones 1987). [Very easily grown, easily raised from spores (Jones & Clemesha 1981).]
**Fire response:** Resprouts from apex, old plants may have survived many bushfires.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS; Qld, Vic., Tas.
**Distribution Sydney area:** Coast & Blue Mountains, widespread.
**Select locations:** Gosford, Narrabeen, Otford, Bulli, Gerringong, Nowra, Kurrajong, Mt Tomah, Mt Wilson, Blackheath, Bundanoon.

### Habitat

**Habitat:** In gullies or on hillsides in moist shady situations.
**Altitude:** 0–1050 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Widespread in rainforest or open-forest.
**Substrate:** Sandstone, basalt, quartzite. Soil fertile. Moisture supply continuous.
**Exposure:** Sheltered situations; deep–light shade.

### Conservation

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

## Cyathea cooperi * — CYATHEACEAE

Straw Treefern

### Life history

**Growth form:** Terrestrial, arborescent fern with erect trunk to 12 m high and up to 15 cm diameter.
**Vegetative spread:** No vegetative spread.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Few records.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind over long distances. Probably no dormancy mechanism. Fast growing. Reported as potential major weed in Hawaii where its rapid growth 0.3 m per year and high densities (1 plant per 6.4 $m^2$ in study plots) enable it to shade out understorey species (Medeiros *et al.* 1992). [Very easily grown and very hardy, heavy frosts may kill the fronds but plants quickly recover (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Not regarded as native to Sydney region but appears to be naturalized in Sydney as a garden escape (P. Hind pers. comm.).
**Botanical subregions:** NC **CC** SC; Qld, W.A.*
**Distribution Sydney area:** Coastal, north from Durras Mountain, Illawarra (uncommon), North Shore suburbs. Sydney specimens date from 1950s but there is a collection from Jervis Bay 1942 (Steamer Beach) and Minnamurra Falls 1953 where it is probably native.
**Select locations:** Jervis Bay, Minnamurra Falls*, Northbridge*, Beecroft*, Terrey Hills*.

### Habitat

**Habitat:** In gullies.
**Altitude:** 0–200 m **Annual rainfall:** above 1000 mm
**Typical local abundance:**
**Vegetation:** Warm coastal rainforest.
**Substrate:** Soil fertile. Moisture supply continuous, fresh. Water table mostly high. Colonizes sandstone cuttings in Sydney.
**Exposure:** Sheltered; light–deep shade.

### Conservation

**Conservation:** Adequately conserved.

## Cyathea leichhardtiana CYATHEACEAE

Prickly Treefern

### Life history

**Growth form:** Terrestrial arborescent fern with erect trunk to 7 m high and 5–15 cm diam.
**Vegetative spread:** No vegetative spread.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Spores peak March, May, otherwise sporadic.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Very slow growing. [In cultivation requires a well protected position (Jones & Clemesha 1981).]
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld, Vic.
**Distribution Sydney area:** Coast & Blue Mountains.
**Select locations:** Calga, Ku-ring-gai Chase NP, Otford, Bellambi, Minnamurra, Bilpin, Mt Wilson, Blackheath.

### Habitat

**Habitat:** Mountain slopes or near creeks.
**Altitude:** 0–1000 m **Annual rainfall:** 1200–1600 mm
**Typical local abundance:** Frequent.
**Vegetation:** Warm and cool *Nothofagus* rainforest.
**Substrate:** Basalt, sandstone. Soil fertile. No salinity.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Uncommon, conservation status unknown.

## Arthropteris beckleri DAVALLIACEAE

Small Jointed Fern

### Life history

**Growth form:** Epiphytic or climbing fern
**Vegetative spread:** Rhizome long-creeping, forming mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very difficult to establish in cultivation but easy once established (Jones & Clemesha 1981).]
**Fire response:** Probably killed.
**Interaction with other organisms:** Epiphytic.

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC CT** NWS; Qld.
**Distribution Sydney area:** Coastal Ranges, north from the Cambewarra Range.
**Select locations:** Gosford, Helensburgh, Mt Keira, Minnamurra Falls, Belmore Falls, Carrington Falls.

### Habitat

**Habitat:** Rainforest.
**Altitude:** 0–600 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Rainforest.
**Substrate:** On rocks or trees, sandstone boulders. Soil fertile. Moisture supply intermittent. No salinity.
**Exposure:** Sheltered, mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## Arthropteris tenella — DAVALLIACEAE

Jointed Fern

### Life history

**Growth form:** Epiphytic or climbing fern.
**Vegetative spread:** Rhizome long-creeping.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores peak April and November, otherwise sporadically at any time. Spore size 41–59 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very difficult to establish in cultivation but easy to grow once established (Jones & Clemesha 1981).]
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** NWS; LHI, Qld, N.I., N.Z.
**Distribution Sydney area:** Coastal, less commonly Blue Mountains.
**Select locations:** Mt Warrawolong, Gosford, Royal NP, Mt Keira, Gerringong, Kangaroo Valley, Blackheath, Oberon, Robertson.

### Habitat

**Habitat:** Epiphytic or lithophytic, in gullies.
**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Rainforest.
**Substrate:** On rocks or trees, mainly basalt, occasionally sandstone. Fertile soils. Moisture supply intermittent.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Davallia pyxidata — DAVALLIACEAE

Hare's Foot Fern

### Life history

**Growth form:** Epiphytic or lithophytic fern with long-creeping rhizome; aerial rhizomes act as litter-collecting device (Jones 1987).
**Vegetative spread:** Forms clumps.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, too few records.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990).
[Very easily grown (Jones & Clemesha 1981).] Sheds fronds during drought.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** NWS CWS; Qld, Vic., Tas.
**Distribution Sydney area:** Mainly coastal.
**Select locations:** Patonga, Pittwater, Oatley, Cambewarra, Nowra, Barren Grounds.

### Habitat

**Habitat:** Epiphytic and in rock crevices.
**Altitude:** 0–600 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:** Occasional.
**Vegetation:** Rainforest and eucalypt forest.
**Substrate:** Sandstone & basalt. Epiphytic on trees in rainforests or climbing over rocks in eucalypt forests. Soil fertile–infertile. Moisture supply intermittent, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Nephrolepis cordifolia * DAVALLIACEAE

Fishbone Fern

### Life history

**Growth form:** Terrestrial fern with abundant stolons; upper surface of frond secretes a calcareous substance, frequently bears potato-like tubers on rhizomes (Tryon 1982).
**Vegetative spread:** Spreads by stolons to form dense mats. Can reproduce from tubers (Jones 1987).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spore size 17–22 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind but mainly dispersed vegetatively by humans in garden waste etc. Often cultivated; escaped and established in the Sydney area. Tubers formed on roots.
**Fire response:** Probably resprouts.
**Interaction with other organisms:** Infusions and decoctions used to cure chest complaints; tubers eaten after roasting, in Nepal (Jones 1987).

### Distribution

**Status/origin:** Naturalized in Sydney region, though native north of the Clarence River.
**Botanical subregions:** NC CC*; Qld, N.T., pantrop.
**Distribution Sydney area:** Naturalised in Sydney suburban area, particularly North Shore.
**Select locations:** Lindfield, Willoughby, Mosman. (Limited data.)

### Habitat

**Habitat:** Gardens and urban bushland.
**Altitude:** 0–200 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** Disturbed sites, bushland margins.
**Substrate:** Amongst rocks. Soil fertile–infertile. Moisture supply intermittent, fresh.
**Exposure:** Deep shade.

### Conservation

**Conservation:** Localized invasion of bushland, generally from adjacent garden edges, minor problem.

## Rumohra adiantiformis DAVALLIACEAE

### Life history

**Growth form:** Epiphytic or lithophytic fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forms mats or clumps.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak May–June, October, range May–December. Spore size 21–30 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Resents disturbance, but once established is easy to grow (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC NT CT ST; Qld, Vic., Tas., N.Z., S Africa, S & C Amer.
**Distribution Sydney area:** Mainly Blue Mountains.
**Select locations:** Mt Wilson, Mt Tomah, Blackheath, Mt Victoria, Hilltop, Minnamurra Falls.

### Habitat

**Habitat:** Epiphytic on cliffs, rocks or trees.
**Altitude:** 0–1100 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest margins.
**Substrate:** Epiphytic on rocks (sandstone) and trees, particularly treeferns. Soil fertile. Moisture supply continuous, fresh.
**Exposure:**

### Conservation

**Conservation:** Relatively common in the Blue Mountains but regionally rare in Illawarra region (Mills 1988).

## Dennstaedtia davallioides DENNSTAEDTIACEAE

Lacy Ground Fern

### Life history

**Growth form:** Terrestrial, long-creeping, stout rhizome.
**Vegetative spread:** Creeping rhizome forms colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in a cool, protected situation.]
**Fire response:**
**Interaction with other organisms:** The plants may be severely attacked by green caterpillars (Jones & Clemesha 1981).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC CT**; Qld, Vic., N.I.
**Distribution Sydney area:** Upper Blue Mountains and Illawarra.
**Select locations:** Waterfall, Mt Tomah, Mt Wilson, Jenolan Caves.

### Habitat

**Habitat:** Cool shaded areas, particularly alluvial flats along streams. Edge of rainforest.
**Altitude:** 0–1000 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest margins or moist sites in tall open-forest e.g. with *Pteridium esculentum* or *Pellaea falcata*. Ground stratum.
**Substrate:** Fertile alluvial soils. Basalt. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Light shade.

### Conservation

**Conservation:** Conservation status unknown.

## Histiopteris incisa DENNSTAEDTIACEAE

Bat's Wing Fern

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome often forms extensive colonies many metres across.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores mainly January–May. Spore size 21–29 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Growth seasonal, fronds produced in a flush of growth (e.g. in late winter, summer) (E. Brown pers. comm.). [Easily transplanted.]
**Fire response:** Resprouts in swampy sites.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., N.T., S.A., trop. and S Hemi.
**Distribution Sydney area:** Coast and Blue Mountains.
**Select locations:** Bouddi, Peats Crater (L.McD.), Narrabeen, Balmain, Kurnell, Waterfall, Mt Tambo, Kurrajong, Wolgan Gap, Linden, Bowral.

### Habitat

**Habitat:** Moist sheltered sites, gullies, sandstone cliff lines, lake edges.
**Altitude:** 0–900 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional–frequent.
**Vegetation:** Rainforest and moist eucalypt forest or scrub near water.
**Substrate:** Moist sandy soil, low nutrient. Water table permanently high, moisture supply continuous.
**Exposure:** Sheltered, mid–light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Hypolepis glandulifera DENNSTAEDTIACEAE

### Life history

**Growth form:** Terrestrial fern with thick long-creeping rhizome and stout stems.
**Vegetative spread:** Creeping rhizome usually forming large colonies. Often forms tall thickets in area opened up to light. Can spread 1–2 m per year.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Quick growing, especially during wet periods in summer. [Easily transplanted and very easily grown in a damp position.]
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST CWS; Qld, Vic., N.G., N.Cal, Malesia, India.
**Distribution Sydney area:** Coast south of Port Hacking and Tablelands.
**Select locations:** Garie, Macquarie Pass, Minnamurra Falls, NW of Windsor, Springwood, Jenolan Caves, Robertson.

### Habitat

**Habitat:** Open sites near rainforest, usually along creek banks.
**Altitude:** 0–900 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** In or near rainforest.
**Substrate:** Moderate nutrient soils, sometimes sandy. No salinity, water table mostly high.
**Exposure:** Light shade.

### Conservation

**Conservation:** Conservation status unknown.

## Hypolepis muelleri DENNSTAEDTIACEAE

Harsh Ground Fern

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Creeping rhizome often forming open colonies spreading to 0.5 m per year.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores dispersed by wind. Probably no dormancy mechanism. Sporing mainly November–July, peak February.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Summer growing. [Very easily grown in a moist position even tolerating full sun (Jones & Clemesha 1981).]
**Fire response:** Resprouts from rhizome.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST CWS; Qld, Vic., Tas.
**Distribution Sydney area:** Coast & occasionally Tablelands.
**Select locations:** Gosford, Avalon, Mascot, Upper Cordeaux Dam, Culoul Range, Cattai, Wedderburn, Rylstone, Bundanoon.

### Habitat

**Habitat:** Along creeks and in swamps.
**Altitude:** 0–700 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Margin of rainforest or open-forest, floodplain tall open-forest e.g. *Eucalyptus tereticornis* or *Melaleuca*; sometimes a dominant feature of the ground flora.
**Substrate:** Sandy alluvial soils, medium nutrient; sandy soils, sandstone. Water table permanently high, ?brackish or fresh.
**Exposure:** Sheltered; light, no shade.

### Conservation

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

## Hypolepis rugosula DENNSTAEDTIACEAE

### Life history

**Growth form:** Terrestrial fern with slender long-creeping rhizome.
**Vegetative spread:** Creeping rhizome forming extensive colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak March, but few records.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in a damp position (Jones & Clemesha 1981.]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** **CT** CWS SWS; Qld, Vic., Tas., S.A., W.A.
**Distribution Sydney area:** Blue Mountains.
**Select locations:** Mt Wilson, Mt Tomah, Blackheath, Jenolan Caves, NE of Bathurst.

### Habitat

**Habitat:** Mountain gullies near creeks or in swampy land.
**Altitude:** 800–1000 m **Annual rainfall:** 1100–1400 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:** Basalt, sandstone, trachyte. Soil fertile–infertile. Non-saline.
**Exposure:** Can tolerate relatively high light intensities and form dense cover in open situations (in Tasmania) (Jarman *et al.* 1986).

### Conservation

**Conservation:** Conservation status unknown.

## Pteridium esculentum DENNSTAEDTIACEAE

Bracken

### Life history

**Growth form:** Terrestrial fern with stiff fronds to 1.5 m high, nectaries on young fronds; long-creeping much branched rhizome.
**Vegetative spread:** Vegetative spread mainly by rhizome. Produces an enormous reserve of underground rhizome apices, produced each time a frond is produced. These may grow or remain dormant (O'Brien 1963 in Thomson & Smith 1990).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores February–July. Spore size 24–33 µm (Large & Braggins 1991).

**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). Only one (unverified) published record of sporeling establishment in forest environments in Australia (Tolhurst in Thomson & Smith 1990). Has spread by spores in the past and the potential to do so still exists (A.F. Dyer in Thomson & Smith 1990). Otherwise spreads vegetatively, particularly after fire. In absence of frosts grows continuously throughout year, with a few new fronds in winter but most in autumn and spring. There is always spring growth, but may be little or no summer or autumn growth; vigorous new growth after rain. Very drought resistant. Dormant rhizome buds may remain dormant for at least 10 years (O'Brien 1963). Frond longevity is normally about 12 months ( Tolhurst in Thomson & Smith 1990). Fronds cut in summer will cause rhizomes to grow and produce another frond, until March (O'Brien 1963). Transplantation said to be difficult e.g. by Jones & Clemesha — not so, provided care is taken to use undamaged portion of rhizome (cracks in sclerotised rhizome surface allow entry of fungi etc) including shoot apex and leaf primordia as well as dormant buds if possible, with adequate length of older rhizome to provide storage reserves during establishment period. Transplant in spring or early autumn (J. Thomson pers. comm.).

**Fire response:** Leaves burnt but resprouts rapidly (within a month even in absence of rain). May be indicative of frequent fire and is able to survive annual burning (Bradstock 1981). May become dominant after a low intensity burn but show no significant spread after a high intensity fire. One year after spring burning individual frond size and total biomass increased, but after autumn burning frond size decreased and biomass was unaltered ( Tolhurst 1990 in Thomson & Smith).

**Interaction with other organisms:** Simulated rainwater run-off from undamaged juvenile and mature fronds inhibited radicle elongation in *Medicago* and *Trifolium*. Run-off from juvenile but not mature fronds inhibited radicle extension in *Eucalyptus haemastoma* seedlings (Taylor & Thomson in Thomson & Smith1990). Endemic Australian Drosophilidae: adult flies come to nectaries along with ants and spiders. *Drosophila notha:* larvae are gregarious tunnellers in stipe and rachis (J. Thomson pers. comm.). *Drosophila megagenys:* solitary larvae form galls at tips of pinnae and pinnules (Thomson, Jackson & Bock 1982). For herbivorous arthropod fauna in the Sydney area see Shuter & Westoby (1992). Ingestion of the green parts of this fern by animals (poultry also affected) causes haemorrhage and/or death, the rhizomes are apparently eaten without injury (Hurst 1942). Used in some coastal areas of Australia to stabilize areas after sand mining (Jones 1987). Nectaries on young fronds may encourage ants to set up colonies nearby, discouraging fern-herbivores e.g. slugs and snails (Page 1982).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS SWP; Qld, Tas., S.A., N.Z., Pac Is. See also Thomson, Willoughby & Shearer 1986.
**Distribution Sydney area:** Widespread, Coast and Blue Mountains.
**Select locations:** Gosford, Palm Beach, Oatley, Agnes Banks, Lake Illawarra, Cambewarra, Kandos, Blackheath, Glanmire, Penrose, Long Swamp (Kodela *et al.* 1992).

### Habitat

**Habitat:** Open-forest, damp sandy flats, sandstone gullies, pasture land or at the edge of sand dunes. Bracken is most abundant in cleared agricultural land at high altitudes, in high rainfall areas, and where January maximum and July minimum temperatures are low; natural vegetation is dry sclerophyl woodland, and the soils are deep, well structured and initially of high fertility. In woodland communities, the correlation of bracken abundance are similar, but include association with mixed eucalypt forests, and with deep coarse-textured soil types showing good drainage (Thomson, Willoughby & Shearer 1986). Margin of upland mire (Kodela *et al.* 1992).
**Altitude:** 0–1200 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Dominant–common.
**Vegetation:** Open eucalypt forest and woodland, pasture land, or floodplain in tall open-forest e.g. with *Eucalyptus deanei, E. tereticornis, Angophora floribunda.*

## **Pteridium esculentum** (continued) DENNSTAEDTIACEAE

**Substrate:** May occur on very fertile–very infertile soils, sandy loams or sands from sandstone, volcanics and alluvium. Rarely on clay soils. Water table permanently low, fresh. Generally well-drained sites. In drier areas may occur near water. Colonizes low pH (2.5–6.5) acid sulphate estuarine soils in the Wyong area (Payne 1992).
**Exposure:** Exposed–sheltered situations, light shade–no shade.

### Conservation

**Conservation:** Conserved in Western Sydney (Benson & McDougall 1991) and adequately conserved elsewhere. May be considered a weed in agricultural situations.

## **Calochlaena dubia** (Culcita dubia) DICKSONIACEAE

Common Ground Fern

### Life history

**Growth form:** Terrestrial fern with stout, creeping rhizome.
**Vegetative spread:** Spread by rhizome to form almost pure stands with fronds to 2 m tall.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores January–June.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). Recruitment mainly after fire (D. Keith pers. comm.). Spreads about 0.3 m per year. New frond growth in October, and after rain during growing period. [Easily cultivated. Will tolerate considerable exposure but does not seem to persist long after clearing (Jones & Clemesha 1981).]
**Fire response:** Leaves scorched & burnt. May shoot within a month of burning even without rain. No significant spread after high intensity fire but may become dominant after low intensity fire (at Mosman). Resprouts vigorously at ground level or below. May indicate frequent, low intensity fire regime.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST CWS; Qld, Vic., Tas.
**Distribution Sydney area:** Coast, Gosford–Nowra and Blue Mountains; widespread & common.
**Select locations:** Gosford, Pennant Hills, Chowder Head, Royal NP, Mt Kembla, Mt Wilson, Blackheath, Springwood, Bundanoon.

### Habitat

**Habitat:** Eucalypt forests on poor soils in open places or sheltered gullies, often on sandstone gullies. Forested slopes, creek banks and roadsides.
**Altitude:** 0–900 m **Annual rainfall:** above 1200 m
**Typical local abundance:** Dominant–frequent.
**Vegetation:** Eucalypt tall open-forest or open-forest.
**Substrate:** Usually on poorer soils, sandstones, shales. Soil fertile–infertile. Water table mostly high, moisture supply continuous, fresh. Well drained. Colonizes low pH (2.5–6.5) acid sulphate estuarine soils in the Wyong area (Payne 1992).
**Exposure:** Sheltered; light shade–no shade.

### Conservation

**Conservation:** Conserved in Western Sydney (Benson & McDougall 1991) and adequately conserved elsewhere.

## Dicksonia antarctica — DICKSONIACEAE

Soft Treefern

### Life history

**Growth form:** Treefern with thick trunk to 4.5 m high.
**Vegetative spread:** No.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak May, August.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Spores retain viability 10–15 years (Jones 1987). [Very hardy, grows very easily (Jones & Clemesha 1981).]
**Fire response:** Resprouts.
**Interaction with other organisms:** Both possums & parrots eat the young croziers and at times are very destructive (Jones & Clemesha 1981). Aborigines ate the pith from the centre of the trunk (Jones & Clemesha 1981).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC ST NT CT ST CWS; Qld, Vic., Tas., S.A.
**Distribution Sydney area:** Illawarra, Blue Mountains.
**Select locations:** Mt Kembla, Minnamurra, Mt Coricudgy, Mt Wilson, Mt Tomah, Jenolan Caves, Mt Werong, Bundanoon.

### Habitat

**Habitat:** Widespread in mountain gullies, usually along creeks.
**Altitude:** 400–900 m **Annual rainfall:** 1400 mm
**Typical local abundance:**
**Vegetation:** Cooler rainforest
**Substrate:** Red clay loam derived from basalt. No salinity.
**Exposure:** Sheltered.

### Conservation

**Conservation:** Conservation status unknown.

## Arachniodes aristata — DRYOPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern with creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forms colonies and occasionally dense masses to 2 m high.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spore size 25–42 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very slow to spread in cultivation (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld, Pac, Malesia, Asia.
**Distribution Sydney area:** Chiefly in north coastal regions.
**Select locations:** Newport (1906). Herbarium records not available.

### Habitat

**Habitat:** Rainforest especially near creeks, often on mountain slopes.
**Altitude:** **Annual rainfall:**
**Typical local abundance:**
**Vegetation:** Rainforest especially near creeks.
**Substrate:**
**Exposure:** Sheltered.

### Conservation

**Conservation:** Conservation status unknown.

## **Cyrtomium falcatum** * cv 'Rochfordii' DRYOPTERIDACEAE

Holly Fern

### Life history

**Growth form:** Terrestrial fern with short rhizome.
**Vegetative spread:** Creeping rhizome. Can reproduce from large pieces of old withered rhizome — dormant vegetative buds become active when rhizome is detatched from plant (Jones 1987).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond (inadequate material). Spore size 29–39 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Japan. Probably a garden escape.
**Botanical subregions:** CC.
**Distribution Sydney area:** Sydney Harbour and the coast.
**Select locations:** Garigal NP (L.McD.), Curl Curl, Rose Bay, Coogee, Cape Solander, Cronulla.

### Habitat

**Habitat:** Crevices of cliffs and walls.
**Altitude:** 0–200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:**
**Substrate:** Sandstone cuttings and crevices close to the sea.
**Exposure:**

### Conservation

**Conservation:** Restricted exotic species.

## **Lastreopsis acuminata** DRYOPTERIDACEAE

Shiny Shield Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping, thick rhizome, fronds to 90 cm long.
**Vegetative spread:** Probably limited.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak May and August (but few records).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** NWS CWS; Qld, Vic., Tas., S.A.
**Distribution Sydney area:** Coast and Blue Mountains.
**Select locations:** Watagan Mtns, Royal NP, Bulli Pass, Minnamurra Falls, Mt Coricudgy, Mt Wilson, Mt Tomah.

### Habitat

**Habitat:** Usually near creeks.
**Altitude:** 0–800 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest and wet sclerophyll forest.
**Substrate:** Basalt soils, very fertile. Water table mostly high, moisture supply continuous, fresh.
**Exposure:** Deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Lastreopsis decomposita — DRYOPTERIDACEAE

Trim Shield Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Sometimes covers large areas.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak May, (but few records).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). [Easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT CWS; Qld, Vic.
**Distribution Sydney area:** Widespread, Coast and Lower Blue Mountains.
**Select locations:** Culoul Range, Mountain Lagoon, Ourimbah, McCarrs Creek, Garie, Mt Kembla, Macquarie Pass, Nortons Basin, Leura.

### Habitat

**Habitat:** Rocky gullies and hillsides.
**Altitude:** 0–800 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Sometimes covers large areas.
**Vegetation:** Rainforest and wet sclerophyll forest.
**Substrate:** Basalt, sandstone. Soil fertile. No salinity.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Lastreopsis hispida — DRYOPTERIDACEAE

Bristly Shield Fern

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome, fronds to 15–60 cm long, sometimes to 90 cm.
**Vegetative spread:** Long-creeping rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spore size 33–45 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown but very slow (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CT; Vic., Tas., N.Z.
**Distribution Sydney area:** Blue Mountains, rare.
**Select locations:** Waterfall Gully, Mt Wilson (1903), Happy Valley, Mt Wilson (1914), Blue Mountains 1903) (Tindale 1963) Herbarium records not available.

### Habitat

**Habitat:** Shady wet situations, often in gravelly soil or on mossy or rotting logs (Jones & Clemesha 1981).
**Altitude:** 1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest.
**Substrate:** Moisture supply continuous.
**Exposure:** Deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Lastreopsis microsora — DRYOPTERIDACEAE

Creeping Shield Fern

### Life history

**Growth form:** Terrestrial fern.
**Vegetative spread:** Long-creeping rhizome, often forming large clumps.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing March, May.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). [Very easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld, Vic., N.Z.
**Distribution Sydney area:** Widespread, coast, Blue Mountains.
**Select locations:** Gosford, Newport, Bulli Pass, Minnamurra Falls, Cambewarra, Fitzroy Falls, Mt Tomah, Mt Irvine, Mt Wilson, Blackheath, Wentworth Falls.

### Habitat

**Habitat:**
**Altitude:** 0–900 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Common.
**Vegetation:** Rainforest and wet sclerophyll forest.
**Substrate:** Coastal sandy alluvium, basalt soils, alluvium. Soil very fertile–fertile. No salinity.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Polystichum australiense — DRYOPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern.
**Vegetative spread:** Proliferous buds often present on the main rhachis.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak Aug, range June–Nov.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** CWS.
**Distribution Sydney area:** Widespread. Coast & Blue Mountains.
**Select locations:** Watagan Mtns, Otford, Minnamurra Falls, Mountain Lagoon, Erskine Creek, Mt Wilson, Blackheath, Capertee, Bundanoon.

### Habitat

**Habitat:** Gullies & hillsides, near creeks.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-forest and on rainforest margins.
**Substrate:** Basalt, sandstone gully soils. No salinity.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## Polystichum formosum — DRYOPTERIDACEAE

Broad Shield Fern

### Life history

**Growth form:** Terrestrial fern.
**Vegetative spread:** Probably limited.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing time ? (inadequate records).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC NT **CT**; Qld, Vic.
**Distribution Sydney area:** Only recorded from Fitzroy Falls and Sunny Corner.
**Select locations:** Fitzroy Falls, Sunny Corner.

### Habitat

**Habitat:** Rocky gorges near waterfalls.
**Altitude:** 500–1000 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest or eucalypt forest.
**Substrate:** Basalt, trachyte. Soil fertile. Water table mostly high, fresh.
**Exposure:**

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988) and elsewhere.

## Polystichum proliferum — DRYOPTERIDACEAE

Mother Shield Fern

### Life history

**Growth form:** Terrestrial fern with thick, ascending, scaly rhizome.
**Vegetative spread:** Plantlets formed from proliferous buds near ends of fronds take root and form large colonies (Jones & Clemesha 1981).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, mainly August–December. Spore size 27–39 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Possibly dispersed locally by plantlets. [Very easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS; Vic., Tas.
**Distribution Sydney area:** Mainly Upper Blue Mountains.
**Select locations:** Mt Coricudgy, Mt Wilson, Mt Tomah, Mt Werong, Jenolan Caves, Wentworth Falls, Minnamurra Falls.

### Habitat

**Habitat:** Cool mountain areas.
**Altitude:** 0–1200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest, or moist eucalypt open-forest.
**Substrate:** Basalt loam, high nutrient on hillsides and in valleys.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Equisetum arvense* EQUISETACEAE

Common Horsetail, Scouring Rush

### Life history

**Growth form:** Perennial herb with erect annual stems, fertile and sterile, usually hard and covered with silicaceous deposits; stems consist of nodes and internodes with branches radiating in whorls from each node, whorled leaves reduced to scales. Perennial pubescent rhizomes to several metres long.
**Vegetative spread:** Plant shoots from an extensive system of rhizomes which divide frequently. New plants grow from rhizome fragments and from tubers. Spreads quickly.
**Longevity:** Indefinite.
**Reproduction:** Spores formed in terminal cones on short-lived brownish shoots in spring. Spore size 39–59 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Spores have strap-like arms or elators which are hygroscopic and move with variations in humidity; movement of the elators entanges other spores so they are shed in groups (Jones 1987). Spores contain chlorophyll and germinate in light on soil surface (Jones 1987). Needs prolonged moist conditions to germinate and grow — usually spreads by vegetative reproduction.
**Fire response:**
**Interaction with other organisms:** Poisonous to stock; horses and sheep paricularly susceptible and can die within a few hours of eating large amounts of the plant. Dried plant more poisonous — can be a contaminant of hay. High densities in agricultural land reduce crop yield by producing inhibitory substances that depress the growth of neighbouring plants (Smith & Trounce 1990).

### Distribution

**Status/origin:** Exotic, native to S Africa. Introduced as a garden plant, occasionally cultivated as an ornamental plant or medicinal herb.
**Botanical subregions:** CC CWS; Eur., Asia, N Amer.
**Distribution Sydney area:** Sydney suburban area.
**Select locations:** Belrose.

### Habitat

**Habitat:** Gardens or adjacent bushland.
**Altitude:** 0–200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Eucalypt woodland adjacent to gardens.
**Substrate:** Free draining gravelly or sandy soils, porous soils with high water tables, and poorly drained depressions or swamps (Smith & Trounce (1990).
**Exposure:** Indifferent.

### Conservation

**Conservation:** Exotic garden plant rarely reported as naturalized. Could become a persistent weed of cultivated land and invade disturbed native vegetation particularly on damp ground on river banks and lake margins. Difficult to eradicate. Declared noxious in parts of Sydney.

## Dicranopteris linearis GLEICHENIACEAE

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome often straggling and forming dense thickets.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak ? Aug. (limited data).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Damaged by disturbance but small plants establish easily; will not survive drying out of root system (Jones & Clemesha 1981).
**Fire response:**
**Interaction with other organisms:** Rhizomes recorded as edible; used externally in poultices or emollients to treat wounds, burns, bruises, and sprains; pliant stems widely used in Asia for ropes, baskets, hats, fish traps (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld, N.T., tropics.
**Distribution Sydney area:** North from Royal NP, widespread but now rare.
**Select locations:** Hawkesbury River (1895), Gordon West, Chatswood, Loftus.

### Habitat

**Habitat:** Banks of streams in permanently damp situations, sometimes in sandstone road cuttings in Sydney area.
**Altitude:** 0–300 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** In eucalypt forest.
**Substrate:** Sandstone crevices. Soil infertile. Moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Very rare, probably inadequately conserved.

## Gleichenia dicarpa GLEICHENIACEAE

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forms large scrambling colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time except July; peak April, August–Sept (coast), April, October (mountains). Spore size 26–33 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores, dispersed by wind, probably no dormancy mechanism. Young plants establish on wet cliff lines, soaks etc. Recruitment mainly after fire (D. Keith pers. comm.). Easily grown from spores. [A hardy fern but difficult to transplant, will not tolerate the root system drying out (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST; Qld, Vic., Tas., N.Z., N.G., N.Cal, Philipp.
**Distribution Sydney area:** Common, widespread species; coast & Blue Mtns.
**Select locations:** Gosford, Ku-ring-gai Chase NP, Castlecrag, Kogarah, Appin, Cambewarra, Minnamurra, Blackheath, Woodford, Kanangra, Bundanoon.

### Habitat

**Habitat:** In sunny damp sites around swamps & bases of cliffs.
**Altitude:** 20–1200 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Rainforest margins and tall open-forest.
**Substrate:** Sandy or peaty soil — low nutrient, permanently running water; sandstone, quartzite. Water table permanently high, moisture supply continuous, fresh.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Gleichenia microphylla GLEICHENIACEAE

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forming large scrambling colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time except May–June, peak Oct. Spore size 25–38 μm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Recruitment mainly after fire (D. Keith pers. comm.). [Hardy but difficult to transplant; easily grown from spores (Jones & Clemesha 1981).]
**Fire response:** Resprouts (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT**; all states, N.Z., SE Asia.
**Distribution Sydney area:** Widespread species, coast & Blue Mtns.
**Select locations:** Gosford, Royal NP, Barrengarry, Lawson, Blackheath, Newnes Junction, Nepean Dam, Macquarie Pass.

### Habitat

**Habitat:** In sunny damp sites around swamps at bases of cliffs. Stunted plants seen in rock crevices (Jones & Clemensha 1981).
**Altitude:** 10–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-forest.
**Substrate:** Sandy or peaty soils — low nutrient; sandstone. Water table permanently high, moisture supply continuous, fresh.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Gleichenia rupestris GLEICHENIACEAE

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forming scrambling colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period January–May, September–October, peak March.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). [A hardy fern but difficult to transplant, easily grown from spores (Jones & Clemesha 1981).]
**Fire response:** Resprouts (Bantry Bay 1991, L.McD.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST; Qld, ?Vic.
**Distribution Sydney area:** Coast & Upper Blue Mtns, common.
**Select locations:** Gosford, Hornsby, Bantry Bay, Royal NP, Bulli, Brogers Creek, Mt Wilson, Blackheath, Wentworth Falls, Bundanoon.

### Habitat

**Habitat:** Crevices in cliffs.
**Altitude:** 0–1200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Common–frequent.
**Vegetation:** In open-forest or woodlands.
**Substrate:** Low to medium nutrient, on sandstone. Soil infertile or very infertile. Water table mostly high, moisture supply continuous–intermittent, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Probably adequately conserved.

## Sticherus flabellatus — GLEICHENIACEAE

Umbrella Fern

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forming large colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time except June & Sept (CC) Jan–March (CT), peak Aug (CC) Jan (CT). Spore size 14–18 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Resents disturbance but small plants adapt to cultivation, will not tolerate drying of the root system (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST; Qld, Vic., N.Z., N.Cal.
**Distribution Sydney area:** Coast & Blue Mtns.
**Select locations:** Mt White, Cheltenham, Royal NP, Bargo, Shoalhaven Gorge, Springwood, Blackheath, Glen Davis, Bundanoon.

### Habitat

**Habitat:** Moist gullies, damp soaks, along creeks, permanent moisture.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Eucalypt forests or edge of rainforest.
**Substrate:** Sandy soils, infertile. Water table permanently high, moisture supply continuous, fresh.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Sticherus lobatus — GLEICHENIACEAE

Spreading Shield Fern

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome forms large colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing sporadic throughout the year, peak March.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Resents disturbance but small plants adapt to cultivation, will not tolerate drying of the root system (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level (Jones & Clemesha 1981).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST; Qld, Vic., Tas.
**Distribution Sydney area:** Upper Blue Mtns & Bundanoon, rare on Coast.
**Select locations:** Woy Woy, Royal NP, Mt Wilson, Blackheath, Woodford, East Kangaloon, Bundanoon.

### Habitat

**Habitat:** Moist slopes, permanent moisture.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-forest or margins of rainforest.
**Substrate:** Sandstone & basalt. Soil fertile–infertile. Moisture supply continuous, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Sticherus tener GLEICHENIACEAE

Silky Fan Fern

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome. Shows considerable variation in both form and texture and this may be due to its possible hybrid origin. It has twice as many chromosomes as the other two species (Duncan & Isaac 1986).
**Vegetative spread:** Long-creeping rhizome forms large colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing Dec–May, peak March.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Resents disturbance but small plants adapt to cultivation, will not tolerate drying of the root system (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NT **CT** ?NWS; Vic., Tas.
**Distribution Sydney area:** Upper Blue Mtns & Bundanoon.
**Select locations:** Hazelbrook, Wentworth Falls, Blackheath, Mt. Wilson, Dargans Creek, Carrington Falls, Bundanoon, Minnamurra Falls.

### Habitat

**Habitat:** Creek banks and sheltered gullies; cliff faces and near permanent moisture waterfalls.
**Altitude:** 200–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Tall eucalypt open-forest or rainforest.
**Substrate:** Often in rock crevices, sandstone. Soil infertile. Water table permanently high, moisture supply continuous, fresh.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Grammitis billardieri GRAMMITACEAE

Finger Fern

### Life history

**Growth form:** Small, tufted, epiphytic fern.
**Vegetative spread:** No.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing March–August. Spore size 19–31 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Difficult to keep growing in cultivation (Jones & Clemesha 1981).]
**Fire response:** Probably killed.
**Interaction with other organisms:** Possibly requires association with mycorrhizal fungus for successful growth (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., N.Z.
**Distribution Sydney area:** Blue Mountains and occasionally coastal.
**Select locations:** Coba Creek, Gymea Bay, Cambewarra, Springwood, Mt Wilson, Blackheath.

### Habitat

**Habitat:** Epiphytic, near waterfalls or often in crevices near cliff faces.
**Altitude:** 0–1000 m **Annual rainfall:** above 1100 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Rainforest or moist open-forest.
**Substrate:** Epiphytic on mossy trees or rocks, on sandstone or basalt. Soil fertile or infertile. Moisture supply continuous, fresh.
**Exposure:** Sheltered situations; deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Hymenophyllum australe HYMENOPHYLLACEAE

### Life history

**Growth form:** Small epiphytic fern.
**Vegetative spread:** Long-creeping rhizome, forms a dense mat of foliage.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores all year.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind. Probably no dormancy mechanism. All Hymenophyllaceae have short-lived spores — a lot start germinating whilst still on the fronds (E. Brown pers. comm.). [Easily grown in a terrarium (Jones & Clemesha 1981).]
**Fire response:** Probably killed by fire.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT**; Qld, Vic., Tas.
**Distribution Sydney area:** Especially common in and to the south of the Blue Mountains.
**Select locations:** Gosford (1888), Mt Kembla (1891), Cambewarra (1886), Minnamurra Falls, Mountain Lagoon, Bowens Creek, Mt Wilson, Blackheath, Pierces Pass, Bundanoon.

### Habitat

**Habitat:** Epiphytic or lithophytic, often along creeks.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Rainforest or tall open-forest e.g with *Ceratopetalum apetalum, Backhousia myrtifolia.*
**Substrate:** On damp rocks — mainly sandstone boulders, or decaying logs, or epiphytic on trees and tree ferns.
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Hymenophyllum bivalve HYMENOPHYLLACEAE

### Life history

**Growth form:** Small epiphytic or terrestrial fern.
**Vegetative spread:** Long-creeping rhizome forms large patches.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores March–July. Spore size 40–58 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT**; Qld, N.Z.
**Distribution Sydney area:** Southern Illawarra.
**Select locations:** Upper Brogers Creek, above Minnamurra Falls.

### Habitat

**Habitat:** Damp rocks near streams.
**Altitude:** 300–600 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest and wet eucalypt forest. Sometimes among mosses on rainforest floor (Tindale 1963).
**Substrate:** Forms large patches on boulders, old mossy tree trunks, damp rock faces and in clefts.
**Exposure:** Sheltered.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988), Minnamurra Falls — southern limit.

## Hymenophyllum cupressiforme HYMENOPHYLLACEAE

Common Filmy Fern

### Life history

**Growth form:** Epiphytic or terrestrial fern.
**Vegetative spread:** Long-dreeping rhizome forms mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores all year but mainly March–May, August. Spore size 29–43 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. In dry times, fronds shrivel but usually refreshen with rain (Jones & Clemesha 1981). Easily grown in a pot (Jones & Clemesha 1981).
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990). Post-fire recruitment from spores.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST CWS; Qld, Vic., Tas.
**Distribution Sydney area:** Blue Mountains and Illawarra.
**Select locations:** Yarramalong, Middle Harbour Creek, Narrabeen, Waterfall, Loddon Falls, Fitzroy Falls, Minnamurra Falls, Woodhill, Mulgoa, Erskine Creek, Mt Tomah, Bowens Creek, Govetts Leap, Kanangra.

### Habitat

**Habitat:** Fern gullies and drier situations such as rock crevices, mine shafts and creek banks.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** In rainforest e.g with *Acmena smithii* and protected sites in drier areas. Associated with mosses and hepatics.
**Substrate:** Forms mats on rocks, often sandstone boulders but also on basalt, rotting logs, or trees, particularly tree ferns. Able to withstand short periods of drought and laminas uncurl during next rain (Tindale 1963).
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Widespread, probably adequately conserved.

## Hymenophyllum flabellatum HYMENOPHYLLACEAE

Shiny Filmy Fern

### Life history

**Growth form:** small epiphytic or terrestrial fern.
**Vegetative spread:** Long-creeping rhizome forms mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, Dec–Sept. Spore size 33–47 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in a terrarium (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., N.Z., Polynesia.
**Distribution Sydney area:** Coastal ranges and Blue Mountains.
**Select locations:** Watagan Mtns, Mt Wilson, Blackheath, Deep Pass, Upper Brogers Creek.

### Habitat

**Habitat:** On rocks or tree trunks, near waterfalls.
**Altitude:** 0–1000 m **Annual rainfall:** above 1100 mm
**Typical local abundance:** Rare–frequent.
**Vegetation:** Rainforest and wet eucalypt forest.
**Substrate:** Forms mats on rocks, ledges and boulder or tree ferns e.g. *Dicksonia antarctica.* Basalt. Moisture supply continuous. Appears to be very drought tolerant, often found on dry roof of overhanging rocks (in Tasmania) (Jarman *et al.* 1986).
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Hymenophyllum marginatum HYMENOPHYLLACEAE

Bordered Filmy Fern

### Life history

**Growth form:** Tiny mat-forming fern.
**Vegetative spread:** Long-creeping rhizome forms mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, January–June.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NT CT; Qld, Tas.
**Distribution Sydney area:** Upper Blue Moutains and Kiama area.
**Select locations:** Wentworth Falls, Blackheath, Brogers Creek, Barren Grounds, Minnamurra Falls.

### Habitat

**Habitat:** Grows on rocks or logs, usually near creeks or foot of waterfalls in mist area.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest with *Ceratopetalum apetalum.*
**Substrate:** On wet rocks, logs or soil in mist below falls. Moisture supply continuous, fresh.
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988).
Conservation status elsewhere unknown.

## Hymenophyllum pumilum HYMENOPHYLLACEAE

### Life history

**Growth form:** Delicate epiphytic fern.
**Vegetative spread:** Long-creeping rhizome forming mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC CT.
**Distribution Sydney area:** Blue Mountains and Illawarra — uncommon.
**Select locations:** Mt Tomah, Blackheath, Bowens Creek, Carrington Falls, Jamberoo Pass.

### Habitat

**Habitat:** Rainforest.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Cooler rainforest
**Substrate:** Epiphytic on wet rocks and cliffs (Mills 1988).
**Exposure:**

### Conservation

**Conservation:** Uncommon, appears to be endemic to Sydney area.
Nationally coded 3RC (Briggs & Leigh 1988). Not conserved in Illawarra region (Mills 1988).

## Hymenophyllum rarum HYMENOPHYLLACEAE

Narrow Filmy Fern

### Life history

**Growth form:** Epiphytic or terrestrial fern.
**Vegetative spread:** Long-creeping rhizome forms large patches on boulders, tree trunks.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores May–July. Spore size 30–51 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily maintained in a terrarium (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT**; Vic., Tas., N.Z.
**Distribution Sydney area:** Blue Mountains and Illawarra.
**Select locations:** Mt Wilson, Upper Brogers Creek, Upper Minnamurra Falls.

### Habitat

**Habitat:** Damp rocks near streams.
**Altitude:** 600–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare–frequent.
**Vegetation:** in rainforest or moist gullies.
**Substrate:** On damp rocks, also epiphytic on trees or tree ferns.
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988). Conservation status unknown.

## Polyphlebium venosum HYMENOPHYLLACEAE

### Life history

**Growth form:** Epiphytic fern.
**Vegetative spread:** Creeping rhizome, forms densely matted patches.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, December–May.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily maintained on a piece of *Dicksonia antarctica* trunk (Jones & Clemesha 1981).]
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., N.Z.
**Distribution Sydney area:** Blue Mountains and Illawarra.
**Select locations:** Narrabeen Lake (1887), Cambewarra (1886), Minnamurra Falls, Mt Tomah, Mt Wilson, Mt Irvine, Leura Falls (1903), Jenolan Caves (1899).

### Habitat

**Habitat:** Common on logs and tree trunks, especially on *Dicksonia antarctica*.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional–frequent.
**Vegetation:** Rainforest, epiphytic on trunks of *Dicksonia antarctica* in particular, but also *Cyathea*.
**Substrate:** Moisture supply continuous, fresh. Soil fertile.
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Sphaerocionium lyallii — HYMENOPHYLLACEAE

### Life history

**Growth form:** Epiphytic fern with long-creeping, mat-forming rhizomes.
**Vegetative spread:** Creeping rhizome forms dense mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, May–October.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC CT ST; N.Z.
**Distribution Sydney area:** Blue Mountains and Illawarra region.
**Select locations:** Coledale, Macquarie Pass (Mills 1988), Cambewarra, Minnamurra, Barren Grounds, Mt Wilson, Wentworth Falls, Katoomba.

### Habitat

**Habitat:** On damp rocks or trees, in deep gullies.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Moist rainforest with other fern species.
**Substrate:** Epiphytic on trees, e.g. on old *Ceratopetalum apetalum*, or base of Todea barbara, also on wet rocks and cliffs amongst other small ferns (Mills 1988). May be within mist of waterfalls.
**Exposure:** Sheltered, deep shade.

### Conservation

**Conservation:** Rare, nationally coded 3RC (Briggs & Leigh 1988). Mills reports that the small number of records suggest that it is quite rare in the region and in NSW (Mills 1988).

## Lindsaea dimorpha — LINDSAEACEAE

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Recruitment mainly after fire (D. Keith pers. comm.). [Very difficult to cultivate (Jones & Clemesha 1981).]
**Fire response:** Resprouts (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, N.Cal.
**Distribution Sydney area:** Coastal, north from Jervis Bay; rare.
**Select locations:** Somersby, Dharug NP, Mulgoa, Nowra, Huskisson (southern limit).

### Habitat

**Habitat:** Damp places.
**Altitude:** 0–200 m
**Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent–rare.
**Vegetation:** Heath.
**Substrate:** Shallow sandy soil, sandstone. Water table mostly high, fresh.
**Exposure:**

### Conservation

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

## Lindsaea linearis — LINDSAEACEAE

Screw Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Vegetative spread is by a fine rhizome, forms small colonies, spread c. 30 cm.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, sporing peak July–September. Recruitment mainly after fire (D. Keith pers. comm.). Spore size 22–35 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, no special morphology (Westoby *et al.* 1990), probably no dormancy mechanism. [Very difficult to establish or keep growing (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas., S.A., W.A., N.I., N.Z., N.Cal.
**Distribution Sydney area:** Coast and Blue Mountains.
**Select locations:** Catherine Hill Bay, Gosford, Terrey Hills, La Perouse, Darkes Forest, Nowra, Lawson, Blaxland, Fitzroy Falls, Bundanoon, Barren Grounds.

### Habitat

**Habitat:** Moist areas.
**Altitude:** 30–1000 m **Annual rainfall:** 800–1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Eucalypt open-forest, heath or near swamps.
**Substrate:** Often among rocks, clay flats, infertile or very infertile soils, sandstone. Water table mostly high. Non-saline.
**Exposure:** Exposed.

### Conservation

**Conservation:** Probably adequately conserved.

## Lindsaea microphylla — LINDSAEACEAE

Lacy Wedge Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Spreads by rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, peak August (Coast), April (mountains).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Sometimes colonizing man-made excavations especially in micaceous clay soils (Jones & Clemensha 1981). [Very difficult to establish or keep growing (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld, Vic.
**Distribution Sydney area:** Coast and Blue Mtns, common.
**Select locations:** Wollombi, Bouddi, Bobbin Head, Cheltenham, Garie, Wingello, Springwood, Mulgoa, Mt. Wilson, Cudgegong, Hilltop.

### Habitat

**Habitat:** Moist, rocky places, hillsides, or near creeks.
**Altitude:** 0–1000 m **Annual rainfall:** above 400 mm
**Typical local abundance:** Frequent–occasional–rare.
**Vegetation:** Woodland, open-forest & along rainforest margins.
**Substrate:** Sandy soil from sandstone, infertile–very infertile. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Lindsaea trichomanoides LINDSAEACEAE

### Life history

**Growth form:** Terrestrial fern with creeping rhizome.
**Vegetative spread:**
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spore size 16–23 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** ?NC **CC CT**; Vic., Tas., N.Z.
**Distribution Sydney area:** Chiefly in coastal situations south of Sydney; not common.
**Select locations:** Kurrajong, Burralow Swamp (P. Hind pers. comm.), Mt Keira, Kiama, Minnamurra.

### Habitat

**Habitat:** Wet gullies.
**Altitude:** 0–600 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Moist forest, rainforest. On creeks with *Libbertia*.
**Substrate:** Rocky areas. No salinity. On peaty soil and logs (in Tasmania) (Jarman *et al.* 1986).
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Rare. Regionally rare in Illawarra region (Mills 1988).
Conservation status eleswhere unknown.

## Lycopodium cernuum LYCOPODIACEAE

Scrambling Clubmoss

### Life history

**Growth form:** Terrestrial, creeping plant; scrambling aerial stems swith simple leaves and subterranean stems with wiry roots.
**Vegetative spread:** Main stem creeping over ground surface, rooting at intervals.
**Longevity:** Indefinite.
**Reproduction:** Sporangia in cone-like strobili. Sporing peak August–September (limited data). Spore size 18–27 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind; long-lived. Spores only germinate in the absence of light and remain dormant until buried; mycorrhizal fungi aid development of subterranean prothallus, maturity may take 10–15 years (Jones 1987). [Very difficult to transplant but easy once growing (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT; Qld, N.T., W.A., pantrop.
**Distribution Sydney area:** Coastal.
**Select locations:** Watagan Mtns, Gosford, McCarrs Ck, Meadowbank, Royal NP.

### Habitat

**Habitat:** On moist cliff faces, road cuttings, or open areas or swamp edges.
**Altitude:** 0–300 m **Annual rainfall:** above 1000 mm
**Typical local abundance:**
**Vegetation:** Sclerophyll forest.
**Substrate:** Sandstone, very infertile soil. Water table permanently high, moisture supply continuous, fresh.
**Exposure:** Mid–no shade.

### Conservation

**Conservation:** Conservation status unknown.

## Lycopodium deuterodensum LYCOPODIACEAE

Bushy Clubmoss

### Life history

**Growth form:** Terrestrial or epiphytic plant; stems erect to 90 cm high with simple leaves and subterranean main stems with wiry roots.
**Vegetative spread:**
**Longevity:** Indefinite.
**Reproduction :** Sporangia in cone-like strobili. Spores at any time, except June, peak March.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind; long-lived. Spores only germinate in the absence of light and remain dormant until buried; mycorrhizal fungi aid development of subterranean prothallus, maturity may take 10–15 years (Jones 1987). [Impossible to grow (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld. Vic., Tas., S.A., N.I., N.Cal.
**Distribution Sydney area:** Widespread, Coast & Upper Blue Mtns.
**Select locations:** Gosford, Terrey Hills, Royal NP, Minnamurra Falls, Wentworth Falls, Clarence, Jenolan Caves, Kanangra.

### Habitat

**Habitat:** Various situations, hillsides, sometimes swampy.
**Altitude:** 0–1200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Eucalypt woodland, mallee and heath.
**Substrate:** Sandy soils, sandstone, infertile. Water table mostly high or mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## Lycopodium laterale LYCOPODIACEAE

Slender Clubmoss

### Life history

**Growth form:** Terrestrial or epiphytic plant; weak stems with simple leaves and subterranean main stems with wiry roots.
**Vegetative spread:** Subterranean main stems.
**Longevity:** Indefinite.
**Reproduction:** Sporangia in cone-like strobili. Spores at any time, peak April, August. Spore size 31–47 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind; long-lived. Spores only germinate in the absence of light and remain dormant until buried; mycorrhizal fungi aid development of subterranean prothallus, small swollen bodies formed near the soil surface are both photosynthetic and mycorrhizic; maturity of the prothallus may take 10–15 years (Jones 1987). Recruitment mainly after fire (D. Keith pers. comm.). [Can be successfully grown but very slow (Jones & Clemesha 1981).]
**Fire response:** Resprouts (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld, Vic., Tas., S.A., N.Z., N.Cal.
**Distribution Sydney area:** Widespread, Coast & Blue Mtns.
**Select locations:** Gosford, Cowan, Roseville, Austinmer, Maddens Plains, Minnamurra Falls, Bilpin, Woodford, Katoomba, Gospers Mtn.

### Habitat

**Habitat:** Wet boggy areas.
**Altitude:** 0–1200 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Occasional.
**Vegetation:** Sedge swamps and wet heath.
**Substrate:** Soaks below sandstone cliff lines. Infertile soil. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** Indifferent–sheltered; light–no shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Marsilea costulifera** (M. angustifolia) MARSILEACEAE

### Life history

**Growth form:** Fern with slender, creeping rhizomes, rooting at nodes.
**Vegetative spread:** Forms patches (Jones 1993).
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori within a thick-walled, nut-like sporocarp which arises from rhizome at base of frond.
**Dispersal, establishment & growth:** Diaspore: sporocarps; probably water-dispersed.
**Fire response:** Not likely to be burnt but would probably resprout from rhizome.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NT CT SWS NWP SWP NFWP; Qld, Vic., S.A. Does not overlap with *M. angustifolia* which is tropical in N.T., W.A. (Jones 1993).
**Distribution Sydney area:** Western Sydney.
**Select locations:** Doonside (1967), Glenfield (1952). Not all Herbarium records available.

### Habitat

**Habitat:** Wet places; emergent zone, permanent or semi-permanent freshwater swamp.
**Altitude:** 0–200 m **Annual rainfall:** 700–1000 mm
**Typical local abundance:** Abundance probably fluctuates depending on rainfall and flooding. Locally common (Jones 1993).
**Vegetation:** Semi-permanent freshwater swamp.
**Substrate:** Floodplain alluvium. In mud, shallow water and moist depressions (Jones 1993).
**Exposure:**

### Conservation

**Conservation:** Possibly extinct in Western Sydney (Benson & McDougall 1991), though widely distributed, and probably well conserved elsewhere (Jones 1993).

## **Marsilea hirsuta** MARSILEACEAE

### Life history

**Growth form:** Rhizomatous, semi-aquatic fern with hairy, small clover-like fronds.
**Vegetative spread:** Creeping rhizome rooting at nodes.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori within a thick-walled, nut-like sporocarp which arises from rhizome at base of frond. Probably requires an emergent period to develop sporocarps. [Produces sporocarps readily in cultivation (P. Lister pers. comm.).]
**Dispersal, establishment & growth:** Diaspore: sporocarps; probably water-dispersed. Abundance probably fluctuates depending on rainfall and flooding. Probably no spore dormancy.
**Fire response:** Not likely to be burnt but would probably resprout from rhizome.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC ST NWS CWS SWS NWP NFWP SFWP; Qld, Vic., N.T., S.A., W.A.
**Distribution Sydney area:** Western Sydney.
**Select locations:** Richmond, Yarramundi, Penrith, Doonside, Glenfield, Kemps Creek, Narellan.

### Habitat

**Habitat:** Wet places; ephemeral watercourses and ditches.
**Altitude:** 0–50 m **Annual rainfall:** 700–800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Fresh meadow with herbaceous species e.g. *Juncus articulatus, Amphibromus, Ranunculus, Pratia.*
**Substrate:** Floodplain alluvium, fertile soil, semi-permanent or ephemeral watercourses and soakage areas.
**Exposure:** Mid–light shade, 10–60 % Projective Foliage Cover (P. Lister pers. comm.)

### Conservation

**Conservation:** Not adequate. Vulnerable in Western Sydney (Benson & McDougall 1991).

## Marsilea mutica — MARSILEACEAE

### Life history

**Growth form:** Rhizomatous, semi-aquatic, perennial fern with clover-like fronds on stems up to 1 m long. Reproduces sexually & vegetatively.
**Vegetative spread:** Creeping rhizome rooting at nodes.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori within a thick-walled, nut-like sporocarp which arises from rhizome at base of frond. Probably requires an emergent period to develop sporocarps.
**Dispersal, establishment & growth:** Diaspore: sporocarps; probably water-dispersed. Probably no spore dormancy but sporelings only developed after sporocarps were cracked open. First leaves visible in 5–7 days (Yen & Myerscough 1989). Abundance probably fluctuates depending on rainfall and flooding.
**Fire response:** Not likely to be burnt but would probably resprout from rhizome.
**Interaction with other organisms:** In competition with other species, *M. mutica* is possibly the most resistant to wind and waves but least strong competitor for available water surface under sheltered conditions (Yen & Myerscough 1989 a, b) at Bushells Lagoon.

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST NWP; Qld, Vic., Tas., N.T., S.A., W.A., N. Cal.
**Distribution Sydney area:** Mainly Western Sydney.
**Select locations:** Wollombi Brook, Cooranbong, Pitt Town, Richmond (Pughs Lagoon), St Albans, Werrington, Glenfield, Narellan, Port Kembla.

### Habitat

**Habitat:** Wet places.
**Altitude:** 0–50 m **Annual rainfall:** above 600 mm
**Typical local abundance:** Occasional.
**Vegetation:** Emergent zone; permanent or semi-permanent freshwater swamp.
**Substrate:** Floodplain alluvium in water 1–150 cm deep.
**Exposure:** Full sun.

### Conservation

**Conservation:** Not adequate, has disappeared from Longneck Lagoon since 1976.
Vulnerable in Western Sydney (Benson & McDougall 1991).

## Pilularia novae-hollandiae — MARSILEACEAE

Austral Pillwort

### Life history

**Growth form:** Tiny, semi-aquatic, grass-like fern to 8 cm high with rhizome rooting at node, turf forming.
**Vegetative spread:** Spreads by rhizome rooting at nodes.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori within a thick-walled, nut-like sporocarp which arises from rhizome at base of frond.
**Dispersal, establishment & growth:** Diaspore: sporocarps, juveniles submerged, adults submerged, emergent or temporarily terrestrial (Cook 1990). Probably no spore dormancy.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC ST SWS; Vic., Tas., SA.
**Distribution Sydney area:** Western Sydney.
**Select locations:** Doonside (1966, only record for area).

### Habitat

**Habitat:** In a dried out roadside ditch, not plentiful (1966).
**Altitude:** 50 m **Annual rainfall:** 800 mm
**Typical local abundance:** Rare.
**Vegetation:** Sedgeland e.g. *Juncus, Elatine, Melaleuca.*
**Substrate:** Clay soil.
**Exposure:**

### Conservation

**Conservation:** Rare, not conserved.
Vulnerable in Western Sydney (Benson & McDougall 1991).

## Botrychium australe OPHIOGLOSSACEAE

Parsley Fern

### Life history

**Growth form:** Perennial herb to 50 cm high, with deeply buried non-creeping rhizome and fleshy roots. Frond usually solitary 7–50 cm high; not coiled when young (Jones 1987).
**Vegetative spread:** No.
**Longevity:** Indefinite.
**Reproduction:** Frond with fertile and sterile segments; spores produced in sporangia on lower surface. Sporing period peak April–May. Spore size 22–33 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Light inhibits germination of spores, must be covered with humus or washed into holes or cracks (Jones 1987). Subterranean prothallus lacks chorophyll, requires mycorrhizal fungus to develop; may persist in soil for 20 years (Jones 1987). [Easily cultivated; no record of ferns being raised from spores (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level or below (1 report).
**Interaction with other organisms:** Association with mycorrhizal fungus essential at all stages of development (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; LHI, Qld, Vic., Tas., S.A., N.Z.
**Distribution Sydney area:** Generally coastal, rare.
**Select locations:** Martinsville, Watagan Mtns (P. Hind), Newport, Mosman, Sandy Point, Long Swamp (Kodela *et al.* 1992), Minnamurra Falls, Blue Gum Forest, Yerranderie (P. Hind pers. comm.).

### Habitat

**Habitat:** Damp sites, near creeks; margin of upland mire (Kodela 1992).
**Altitude:** 30–620 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Rare.
**Vegetation:** Open-forest or grassy places on edge of rainforest. Swamp margin at base of slope amongst *Lomandra longifolia* (Kodela *et al.* 1992).
**Substrate:** Sandy soil on sandstone. Soil fertile or infertile. Damp sites with intermittent moisture supply. No salinity.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

**Conservation:** Rare, likely to be poorly conserved. Although widespread, is uncommon and considered rare by Tindale (1982) (Kodela *et al.* 1992).

## **Ophioglossum lusitanicum** subsp. **coriaceum** OPHIOGLOSSACEAE

Adder's Tongue

### Life history

**Growth form:** Terrestrial herb 3–15 cm high, with deeply buried knobby rootstock and fleshy roots. Fronds usually 1–5; not coiled when young (Jones 1987).
**Vegetative spread:** No.
**Longevity:** Indefinite.
**Reproduction:** Fertile spike on stalk to 8 cm long, spores produced in sporangia on lower surface. Sporing period? (inadequate material).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Light inhibits germination of spores, must be covered with humus or washed into holes or cracks (Jones 1987). Subterranean prothallus lacks chorophyll, requires mycorrhizal fungus to develop; may persist in soil for 20 years (Jones 1987). [Difficult to cultivate (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:** Association with mycorrhizal fungus essential at all stages of development (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS SWS NFWP; Qld, Vic., Tas., N.T., S.A., W.A., cosmop.
**Distribution Sydney area:** Coast and Dividing Range — rare.
**Select locations:** Woy Woy, Riverstone, Royal NP, Casula, Rylstone, Gardiners Gap, Boyd Crossing.

### Habitat

**Habitat:** Damp open sites, in grassland or amongst mossy rocks.
**Altitude:** 0–1200 m **Annual rainfall:** 800–1400 mm
**Typical local abundance:** Occasional, rare.
**Vegetation:** Open grassland, freshwater swamps or in peaty soil in heathland.
**Substrate:** Peaty soil, rock platforms in skeletal soil or sandstone granite or basalt. Soil infertile, damp. Moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent; light–no shade.

### Conservation

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

## **Leptopteris fraseri** OSMUNDACEAE

### Life history

**Growth form:** Terrestrial fern with arborescent trunk to 1 m high.
**Vegetative spread:**
**Longevity:** Indefinite.
**Reproduction:** Spores green, produced in sporangia on lower surface of frond, August–May, peak March–April; lose viability within hours (Jones & Clemesha 1981).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in protected places (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT** ST; Qld.
**Distribution Sydney area:** Chiefly on the ranges, Upper Blue Mtns and Minnamurra.
**Select locations:** Mt Wilson, Blackheath, Wentworth Falls, Barren Grounds, Minnamurra Falls, Belmore Falls.

### Habitat

**Habitat:** Very wet places in caves, often near waterfalls, rocky mountain gullies.
**Altitude:** 0–1100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Cooler rainforest.
**Substrate:** Moisture supply continuous.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988).
Conservation status elsewhere unknown.

## Todea barbara OSMUNDACEAE

King Fern

### Life history

**Growth form:** Terrestrial fern with arborescent trunk to 3 m high, slow growing.
**Vegetative spread:** Limited, old specimens have trunks to 2 m in diameter with numerous crowns.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sporangia on lower surface of frond, green and contain chlorophyll; lose viability within hours (Jones & Clemesha 1981). Spore size 47–78 µm (Tryon & Lugardon 1991), peak September–October. Massive spore release in Dec ? in NZ (E. Brown pers. comm.). Spore size 43–62 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores, dispersed by wind, probably no dormancy mechanism; germinates in light, prothallus capable of photosynthesis (Jones 1987). Slow growing. [Vigorous colonizer of damp, partly cleared sites, does well in cultivation (Duncan & Isaac 1986).
**Fire response:**
**Interaction with other organisms:** Trunk often bears epiphytes. Exploited as source of growing medium (trunks) for orchids, ferns etc. (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS; Qld, Vic., Tas., S.A, N.Z., S. Africa.
**Distribution Sydney area:** Widespread especially in the ranges.
**Select locations:** Calga, Royal NP, Mt Kembla, Springwood, Blackheath, Mt Wilson, Rylstone, Bundanoon, Fitzroy Falls.

### Habitat

**Habitat:** Damp places, often along streams.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Tall open-forest, less commonly rainforest gullies.
**Substrate:** Crevices of sandstone cliffs, creek banks; also on granite. Soil fertile–infertile. Water table mostly high, moisture supply continuous.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Dictymia brownii** POLYPODIACEAE

### Life history

**Growth form:** Epiphytic fern with rhizome creeping, green and freqently branched.
**Vegetative spread:** Long-creeping rhizome forming large clumps.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period ? (inadequate material). In established clumps, majority of fronds bear abundant sori althought number of spores released do not seem high (Walker & Page 1982).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).]
**Fire response:** Probably killed.
**Interaction with other organisms:** The rhizome and root masses trap detritis and are often colonized by mosses, epiphytic ferns and orchids, creating a small reservoir of moisture (Walker & Page 1982).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC CT** ST; Qld.
**Distribution Sydney area:** Chiefly ranges north from the Blue Mountains. Colo area, Otford and upper Blue Mountains.
**Select locations:** Crawfords Lookout, Dharug NP, Brisbane Water NP, Otford, Wentworth Falls.

### Habitat

**Habitat:** Epiphytic on rocks or tree trunks, in shady gullies.
**Altitude:** 0–900 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Over its range: in dense rainforest, confined to epiphytic sites in highest canopy and in more open rainforest on branches in crowns of trees and on upper trunks of palms (Walker & Page 1982). Sydney area, in or near rainforest.
**Substrate:** Often forming large clumps on rocks or tree trunks, sandstone. Soil fertile. On mountains where there is frequent cloud and high humidity but can withstand moderate desiccation for periods during middle of day (Walker & Page 1982).
**Exposure:** Sheltered situations; mid shade. Seems to be considerably light-demanding (Walker & Page 1982).

### Conservation

**Conservation:** Rare, regionally rare in Illawarra region (Mills 1988), Otford southern limit. Conservation status unknown.

## **Microsorum pustulatum** (M. diversifolium) POLYPODIACEAE

Kangaroo Fern

### Life history

**Growth form:** Epiphytic fern.
**Vegetative spread:** Very long-creeping rhizome forms mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, peak August.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in a protected site (Jones & Clemesha 1981. High rainfall areas from coast to subalpine regions.]
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC SC NT **CT** ST; Qld, Vic., Tas., N.I., N.Z.
**Distribution Sydney area:** Upper Blue Mountains and southwards.
**Select locations:** Mt Coricudgy, Mt Tomah, Mt Wilson, Blackheath, Ruby Creek, Robertson, Bundanoon.

### Habitat

**Habitat:** On rocks or tree trunks in shady situations.
**Altitude:** 700–1000 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** In or near rainforest.
**Substrate:** Rocks or tree trunks, occasionally as ground cover on forest floor, basalt. Soil very fertile, fertile. No salinity.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## **Microsorum scandens** POLYPODIACEAE

Fragrant Fern

### Life history

**Growth form:** Creeping epiphytic fern with fragrance of cumin when bruised (P. Hind pers. comm.).
**Vegetative spread:** Very long-creeping rhizome forms mats.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, peak March (mountains), November (coast).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in protected situations and useful ground cover in dark situations (Jones & Clemesha 1981).]
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST CWS; LHI, Qld, Vic., N.Z.
**Distribution Sydney area:** Coast and Blue Mountains, widespread.
**Select locations:** Watagan Mtns, Gosford, Otford, Jamberoo, St Helena, Mt Tomah, Mt Wilson, Bundanoon.

### Habitat

**Habitat:** Epiphytic on boulders or tree trunks, in sheltered gullies.
**Altitude:** 0–1000 m **Annual rainfall:** generally above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** In rainforest and fern gullies; rainforest low-climber.
**Substrate:** On boulders, mossy tree trunks and tree ferns or as ground cover on sloping river banks; mostly basalt, less commonly sandstone. Soil very fertile–fertile. No salinity.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## **Platycerium bifurcatum** subsp. **bifurcatum** POLYPODIACEAE

Elkhorn

### Life history

**Growth form:** Epiphytic bracket fern, forming 'nest', with dimorphic fronds and short thick rhizome.
**Vegetative spread:** Very limited — plantlets grow from buds on the outer lower margins and enable the clump to circle the tree.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown, hardy in open as far south as Melbourne (Jones & Clemesha 1981.]
**Fire response:** Probably killed.
**Interaction with other organisms:** Host plant of *Halticorcus platyceryi* Staghorn Beetle and Staghorn Borer (Jones & Elliot 1986). Reported as epiphytic on *Casuarina*. Other epiphytics frequently grow on the 'nests'.

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC; LHI, Qld, N.G.
**Distribution Sydney area:** Coastal — now rare but reported 'plentifully about the trees and rocks in shady places in the vicinity of Port Jackson' (Bennett 1860).
**Select locations:** Gosford, Blakehurst (1902), Austinmer, Nowra, Shoalhaven.

### Habitat

**Habitat:** Usually epiphytic on trees or on boulders and rock faces.
**Altitude:** 0–500 m **Annual rainfall:** 1200–1600 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest, sometimes swamp forest or open-forest.
**Substrate:** Soil fertile. Water table permanently low, moisture supply intermittent, brackish or fresh.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

**Conservation:** Native to coastal rainforest and swamp forest but now found sometimes as naturalized in bushland near houses (e.g. Nth Head, as escape from cultivation. Evidently once more common (Bennett 1860, see above) but probably extensively collected for horticultural purposes.

## Pyrrosia confluens POLYPODIACEAE

Horsehoe Felt Fern

### Life history

**Growth form:** Small epiphytic fern with dimorphic fronds and creeping rhizome.
**Vegetative spread:** Long-creeping rhizome allows limited spread on host tree.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).] During drought fronds may curl and shrivel but will swell again with rain.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT** NWS CWS; LHI, Qld, N.I., N.Cal.
**Distribution Sydney area:** North from the Wyong area.
**Select locations:** Ourimbah, Calga, Wentworth Falls (very old record).

### Habitat

**Habitat:** Epiphytic on tree branches and trunks, other epiphytes or rocks.
**Altitude:** 0–900 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:** Rainforest.
**Substrate:** Rocks or tree trunks, soil fertile, basalt. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; deep shade.

### Conservation

**Conservation:** Very rare in the area, only 3 records. Conservation status unknown.

## Pyrrosia rupestris POLYPODIACEAE

Rock Felt Fern

### Life history

**Growth form:** Small epiphytic fern with dimorphic fronds and creeping rhizome.
**Vegetative spread:** Long-creeping rhizome allows limited spread on host.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time; peak August, December. Spore size 56–87 µm diameter.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Dispersal: no special morphology (Westoby *et al.* 1990). [Easily grown (Jones & Clemesha 1981).] In times of drought fronds may curl and shrivel but will swell again with rain.
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS; Qld, N.G.
**Distribution Sydney area:** Widespread, north from Nadgee.
**Select locations:** Watagan Mtns, Bouddi, Eastwood, Menangle, Wollongong, Cambewarra, Mt Coricudgy, Springwood, Mt Wilson, Robertson, Bundanoon, Wombeyan.

### Habitat

**Habitat:** Epiphytic on tree trunk and branches or rocks.
**Altitude:** 0–1000 m **Annual rainfall:** 800–1400 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Rainforest, open-forest.
**Substrate:** Epiphytic, also rocks in exposed situations; sandstone, basalt, granite. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered.

### Conservation

**Conservation:** Conservation status unknown.

## Psilotum nudum PSILOTACEAE

Skeleton Fork Fern

### Life history

**Growth form:** Terrestrial or epiphytic plant with short-creeping rhizome, lacking roots.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Sporing March–Nov, peak Sept–Oct. Spore size 22–40 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. The gametophytes are colourless, subterranean, very slow growing and depend on an associated fungus which lives in their tissues; they have never been cultivated and rarely have been seen (C. Chambers pers. comm.). [A hardy but slow-growing plant in cultivation (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT** NWS CWS; Qld, Vic., N.T., W.A., N.Z., trop, Japan.
**Distribution Sydney area:** Rare away from coastal areas. North of the Shoalhaven River.
**Select locations:** Mt Yengo, Central Colo, Gosford, McCarrs Ck, Deep Ck, Castle Cove, Sydney Opera House, Royal NP, The Woolwash, Bundanoon.

### Habitat

**Habitat:** Usually found tufted in rock crevices.
**Altitude:** 0–500 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Rare.
**Vegetation:** Eucalypt open-forest or tall open forest.
**Substrate:** Crevices of sandstone rocks or cliffs. Soil infertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Tmesipteris obliqua (T. billardieri nom. illeg.) PSILOTACEAE

### Life history

**Growth form:** Pendent epiphyte, rarely terrestrial, aerial shoots usually 20–40 cm long; long-creeping rhizome, without roots.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Sporing November–August, peak March (limited data).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. The gametophytes are colourless, subterranean, very slow growing and depend on an associated fungus which lives in their tissues; they have never been cultivated and rarely have been seen (C. Chambers pers. comm.). [Cultivation unknown (Jones & Clemesha 1981).]
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** **CC** SC **CT** ST; Vic., Tas.
**Distribution Sydney area:** Upper Blue Mountains & Minnamurra.
**Select locations:** Kurrajong Heights, Mt Tomah, Mt Irvine, Mt Wilson, Minnamurra Falls.

### Habitat

**Habitat:** Usually epiphytic on trunks and bases of treeferns, or rocks along creeks.
**Altitude:** 200–1000 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Occasional–rare.
**Vegetation:** Rainforest or rarely tall eucalypt forest.
**Substrate:** Usually epiphytic on treeferns, *Cyathea* and *Dicksonia antarctica*, or on rocks; also in humus accumulations on banks and around tree bases (Chinnock 1993). Basalt soils, very fertile. Moisture supply intermittent, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988), conservation status unknown.

## Tmesipteris ovata — PSILOTACEAE

### Life history

**Growth form:** Pendent epiphyte with aerial stems and long-creeping rhizome without roots.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Sporing January (limited records).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. The gametophytes are colourless, subterranean, very slow growing and depend on an associated fungus which lives in their tissues; they have never been cultivated and rarely have been seen (C. Chambers pers. comm.). [Cultivation unknown (Jones & Clemesha 1981).]
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT**; Qld, Vic., Tas. (King Is).
**Distribution Sydney area:** Only two Herbarium records.
**Select locations:** Blackheath, Minnamurra Falls.

### Habitat

**Habitat:** Usually epiphytic on treeferns.
**Altitude:** 0–1000 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest.
**Substrate:** Usually epiphytic on treeferns e.g. *Cyathea australis*. Soil fertile. Water table permanently high, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Rare. Regionally rare in Illawarra region (Mills 1988), conservation status elsewhere unknown.

## Tmesipteris parva — PSILOTACEAE

### Life history

**Growth form:** Pendent epiphyte with aerial stems and long-creeping rhizome without roots.
**Vegetative spread:**
**Longevity:** Limited.
**Reproduction:** Spores August–September.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. The gametophytes are colourless, subterranean, very slow growing and depend on an associated fungus which lives in their tissues; they have never been cultivated and rarely have been seen (C. Chambers pers. comm.). [Cultivation unknown (Jones & Clemesha 1981).]
**Fire response:** Killed by high intensity fire (Chesterfield,Taylor & Molnar 1990).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST; Qld, Vic.
**Distribution Sydney area:** Blue Mountains, but not common.
**Select locations:** Mt Wilson, Glenbrook, Cambewarra. Not all Herbarium records available.

### Habitat

**Habitat:** Usually epiphytic on tree ferns.
**Altitude:** 0–1000 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional.
**Vegetation:** Epiphytic on *Cyathea* and *Dicksonia antarctica* trunks in rainforest and moist eucalypt forest.
**Substrate:** Usually epiphytic on treeferns, high nutrient soils, basalt.
**Exposure:** Sheltered.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988), probably rare at other localities.

## Tmesipteris truncata PSILOTACEAE

### Life history

**Growth form:** Epiphytic or terrestrial fern with aerial stems and long-creeping rhizome without roots.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Spores at any time, peak July–September.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. The gametophytes are colourless, subterranean, very slow growing and depend on an associated fungus which lives in their tissues; they have never been cultivated and rarely have been seen (C. Chambers pers. comm.). [Cultivation unknown (Jones & Clemesha 1981).]
**Fire response:** Probably killed.
**Interaction with other organisms:** Epiphytic on *Todea barbara.*

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CT ST; LHI, Qld.
**Distribution Sydney area:** North from Mt Dromedary, Coast & Mountains.
**Select locations:** Watagan Mtns, Gosford, McCarrs Ck, Mona Vale (Katandra Bushland Sanctuary), Coalcliff, Rylstone, Blackheath, Wentworth Falls, Robertson.

### Habitat

**Habitat:** Damp rock crevices or on trunks of *Todea barbara.*
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent–rare.
**Vegetation:** Rainforest or sandstone gullies in eucalypt forest.
**Substrate:** Damp rock crevices or on trunks of *Todea barbara,* fertile sandstone soils. Moisture supply intermittent, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Pteris ensiformis PTERIDACEAE

Slender Brake

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Disturbance is detrimental but once established in cultivation is easy to grow (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Naturalized exotic, native to Queensland.
**Botanical subregions:** CC*, Qld, Asia, Pacific.
**Distribution Sydney area:** Naturalized in Sydney district (Harden 1990).
**Select locations:** (no herbarium specimens)

### Habitat

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

### Conservation

**Conservation:** Conservation status unknown.

## **Pteris** sp. aff. **comans** PTERIDACEAE

Hairy Bracken

### Life history

**Growth form:** Terrestrial fern with erect tufted rhizome.
**Vegetative spread:** Probably not.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing period ? (inadequate material).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Disturbance is detrimental and is much more difficult to cultivate than *P. tremula;* easily raised from spores (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC SC **CT**; Qld, Vic., Tas., N.Z., Pac.
**Distribution Sydney area:** Rare.
**Select locations:** Belmore Falls, Minnamurra Falls.

### Habitat

**Habitat:** In gullies near watercourses, wet places, near creeks or waterfalls.
**Altitude:** 0–600 m **Annual rainfall:** 1400 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest or tall open-forest.
**Substrate:** Moist ground, basalt and sandstone. No salinity.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988).

## **Pteris tremula** PTERIDACEAE

Tender Brake

### Life history

**Growth form:** Terrestrial fern with erect tufted rhizome; fronds emit an odour resembling urine of tom-cats (Jones 1987).
**Vegetative spread:** No.
**Longevity:** Short-lived, probably 2–5 years.
**Reproduction:** Spores produced in sori on lower surface of frond.
Spore size 34–45 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Spores retain viability 10–15 years (Jones 1987). Establishes during wet periods and grows quickly. [Easily grown in a variety of habitats, easily raised from spores (Jones & Clemesha 1981).] Naturalized in gardens from spores.
**Fire response:** Probably killed.
**Interaction with other organisms:** Host to Leaf Nematodes (*Aphelenchoides* spp.) (Jones & Elliot 1986).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** NWS CWS SWP; LHI, Qld, Vic., Tas., N.T., S.A., N.I., N.Z., Fiji.
**Distribution Sydney area:** Blue Mtns, also naturalizes in Sydney suburban gardens.
**Select locations:** Mt Yengo, Mt Tayan, Mt Wilson, Jenolan, Kanangra, Linden, Wombeyan, Cambewarra.

### Habitat

**Habitat:** Sheltered places, rocky gullies, rock ledges, creek banks.
**Altitude:** 600–1000 m **Annual rainfall:** above1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Rainforest or eucalypt open-forest.
**Substrate:** Shale, limestone, basalt. Soil fertile. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

**Conservation:** Conservation status unknown. Naturalizes in Sydney suburban gardens and probably in urban bushland.

## Pteris umbrosa PTERIDACEAE

Jungle Brake

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Spreads by rhizome to form colonies.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time except June–August, peak (material inadequate).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT; Qld, Vic.
**Distribution Sydney area:** Illawarra, Upper Blue Mtns.
**Select locations:** Thirroul, Bulli, Mt Keira, Barrengarry, Minnamurra, Bundanoon, Wentworth Falls.

### Habitat

**Habitat:** Shaded places, creek beds and flats, usually amongst rocks.
**Altitude:** 0–900 m **Annual rainfall:** 1400 mm
**Typical local abundance:**
**Vegetation:** Rainforest.
**Substrate:** Often on basalt.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Pteris vittata PTERIDACEAE

Chinese Brake

### Life history

**Growth form:** terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Limited spread.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Spores retain viability 10–15 years (Jones 1987). [Very slow-growing in cultivation in southern Australia prefers some lime in the soil mix, resents complete shade, easily raised from spores (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC ?ST; Qld, Vic., N.T., W.A., Asia, Afr., trop.
**Distribution Sydney area:** Coastal, rare.
**Select locations:** Patonga, Castlecrag, Bellambi.

### Habitat

**Habitat:** On hillsides, often near streams.
**Altitude:** 0–300 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:**
**Substrate:** On sandstone, granite or limestone. Naturalized on rock cuttings at Castlecrag.
**Exposure:**

### Conservation

**Conservation:** Rare, conservation status unknown.

## **Salvinia molesta** * SALVINIACEAE

### Life history

**Growth form:** Free-floating, mat-forming aquatic fern.
**Vegetative spread:** Spreads vegetatively by fragmentation and can grow from a single node. In warm water, with high nutrient levels and good light it can double its mass in 2 days (Ryan 1982).
**Longevity:** Indefinite.
**Reproduction:** Sporocarps borne on pendant branches of submerged, much-divided leaf. Sporocarps sterile as species is of hybrid origin.
**Dispersal, establishment & growth:** Diaspore: plant fragments dispersed by humans or floods. Generally grows best in high nutrient levels and water temperatures around 20–30° C, but can survive 10–35° C. Although frost sensitive it can survive these conditions (Sainty & Jacobs 1981). Spread by aquarium trade, local spread by wind, water currents and boat traffic (Australian Weeds 1981).
**Fire response:** Unlikely to be burnt.
**Interaction with other organisms:** Mats may interfere with recreation, deplete oxygen levels, shade out submerged plants and foul banks (Australian Weeds 1981).

### Distribution

**Status/origin:** Naturalized exotic. Introduced from S America, probably as an aquarium plant (Ryan 1982).
**Botanical subregions:** NC CC CWS SWP; Qld, Vic., N.T., S.A., W.A.
**Distribution Sydney area:** Coastal Sydney, not Tablelands.
**Select locations:**

### Habitat

**Habitat:** Permanent still or slowly flowing water, or frequently inundated land.
**Altitude:** 0–300 m? **Annual rainfall:** above 700 mm
**Typical local abundance:** Dominant.
**Vegetation:** Open water or land frequently inundated.
**Substrate:** Responds well to high nutrients. Water table permanently high. Tolerates salinity to 20% with reduced growth rate (Ryan 1982), but killed by seawater.
**Exposure:** Full sun.

### Conservation

**Conservation:** Invasive exotic species, taints water storages and seriously affects other aquatic plants. Difficult to eradicate from large areas (Ryan 1982). Proclaimed noxious weed.

## Schizaea bifida SCHIZAEACEAE

Forked Comb Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome 5–8 cm deep, fronds clustered, erect, 25–35 cm high, sterile fronds divided 2–20 segments.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Fertile frond divided 1–2 or 3 times; spores produced in sporangia along both sides of segments pinnately arranged at apex of frond or branches ('combs'). Spores at any time, peak July–August. Spore size 26–45 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind. Dispersal: no special morphology (Westoby *et al.* 1990). Probably no dormancy mechanism. Recruitment mainly after fire (D. Keith pers. comm.). [No record of spore-raising in cultivation, transplanting difficult (Jones & Clemesha 1981).]
**Fire response:** Resprouts from underground rhizomes.
**Interaction with other organisms:** Mycorrhizal fungus essential for successful germination and growth (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld, Vic., Tas., S.A., N.Z., N.Cal.
**Distribution Sydney area:** Widespread, coast, Blue Mountains.
**Select locations:** Bucketty, Kariong, Cattai,Terrey Hills, Royal NP, Minnamurra Falls, Mt Wilson, Lawson, Blaxland.

### Habitat

**Habitat:** Rocky hillsides and ridges.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 m
**Typical local abundance:** Rare.
**Vegetation:** Eucalypt open-forest, scrub or heath.
**Substrate:** Sandy soil, often shallow with sandstone rocks. Soil very infertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Indifferent to exposure; light shade.

### Conservation

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

## Schizaea dichotoma SCHIZAEACEAE

Branched Comb Fern

### Life history

**Growth form:** Terrestrial fern, fronds clustered, erect, 20–40 cm high, sterile fronds divided, more than 20 segments.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Fertile frond divided 3–6 times; spores produced in sporangia along both sides of segments pinnately arranged at apex of frond or branches ('combs'). Spores at any time (limited data). Spore size 21–30 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [No record of spore-raising in cultivation, transplanting difficult (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level or below (Fox 1988).
**Interaction with other organisms:** Mycorrhizal fungus essential for successful germination and growth (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC; Qld, N.T., W.A., SE Asia, Pac., Madag.
**Distribution Sydney area:** Coast north from Royal NP — rare.
**Select locations:** Gosford, Mt Kuringai, Narrabeen, Kurnell, Audley.

### Habitat

**Habitat:** Hillsides with sandstone rocks or rock crevices.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Eucalypt open-forest, scrub or heath.
**Substrate:** Sandy soils from Hawkesbury Sandstone, very infertile. Moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Uncommon, conservation status unknown.

## Schizaea fistulosa SCHIZAEACEAE

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome 2–4 cm deep, fronds clustered, erect, simple 10–30 cm long.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Fertile fronds longer than sterile fronds; spores produced in sporangia along both sides of segments pinnately arranged at apex of frond or branches ('combs'). Spore size 43–77 µm polar dimension (Large & Braggins 1991).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [No record of spore-raising in cultivation, transplanting difficult (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:** Mycorrhizal fungus essential for successful germination and growth (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC ST; Vic., Tas., SA., W.A., N.G., N.Z., Borneo, N.Cal, Chile.
**Distribution Sydney area:** Only record Chiswick (Five Dock) (1916).
**Select locations:**

### Habitat

**Habitat:** Various wet habitats, wet peaty soil or on hillocks in bogs.
**Altitude:** 0–50 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Record for Minnamurra Falls but likely to be extinct elsewhere in the area.

## Schizaea rupestris SCHIZAEACEAE

### Life history

**Growth form:** Terrestrial fern with creeping rhizome, sterile fronds 5–12 cm long.
**Vegetative spread:** Short-creeping rhizome forms mats.
**Longevity:** Indefinite.
**Reproduction:** Fertile fronds 8–20 cm long; spores produced in sporangia along both sides of segments pinnately arranged at apex of frond or branches ('combs'). Spores at any time except June, peak May (limited data).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [No record of spore-raising in cultivation (Jones & Clemesha 1981). Transplanting difficult.]
**Fire response:**
**Interaction with other organisms:** Mycorrhizal fungus essential for successful germination and growth (Jones 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CT ST
**Distribution Sydney area:** Gosford district south to the Budawang Mountains.
**Select locations:** Gosford, Newport (L.McD.), Narrabeen, Garigal NP (L.McD.), Royal NP, Lawson, Wentworth Falls, Blackheath, Robertson.

### Habitat

**Habitat:** Wet shaded places such as caves or near waterfalls.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Associated with mosses and ferns, frequently wet eucalypt forest, e.g. with *Livistona australis.*
**Substrate:** On sandstone rocks. Soil infertile. Water table permanently high, moisture supply continuous, fresh.
**Exposure:** Deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Selaginella kraussiana * SELAGINACEAE

### Life history

**Growth form:** Perennial prostrate growing plant.
**Vegetative spread:** Spread by creeping branched stems.
**Longevity:** Indefinite.
**Reproduction:** Sporangia in cone-like strobili, plants fertile October–November.
**Dispersal, establishment & growth:** Diaspore: microspores (male) and megaspores female; commence development while attached to parent plant (Jones 1987). Probably wind or water-dispersed. Megaspore size 370–833 µm, microspore size 30–53 µm polar dimensions (Large & Braggins 1991).
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Africa & the Azores, escape from cultivation.
**Botanical subregions:** CC CT SWS; Qld, Vic., Tas., S.A., natural. in Europe & other temperate regions.
**Distribution Sydney area:** Widespread.
**Select locations:** Mt Wilson*, Albion Park*, Wirrimbirra*, RBG Sydney*. Not all Herbarium records available.

### Habitat

**Habitat:** Cultivated in glasshouses, often established in moist situations such as near ponds and along pathways.
**Altitude:** 0–1000 m **Annual rainfall:** 1400 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:** Water table permanently high, moisture supply continous, fresh.
**Exposure:** Sheltered.

### Conservation

**Conservation:** Exotic, naturalized locally in wet sites.

## Selaginella uliginosa SELAGINACEAE

### Life history

**Growth form:** Perennial plant with erect stems 5–38 cm high, simple leaves and subterranean rhizome.
**Vegetative spread:** Spread by much branched subterranean rhizome.
**Longevity:** Indefinite.
**Reproduction:** Sporangia in cone-like strobili. Spores any time except July with peaks in April and August.
**Dispersal, establishment & growth:** Diaspore: microspores (male) and megaspores female; commence development while attached to parent plant (Jones 1987). Probably wind-dispersed. Recruitment mainly after fire (D. Keith pers. comm.). In dry seasons the tops of the stems may die.
[Easily grown in pots (Jones & Clemesha 1981).]
**Fire response:** Resprouts at ground level.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT; LHI, Qld, Vic., Tas., N.T., W.A.
**Distribution Sydney area:** Widespread, Coast and Blue Mountains.
**Select locations:** Gosford, Narrabeen, Kurnell, Royal NP, Nowra, Blackheath, Wentworth Falls, Belmore Falls, Thirlmere Lakes. Not all Herbarium records available.

### Habitat

**Habitat:** Ground stratum in damp sandy areas.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Open-forest or heath, also recorded with *Sphagnum* at Robertson.
**Substrate:** Deep sand or sandy soils on sandstone, very infertile soil. Perennially moist sites either from seepage and soaks or swampy poorly drained non-saline conditions.
**Exposure:** Sheltered. Light–mid shade.

### Conservation

**Conservation:** Probably adequately conserved.

## **Cheilanthes austrotenuifolia** (C. tenuifolia) SINOPTERIDACEAE

Rock Fern

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome.
**Vegetative spread:** Can spread by creeping rhizomes to form a fresh green 'pasture' on hillsides with soil 10–12 cm deep over rock (Duncan & Isaac 1986).
**Longevity:** Indefinite. Perennates during summer by rhizome while fronds die down (Quirk & Chambers 1981).
**Reproduction:** Spores produced in sori on lower surface of frond. Spore size 33–50 µm diameter (32 per sporangium), (P. Farrant pers. comm.).
**Dispersal, establishment & growth:** Diaspore: spores, dispersed by wind. Spores produced in sori on lower surface of frond. Probably no dormancy mechanism. [Cultivation in pots, not in shade or too humid location. Aerial portion dies back in summer and new fronds grow in autumn, so should not be watered until winter (P. Farrant pers. comm.).] Spores can tolerate dessication and remain viable for long period, germinated 15 months after collection (Quirk & Chambers 1981). Apogamy observed, can develop sporophyte without fertilization in absence of water droplets (Quirk & Chambers 1981).
**Fire response:** Probably resprouts.
**Interaction with other organisms:** Reports of the fern causing poisoning in sheep and cattle are numerous but mostly seasonal — diarrhoea in sheep, haemorrhages under the skin and internal bleeding in cattle (Auld and Medd 1987). Sheep poisoning worse when plant was dry, in summer; veterinary experiments suggest that young plants not toxic (Hurst 1942).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST CWS SWS SWP SFWP; Vic., Tas., S.A., W.A.
**Distribution Sydney area:** Mittagong area.
**Select locations:** Nowra, Mt. Jellore, Goodmans Ford, Wollondilly River (P. Farrant pers. comm.). Not all Herbarium records available.

### Habitat

**Habitat:** Rocky ground or exposed rocky slopes.
**Altitude:** 0–?600 m **Annual rainfall:** 500–600 mm (P. Farrant pers. comm.).
**Typical local abundance:**
**Vegetation:** Open-forest, woodlands and pastures (Auld & Medd). Sometimes growing in clumps mixed with *C. sieberi* (C. Chambers pers. comm.).
**Substrate:** Grows in a variety of habitats and seems to need more moisture and deeper soil than *C. sieberi*. Amongst rocks it often grows in crevices or where soil has accumulated around boulders (Duncan & Isaac 1986). Can withstand periods of drought (Quirk & Chambers 1981).
**Exposure:** Exposed, full sun.

### Conservation

**Conservation:** Conservation status unknown.

## Cheilanthes distans SINOPTERIDACEAE

Bristly Cloak Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Short creeping rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time (coast), August–October (Tablelands); peak August–October. Spore size 43–79 µm diameter, (P. Farrant pers. comm.).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [In cultivation needs low humidity, must not be shaded, does not need a dry rest period like other *Cheilanthes* species (P. Farrant pers. comm.).] Disturbance is detrimental; can be grown in a semi-protected position. Apogamy observed, can develop sporophyte without fertilization in absence of water droplets (Quirk & Chambers 1981).
**Fire response:** Probably resprouts.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NW CWS SWS NWP SWP; LHI, Qld, Vic., S.A., W.A., N.I., N.Z., N.Cal.
**Distribution Sydney area:** Coastal, Campbelltown to Mulgoa and Lower Blue Mountains.
**Select locations:** Watagan Mtns, Peats Ridge, Newport, Kogarah, Menai, Mt Annan, Razorback, Mulgoa, Yerranderie, Jenolan Caves, Hill End, Minnamurra. Pennant Hills, Drummoyne, Nowra, Mosman, Manly Kogarah, Cattai, Wallacia, Calga, Newport, Austinmer (P.F.).

### Habitat

**Habitat:** Rocky hillsides, rocky crevices in moderately wooded, often mountainous areas, not adapted to extremely arid conditions (P. Farrant pers. comm.).
**Altitude:** 0–1000 m **Annual rainfall:** 700–1200 mm
**Typical local abundance:** Occasional– rare.
**Vegetation:** Woodland or open-forest.
**Substrate:** Skeletal soil amongst rocks, shale, basalt, slates, rarely sandstone. Soil fertile–infertile. Water table permanently low, moisture supply intermittent, fresh. Shallow soil pockets in dry rocky hillsides, never in moist constantly humid environments; can withstand periods of drought (Quirk & Chambers 1981).
**Exposure:** Indifferent–sheltered; light shade–no shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Cheilanthes sieberi** subsp. **sieberi** SINOPTERIDACEAE

Rock Fern

### Life history

**Growth form:** Terrestrial with short to medium-creeping rhizome.
**Vegetative spread:** Can spread up to 5 cm per year.
**Longevity:** Indefinite. Perennates during summer by rhizome while fronds die down (Quirk & Chambers 1981).
**Reproduction:** Spores produced in sori on lower surface of frond. Spores at any time, peak March, August (Coast), March (Tablelands). Spore size 49–73 µm diameter (16 per sporangium) or 36–52 µm diameter (32 per sporangium), (P. Farrant pers. comm.).
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Able to withstand high temperatures and considerable water stress. During hot weather it often dries off leaving clumps of persistent, stiff brown fronds. (Duncan & Isaac 1986). [Cultivation in pots, not in shade or location too humid. Some or all fronds die down in summer, so should not be watered until winter (P. Farrant pers. comm.).] Apogamy observed, can develop sporophyte without fertilization in absence of water droplets (Quirk & Chambers 1981).
**Fire response:** Resprouts.
**Interaction with other organisms:** Sometimes growing in clumps mixed with *C. austrotenuifolia* (C. Chambers).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** All NSW divisions; LHI, Qld, Vic., N.T., S.A., W.A., N.I., N.Z., N.Cal.
**Distribution Sydney area:** Widespread Coast, Western Sydney, Lower Blue Mtns, west of Great Dividing Range.
**Select locations:** Patonga, Newport, Pennant Hills (P.F.), Kurrajong, Castlereagh, Springwood, Mt Annan, Dapto, Cullen Bullen, Jenolan Caves, Hill End, Bowral.

### Habitat

**Habitat:** Open places with grassland and mountainous areas in rock crevices, moist soil along creek banks in very arid areas (P. Farrant pers. comm.).
**Altitude:** 0–1200 m **Annual rainfall:** 700–1200 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Open-forest or woodland with open grassy understorey.
**Substrate:** Variable, rocky or heavy clay e.g. Wianamatta Shale, basalt, granite. Soil very fertile, fertile–infertile. Water table mostly low, moisture supply intermittent, fresh. Can withstand periods of drought (Quirk & Chambers 1981).
**Exposure:** Exposed–indifferent; shade, none–light.

### Conservation

**Conservation:** Conservation status unknown.

## **Pellaea falcata** var. **falcata** SINOPTERIDACEAE

Sickle Fern

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome.
**Vegetative spread:** Spreads by short-creeping rhizome, ? 5–10 cm/year.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, October–March. Spore size 30–41 µm (Large & Braggins 1991).
**Dispersal, establishment & growth:** Dispersal: no special morphology (Westoby *et al.* 1990). Spores dispersed by wind. Probably no dormancy mechanism. Drought-resistant, has the properties of a resurrection plant, the cell contents of the leaves are able to revive after dessication (Duncan & Isaac 1986). [Easily grown in cultivation & will grow in full sunlight.]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS; LHI, Qld, Vic., Tas., N.Z., N.Cal., Asia.
**Distribution Sydney area:** Colo area & north-west Sydney, upper Blue Mtns, Royal NP–Illawarra, widespread.
**Select locations:** Mt Corricudgy, Wheeny Creek, Mt Wilson, Galston, Waterfall, Mt Kembla, Camden, Cambewarra.

### Habitat

**Habitat:** Forest floor or occasionally on damp rocks.
**Altitude:** 0–1000 m **Annual rainfall:** 700–1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Generally eucalypt tall open-forest, occasionally rainforest, or floodplain tall open-forest with *Eucalyptus tereticornis* (Scholer 1974).
**Substrate:** Loamy soil, often alluvial or in rocky crevices, derived from sandstone, shale or basalt. Soil fertile. Water table mostly low, moisture supply intermittent; drainage good.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

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

## **Pellaea falcata** var. **nana** SINOPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern with short creeping rhizome.
**Vegetative spread:** Creeping rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond, at any time.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily grown in cultivation.] Drought-resistant — fronds shrivel and refreshen when moistened (P. Bostock pers. comm.).
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT** ST; Qld, Tas.
**Distribution Sydney area:** Colo area, Upper Blue Mtns, Mt Kembla–Minnamurra.
**Select locations:** Glen Davis, Tollagong Range, Mt Wilson, Mt Tomah, Ourimbah, St Helena, Belmore Falls, Fitzroy Falls, Mt Kembla, Minnamurra Falls, Bundanoon.

### Habitat

**Habitat:** On damp rocks or boulders in rainforest gullies.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** On rainforest floor or rarely in wet eucalypt forest.
**Substrate:** On rocks or boulders of sandstone or basalt. Soil fertile. Moisture supply continuous, fresh.
**Exposure:** Mid-deep shade.

### Conservation

**Conservation:** Conservation status unknown.

## Pellaea paradoxa — SINOPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern with medium-creeping rhizome.
**Vegetative spread:** Creeping rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Spores tiny.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. Possibly drought resistant. [Disturbance is detrimental; very slow to re-establish when transplanted (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** NT **CT** ST SWS; Qld, N.Z.
**Distribution Sydney area:** Coastal ranges.
**Select locations:** Watagan SF, Ourimbah, Gosford, Newport, north of Mt Irvine, reported from Minnamurra but not confirmed (Mills 1988).

### Habitat

**Habitat:** Rock crevices in rainforest gullies.
**Altitude:** 0–600 m **Annual rainfall:** 1200–1400 mm
**Typical local abundance:**
**Vegetation:** Mainly in rainforest but extending to drier sites in rock crevices, cliff faces etc.
**Substrate:** Soils from Narrabeen strata, fertile. Drainage good. Moisture supply regular, fresh.
**Exposure:** Sheltered situations; mid-deep shade.

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988), conservation status unknown.

## Christella dentata — THELYPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern with short-creeping rhizome; fronds emit an acrid, musky odour (Jones 1987).
**Vegetative spread:**
**Longevity:** Indefinite.
**Reproduction :** Spores produced in sori on lower surface of frond. Material inadequate to indicate sporing times.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown and adaptable to a variety of situations; fast growing; frost hardy in southern Victoria (Jones & Clemesha 1981).] Occasional colonizer in suburban gardens.
Spore size 24–35 µm polar dimension (Large & Braggins 1991).
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC**; LHI, Qld, S.A., W.A., Pac., trop. & subtrop regions of Asia & Africa.
**Distribution Sydney area:** Coast & lower Blue Mtns, north from Cambewarra, not common.
**Select locations:** Gosford, Gladesville, Cronulla, Douglas Park, Cambewarra, Springwood, Mulgoa.

### Habitat

**Habitat:** Forms tussocks along stream banks.
**Altitude:** 0–400 m **Annual rainfall:** 1000–1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest margins and in eucalypt open-forest, also *Casuarina glauca* forest.
**Substrate:** Creek banks — on sandstone, infertile soil. Moisture supply continuous, fresh.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## Christella hispidula — THELYPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern with erect or short-creeping rhizome.
**Vegetative spread:** Limited.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Very easily grown, fast growing, frost tender (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld, trop.
**Distribution Sydney area:** Rare in NSW, recorded from lower Hunter Valley (Harden 1990). Lane Cove Valley (1992), possibly garden escape.
**Select locations:** Lane Cove (Van Klaphake pers. comm. 1992)

### Habitat

**Habitat:** Stream banks.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** About 40 plants (Lane Cove).
**Vegetation:** Open-forest.
**Substrate:** Hawkesbury Sandstone.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Cyclosorus interruptus — THELYPTERIDACEAE

### Life history

**Growth form:** Terrestrial fern with long-creeping rhizome.
**Vegetative spread:** Long-creeping rhizome.
**Longevity:** Indefinite.
**Reproduction:** Spores produced in sori on lower surface of frond. Sporing peak probably March.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism. [Easily cultivated, frost hardy, takes full sun in a wet spot (Jones & Clemesha 1981).]
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld, N.T., W.A., N.Z., trop.
**Distribution Sydney area:** Coast north from Royal NP, rare.
**Select locations:** Swansea, Woy Woy, Kogarah, Kurnell, Audley.

### Habitat

**Habitat:** Forms large clumps in freshwater swamps.
**Altitude:** 0–50 m **Annual rainfall:** 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Freshwater swamps.
**Substrate:** Sandy loam, infertile soil.
**Exposure:**

### Conservation

**Conservation:** Rare, only 6 collections, 5 old, Audley southern limit. Conservation status unknown.

## Vittaria elongata VITTARIACEAE

### Life history

**Growth form:** Pendent, epiphytic fern with creeping rhizome.
**Vegetative spread:** Limited.
**Longevity:**
**Reproduction:** Spores produced in sori on lower surface of frond.
**Dispersal, establishment & growth:** Diaspore: spores dispersed by wind, probably no dormancy mechanism.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC**; Qld, Malesia, Pacific.
**Distribution Sydney area:** Watagan Mountains.
**Select locations:** Watagan Mountains (1979), the only record.

### Habitat

**Habitat:** Wet tall eucalypt open-forest.
**Altitude:** 0–500 m **Annual rainfall:** above 1400 mm
**Typical local abundance:**
**Vegetation:** With other epiphytes e.g. *Hymenophyllum cupressiforme, Davallia pyxidata.*
**Substrate:** Sandstone boulders.
**Exposure:**

### Conservation

**Conservation:** Rare in CC, Watagan Mountains southern limit, conservation status unknown.

# Cycads

## Macrozamia communis ZAMIACEAE

### Life history

**Growth form:** Palm-like plant; trunk subterranean or on shallow soil 1–2 m high, spirally arranged, leaves 0.7–2 m long.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years; estimated up to 120 years at Bateman's Bay (Cribb 1981).
**Primary juvenile period:** Possibly 10–20 years.
**Reproduction:** Male and female cones on separate plants, 20–45 cm long. Pollen dispersed by wind. Seed 3–4.5 cm long, with a fleshy, scarlet coat. Released at maturity.
**Dispersal, establishment & growth:** Diaspore: seed, dispersed short distance; no dormancy. Seeds germinate slowly without treatment. Often scattered on ground surface, no soil-stored seedbank. Seedlings slow growing, 1 leaf per year as juvenile; faster growth when older (B. Briggs pers. comm.). Seedlings may be clustered around female plant. Seedlings with a tuberous stem and apogeotropic, coralloid roots contain nitrogen-fixing, symbiotic blue-green algae *Anabaena* (Beadle 1972).
**Fire response:** Resprouts from above ground level.
**Interaction with other organisms:** Aborigines leached toxin (azoxyglycosides) from seeds before using for food (Beadle 1972). Leaves toxic to stock, causing serious motor-neurone disease (Hurst 1942, [most reports refer to *M. communis* (K. Hill pers. comm.)]).
Early settlers used pulu from base of leaves to fill cushions, mattresses and upholstery (Maiden 1975 & Cribb 1981). Commercial extraction of starch from stems in 1920s, recent investigation for production of power alcohol (Cribb 1981).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CWS; Qld.
**Distribution Sydney area:** Coast and adjacent ranges.
**Select locations:** Norah Head, Woy Woy, Palm Beach, Bondi 1876 (Cribb 1981), Kurnell, Colo Heights, Cambewarra, Nowra, Caoura–Tallong.

### Habitat

**Habitat:** Well drained sandy soils.
**Altitude:** 0–400 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Sclerophyll woodland and forest.
**Substrate:** Infertile sandy soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered, light shade.

### Conservation

**Conservation:** Probably not at risk.

## **Macrozamia pauli-guilielmi** subsp. **flexuosa** ZAMIACEAE

### Life history

**Growth form:** Palm-like plant; stem mostly subterranean, leaves 40–110 cm long, spirally arranged.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years.
**Primary juvenile period:**
**Reproduction:** Male cones 8–25 cm long, female cones 10–25 cm long, on separate plants. Pollen dispersed by wind. Seeds c. 3 cm long, orange-scarlet. Released at maturity.
**Dispersal, establishment & growth:** Diaspore: seed, probably no dormancy mechanism or soil-stored seedbank. Seedlings with a tuberous stem and apogeotropic, coralloid roots containing nitrogen-fixing, symbiotic blue-green algae *Anabaena* (Beadle 1972).
**Fire response:** Probably resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC.
**Distribution Sydney area:** Morisset (old record only).
**Select locations:** Morisset (1899).

### Habitat

**Habitat:** Coastal ranges.
**Altitude:** 50 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:** Sclerophyll forest.
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Southern limit Morisset though not known if it still occurs there, conservation status unknown.

## **Macrozamia secunda** ZAMIACEAE

### Life history

**Growth form:** Palm-like plant; stem mostly subterranean; leaves 60–80 cm long, spirally arranged.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years.
**Primary juvenile period:**
**Reproduction:** Male cones 15–20 cm long, female cones 15–25 cm long, on separate plants. Pollen dispersed by wind. Fruiting peak April (limited data). Seeds 2–3.5 cm long, scarlet; probably released at maturity.
**Dispersal, establishment & growth:** Diaspore: seed. Probably no dormancy mechanism or soil-stored seedbank. Seedlings with a tuberous stem and apogeotropic, coralloid roots containing nitrogen-fixing, symbiotic blue-green algae *Anabaena* (Beadle 1972).
**Fire response:** Probably resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CT CWS.
**Distribution Sydney area:** North west of area, Rylstone–Kedumba.
**Select locations:** Rylstone, Olinda, Capertee, Ben Bullen, Kedumba Valley.

### Habitat

**Habitat:** Ridges and hillsides.
**Altitude:** 400–800 m **Annual rainfall:** less than 900 mm
**Typical local abundance:** Occasional–rare, though sometimes locally frequent.
**Vegetation:** Dry eucalypt open-forest, Ironbark–Stringybark.
**Substrate:** Sandy or stony country, gravelly clay. Soil very infertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Macrozamia spiralis ZAMIACEAE

### Life history

**Growth form:** Palm-like plant; trunk usually subterranean, leaves 60–80 cm long, spirally arranged. A variable species, larger with ± glaucous leaves in Lower Blue Mountains.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years.
**Primary juvenile period:** Possibly 10–20 years.
**Reproduction:** Male cones 15–20 cm long, female cones 12–20 cm long, on separate plants. Pollen dispersed by wind. Fruiting peak April–May (limited data). Seeds 2.5–3 cm long, orange–scarlet, fleshy coat; released at maturity.
**Dispersal, establishment & growth:** Diaspore: seed. Probably no dormancy mechanism or soil-stored seedbank. Seedlings with a tuberous stem and apogeotropic, coralloid roots containing nitrogen-fixing, symbiotic blue-green algae *Anabaena* (Beadle 1972).
**Fire response:** Resprouts at ground level in response to fire.
**Interaction with other organisms:** Aborigines used seeds for food after washing and roasting; old newspaper reports that the seeds were also used by early settlers for production of starch and arrowroot (Hurst 1942).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC CWS.
**Distribution Sydney area:** Mainly western Sydney.
**Select locations:** Colo River, Castlereagh SF, Maroota, Llandillo, Mulgoa, Picnic Point, Leumeah, Glen Davis.

### Habitat

**Habitat:** Hillsides and gentle slopes.
**Altitude:** 0–300 m **Annual rainfall:** 700–800 mm
**Typical local abundance:** Occasional.
**Vegetation:** Dry eucalypt open-forest e.g. woodland with *Angophora bakeri* and *Eucalyptus fibrosa*.
**Substrate:** Clay, sandy clay soils from Tertiary alluvium or shale/sandstone transition, dry stony soils, very infertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Indifferent to exposure.

### Conservation

**Conservation:** Conserved in Western Sydney (Benson & McDougall 1991) e.g. Castlereagh State Forest, conservation status elsewhere unknown.

## Conifers

### Callitris endlicheri — CUPRESSACEAE

Black Cypress Pine

#### Life history

**Growth form:** Tree, sometimes glaucous, with spreading branches.
**Vegetative spread:** No vegetative spread.
**Longevity:**
**Primary juvenile period:**
**Reproduction:** Male and female cones. Pollen dispersed by wind. Female cones 15–20 mm diameter, shed periodically. Seeds winged.
**Dispersal, establishment & growth:** Diaspore: winged seed, wind-dispersed. Probably no dormancy mechanism. No soil-stored seedbank.
100% mortality when stem cut to ground level (Leigh & Holgate 1979).
**Fire response:** Killed by fire (100 % scorch) (A.M. Gill pers. comm.).
**Interaction with other organisms:**

#### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC NT **CT** ST NWS CWS SWS NWP SWP; Qld, Vic.
**Distribution Sydney area:** Blue Mountains, widespread.
**Select locations:** Howes Valley, Darkes Forest, Warragamba, Hill End, Glowworm Tunnel (Newnes Plateau), Mt Victoria, Abercrombie Falls, Berrima, Tallowa Dam area.

#### Habitat

**Habitat:** Stony hills or ridges, sandstone outcrops.
**Altitude:** 0–1100 m **Annual rainfall:** 800–1200 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Dry sclerophyll forest, heath and mallee.
**Substrate:** Sandy soils, gravelly clay, sandstone outcrops, slate, well-drained. Soil infertile. Water table permanently low with intermittent moisture supply, fresh.
**Exposure:** Exposed.

#### Conservation

**Conservation:** Probably adequately conserved.

### Callitris muelleri — CUPRESSACEAE

#### Life history

**Growth form:** Small tree or shrub to 6 m, with erect branches.
**Vegetative spread:** No vegetative spread.
**Longevity:** Medium, probably 25–50 years.
**Primary juvenile period:**
**Reproduction:** Male and female cones. Pollen dispersed by wind. Female cones 20–30 mm diameter, retained on tree.
**Dispersal, establishment & growth:** Diaspore: winged seeds, no dormancy mechanism. Seeds dispersed following death of branch or fire. Seeds germinate without treatment. Seed supply retained on plant, no soil-stored seedbank. Seedling recruitment mainly after fire.
**Fire response:** Plant killed by fire, seedlings 27 cm high, 3–4 yrs after fire (David Keith, pers. comm.).
**Interaction with other organisms:**

#### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC **CT**.
**Distribution Sydney area:** South from Mt Coricudgy, widespread.
**Select locations:** Gosford, Ku-ring-gai Chase, Thornleigh, Mosman, Menai, Mt Kembla, Mt Coricudgy, Newnes, Mt Victoria, Wentworth Falls, Bundanoon.

#### Habitat

**Habitat:** Rocky places, especially sandstone escarpments in the coastal ranges.
**Altitude:** 0–1100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional but may be locally common.
**Vegetation:** Heath-scrub, forest.
**Substrate:** Sandy soil from sandstone, rocky exposed sites. Low nutrient soils. Permanently low water table with intermittent moisture supply. Non-saline.
**Exposure:** Exposed, no shade.

#### Conservation

**Conservation:** Northern limit Mt Coricudgy. Probably adequately conserved.

## Callitris rhomboidea CUPRESSACEAE

Port Jackson Pine

### Life history

**Growth form:** Tree or shrub with spreading branches.
**Vegetative spread:** No vegetative spread.
**Longevity:** Possibly 50 years.
**Primary juvenile period:** Possibly 5–7 years.
**Reproduction:** Male and female cones. Pollen dispersed by wind. Female cones 20 mm diameter, retained on tree (Ken Hill pers. comm.).
**Dispersal, establishment & growth:** Diaspore: winged seeds. Seed dispersal following death of branch, or fire. Probably no dormancy mechanism. Seed supply retained on plant, no soil-stored seedbank.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld, Vic., Tas., S.A.
**Distribution Sydney area:** Coast and tablelands, widespread but not common.
**Select locations:** Berowra, Mosman, Sylvania, Heathcote, Maldon, Yanderra, Coricudgy Creek, Glow-worm Tunnel (near Lithgow), Newnes Junction.

### Habitat

**Habitat:** Rocky ridges or steep slopes.
**Altitude:** 0–1100 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Woodland, heathland and mallee.
**Substrate:** Sandy soils on rocky ridges or steep slopes, sandstone. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed, no shade.

### Conservation

**Conservation:** Widespread but not common, probably adequately conserved.

## Pinus pinaster * PINACEAE

Cluster Pine

### Life history

**Growth form:** Tall tree.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years.
**Primary juvenile period:**
**Reproduction:** Male and female cones. Pollen dispersed by wind.
**Dispersal, establishment & growth:** Diaspore: winged seed, 3.5 cm long. Probably no dormancy mechanism. Probably no soil-stored seedbank.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, introduced from Mediterranean region as an ornamental.
**Botanical subregions:** CC CT; Vic.
**Distribution Sydney area:** Sydney suburbs.
**Select locations:** Near Kariong (Ken Hill pers. comm.).

### Habitat

**Habitat:** Often planted as windbreaks and as ornamental trees.
**Altitude:** 0–200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:** Found in sandy soil (Simpfendorfer 1975). Not in clay soil — will grow in sea sand (Dallimore & Jackson 1966). Salt tolerant.
**Exposure:** Can stand severe coastal exposure (Simpfendorfer 1975).

### Conservation

**Conservation:** Occasionally naturalised in the area.

## Pinus radiata * PINACEAE

Radiata Pine, Monterey Pine

### Life history

**Growth form:** Large tree — can exceed 50 m in good conditions.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years.
**Primary juvenile period:** 5–10 years.
**Reproduction:** Male and female cones. Pollen dispersed by wind. Seeds 2.5 cm long.
**Dispersal, establishment & growth:** Diaspore: winged seed 2.5 cm long, probably wind-dispersed. Probably no dormancy mechanism or soil-stored seedbank. Grows rapidly when young. Widely planted, major plantation species in cooler regions. Commercial importance in Australia, S Africa & N.Z. — rapid growth makes it suitable as a short rotation crop (Dallimore & Jackson 1966). Comprises 70% of the Australian coniferous plantation resource (McKinnel *et al.* 1991).
**Fire response:** Killed by fire.
**Interaction with other organisms:** Foodplant of moth caterpillar *Digglesia australasiae* (Coupar 1992). Young trees browsed by wallabies, possums, native rats and rabbits; most widespread fungal disease of Radiata Pine is *Diplodea pinea* (McKinnel *et al.* 1991).

### Distribution

**Status/origin:** Exotic, native to California. Introduced to Australia in 1859 (Simpfendorfer 1975).
**Botanical subregions:** NT, CT; Vic.
**Distribution Sydney area:** Mainly tablelands.
**Select locations:** Mittagong, Blackheath, Bilpin, Jenolan, Oberon.

### Habitat

**Habitat:** Locally naturalized in cooler districts.
**Altitude:** 0–1200 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Pine plantations and adjacent areas (Harden 1990).
**Substrate:** Well-drained, poor to moderately fertile soil; can withstand summer droughts (Simpfendorfer 1975).
**Exposure:** Can withstand severe coastal exposure in suitable soil (Simpfendorfer 1975).

### Conservation

**Conservation:** Naturalised in cooler districts particularly on margins of plantations.

## Microstrobos fitzgeraldii PODOCARPACEAE

### Life history

**Growth form:** Ascending or erect shrub mostly less than 1 m tall.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Reproduction:** Male and female cones. Pollen dispersed by wind. Female cones 3 mm long, seeds small.
**Dispersal, establishment & growth:** Diaspore: seed, probably water or wind dispersed, probably no dormancy mechanism. Probably no soil-stored seedbank. Difficult in cultivation, needs constant misting.
**Fire response:** Intolerant of fire (Leigh & Briggs 1992). Wet sites probably serve as fire refugia.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CT
**Distribution Sydney area:** Upper Blue Mountains. The total population of about 300 plants is distributed in six locations along 8 km of cliffline between Wentworth Falls and Katoomba in the Blue Mountains ( Smith 1981).
**Select locations:** Wentworth Falls, Gordon Falls, Leura Falls, Katoomba Falls, Bonnie Doon Falls.

### Habitat

**Habitat:** On wet rocks within the spray of waterfalls or on ledges or in caves near waterfalls; southerly aspect.
**Altitude:** above 900 m
**Annual rainfall:** above 1400 mm
**Typical local abundance:** Occasional. Smith (1981) recorded total population of 203 plants from 6 localities.
**Vegetation:** With ferns & lithophytes.
**Substrate:** Wet sandstone rocks within the spray of waterfalls or on ledges or in caves near waterfalls. Soil infertile. Water table permanently high, moisture supply continuous, fresh.
**Exposure:** Sheltered situations. Southerly aspect.

### Conservation

**Conservation:** Very restricted local endemic, coded 2VCi (Leigh & Briggs1992). Most populations are reserved within Blue Mountains National Park.The largest population at Jamieson Creek, Wentworth Falls is being adversely affected by pollution in the catchment from sewage, sediment and nutrients from gardens (Leigh & Briggs 1992). Plants from Wentworth Falls (National Pass Level) carried extensive dead leaves. Creek disturbance and pollution may lead to foliage damage (Smith 1981).

## Podocarpus elatus — PODOCARPACEAE

Plum Pine, Brown Pine

### Life history

**Growth form:** Medium to large tree with brown bark that is often fissured and scaly, dioecious or rarely monoecious.
**Vegetative spread:** No vegetative spread.
**Longevity:** More than 60 years.
**Primary juvenile period:**
**Reproduction:** Male cones catkin-like to 3 cm long, female cones consist of 2–4 scales each bearing an ovule. Pollen dispersed by wind. Fruiting receptacle fleshy, edible but not appetising, blue-black, to 20 mm diameter bearing single seed 10 mm long. Shed at maturity, Jan–July, peak March.
**Dispersal, establishment & growth:** Diaspore: seed, probably bird-dispersed. Probably no dormancy mechanism and no soil-stored seedbank.
**Fire response:**
**Interaction with other organisms:** Softwood timber suitable for indoor use, resistant to termites and marine borers but seldom used owing to scarcity; excellent ornamental and shelter tree (Anderson 1956). Tested negative for anti-tumour activity (Collins *et al.* 1990).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld.
**Distribution Sydney area:** Coastal, north from Beecroft Peninsula.
**Select locations:** Gosford, Church Point, Shellharbour, Kiama, Whispering Gallery.

### Habitat

**Habitat:** Coastal.
**Altitude:** 0–200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Coastal rainforest or scrub.
**Substrate:** Sandy soils, infertile.
**Exposure:**

### Conservation

**Conservation:** Conservation adequacy unknown.

## Podocarpus spinulosus — PODOCARPACEAE

### Life history

**Growth form:** Shrub or small tree with narrow-linear leaves usually 2–6 cm long.
**Vegetative spread:**
**Longevity:** Indefinite.
**Primary juvenile period:**
**Reproduction:** Male cones 5 mm long in clusters, female cones solitary in leaf axils. Pollen dispersed by wind. Fruiting receptacle blue-black, fleshy, bearing 1–2 seeds, 8–12 mm long. Shed at maturity, August–January, peak October.
**Dispersal, establishment & growth:** Diaspore: seed, probably bird-dispersed. Probably no dormancy mechanism or soil-stored seedbank.
**Fire response:** Resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld.
**Distribution Sydney area:** Widespread.
**Select locations:** Patonga, Dee Why, Pennant Hills, Garigal NP (L.McD.), Moorebank, Macquarie Fields, Thirlmere Lakes, Kenthurst, Glen Davis.

### Habitat

**Habitat:** Sheltered coastal sites and gullies on the adjacent ranges.
**Altitude:** 0–500 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Eucalypt open-forest.
**Substrate:** Deep sandy soil, creek flats, Hawkesbury Sandstone. Soil infertile. Water table mostly low, fresh.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Probably adequately conserved.

# Flowering Plants: dicotyledon families Acanthaceae to Asclepiadaceae

## Brunoniella australis ACANTHACEAE

Blue Trumpet

### Life history

**Growth form:** Perennial herb 2–15 cm high with clusters of tuberous roots joined by underground rhizome. Leaf surface with cystoliths — mineral concentration usually of calcium carbonate.
**Vegetative spread:** Vegetative spread by underground rhizome, probably forming localised patches.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** March and September–November. Two different flower types may occur on the same plant, one large and presumably insect-pollinated, one smaller and presumably self-pollinated (Barker 1986).
**Fruit/seed:** Fruit: capsule 10–16 mm long with 8–12 seeds, matures November–December.
**Dispersal, establishment & growth:**
**Fire response:** Resprouts at ground level and may flower within a month of fire, probably dependent on fire to remove competition from taller species.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NWS CWS NWP; Qld, N.T.
**Distribution Sydney area:** Cumberland Plain and Lower Blue Mountains — widespread.
**Select locations:** Richmond, Prospect, Glenfield, Camden, Douglas Park (southern limit), Valley Heights.

### Habitat

**Habitat:** Eucalypt woodland with grassy understorey.
**Altitude:** 0–600 mm **Annual rainfall:** 700–1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** Eucalypt woodland with grassy understorey — commonly with *Eucalyptus moluccana*, *Eucalyptus tereticornis*, *Eucalyptus crebra* and *Bursaria spinosa*.
**Substrate:** Clay soils from Wianamatta Shale. Fertile soil. Water table permanently low, moisture supply intermittent, fresh. Cystoliths possibly response to calcium in soil.
**Exposure:** Indifferent to exposure, light shade or none.

### Conservation

**Conservation:** Conserved in Western Sydney (Benson & McDougall 1991), Douglas Park (southern limit).

## Brunoniella pumilio ACANTHACEAE

Dwarf Blue Trumpet

### Life history

**Growth form:** Small sprawling perennial herb to 10 cm high. Leaf surface sometimes has cystoliths — mineral concentration usually of calcium carbonate.
**Vegetative spread:**
**Longevity:** 5–20 years (D. Keith pers. comm.).
**Primary juvenile period:**
**Flowers:** March, November.
**Fruit/seed:** Fruit: capsule 12–17 mm long with 8–12 seeds, matures November.
**Dispersal, establishment & growth:** Recruitment mainly after fire (D. Keith pers. comm.).
**Fire response:** Resprouts at ground level or below.
Secondary juvenile period 1 year (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Vic.
**Distribution Sydney area:** Coast and Putty area.
**Select locations:** Gibba Swamp, Putty Road, Woy Woy, Pennant Hills, Oatley (1892), Casula.

### Habitat

**Habitat:** Woodland.
**Altitude:** 0–400 m **Annual rainfall:** 1000–1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Eucalypt woodland e.g. with *Angophora bakeri* or *Melaleuca* scrub.
**Substrate:** Sandstone. Sandy loam soils, infertile. Water table permanently low, fresh.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Pseuderanthemum variabile ACANTHACEAE

Pastel Flower

### Life history

**Growth form:** Perennial herb with creeping rhizome and erect stems.
**Vegetative spread:** Creeping rhizome.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** October–April, peak February.
**Fruit/seed:** Capsule 10–15 mm long with 1–4 seeds, each 2–4 mm long.
**Dispersal, establishment & growth:** Diaspore: seed, no special morphology (Westoby *et al.* 1990). Soil-stored seedbank (Floyd 1966).
**Fire response:** Resprouts. Secondary juvenile period less than 1 year.
**Interaction with other organisms:** Frequently eaten by cattle (W.H. Blakely, comment on specimen collected at Gordon in 1914).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, N.T.
**Distribution Sydney area:** Coast and Lower Blue Mountains — widespread.
**Select locations:** St Albans, Wamberal, Hornsby, Doonside, Liverpool, Camden, Glenbrook, Garie, Berry, Minnamurra Falls.

### Habitat

**Habitat:** Sheltered forest.
**Altitude:** 0–300 m **Annual rainfall:** 700–1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-forest to tall open-forest, occasional rainforest e.g. *Eucalyptus saligna–Eucalyptus pilularis* tall open-forest, *Eucalyptus amplifolia* open-forest.
**Substrate:** Fertile–very fertile clay soil from Wianamatta Shale, basalt. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered, in mid shade.

### Conservation

**Conservation:** Conserved in Western Sydney (Benson & McDougall 1991) and probably adequately conserved elsewhere.

## Thunbergia alata * ACANTHACEAE

Black-eyed Susan

### Life history

**Growth form:** Vigorous, woody, stoloniferous vine.
**Vegetative spread:** Possibly.
**Longevity:**
**Primary juvenile period:**
**Flowers:** August–March.
**Fruit/seed:** Fruit: woody capsule with seed 4 mm diameter, mature May (limited data).
**Dispersal, establishment & growth:** Attractive fleshy edible fruits or seeds dispersed by animals; vegetative reproducer, dispersed by gravity or water (Anon 1991).
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, introduced from S Africa. Garden escape in various places.
**Botanical subregions:** NC CC; Qld.
**Distribution Sydney area:** Sydney and Cumberland Plain, Illawarra.
**Select locations:** Bardwell Park (1946 earliest collection), Epping, Waterfall, Casula, Kurrajong, Shellharbour.

### Habitat

**Habitat:** Disturbed vegetation and vacant land.
**Altitude:** 0–300 m **Annual rainfall:** 800–1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Remnant dry rainforest and sheltered woodland.
**Substrate:** Clay fertile soils from Wianamatta Shale. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations in light shade.

### Conservation

**Conservation:** Minor weed of bushland, no specific threat.

## Acer negundo * ACERACEAE

Box Elder

### Life history

**Growth form:** Small deciduous, usually dioecious tree to 8 m high.
**Vegetative spread:** No.
**Longevity:** Up to 50 years.
**Primary juvenile period:**
**Flowers:** Late August–early September (Price 1963).
**Fruit/seed:** Winged fruit (samara) 3–4 cm long, mature January.
**Dispersal, establishment & growth:** Diaspore: seed. Wind-dispersed locally, seed probably short-lived with no dormancy mechanism; also water-dispersed (Carr *et al.* 1992). Seedlings to 10 cm high common along Hawkesbury River edge in October–November.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to America. Garden escape probably from Camden area originally.
**Botanical subregions:** NC CC NT ST.
**Distribution Sydney area:** Naturalised along Nepean River, Menangle–Penrith, widely cultivated.
**Select locations:** Camden (1959), Cobbitty, Bents Basin.

### Habitat

**Habitat:** Banks of Nepean River, wetlands.
**Altitude:** 0–300 m **Annual rainfall:** 700–900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Degraded riparian eucalypt forest e.g. with *Eucalyptus elata, Eucalyptus viminalis, Casuarina cunninghamiana.*
**Substrate:** Deep sandy alluvial deposits. Soil fertile. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Invades remnant native vegetation along Nepean River but may provide bank protection where other vegetation is absent. Seedlings along Hawkesbury River in 1992, as far down as Windsor.

## Acer pseudoplatanus * ACERACEAE

Sycamore Maple

### Life history

**Growth form:** Deciduous, monoecious tree to 30 m high.
**Vegetative spread:**
**Longevity:** Up to 50 years.
**Primary juvenile period:**
**Flowers:** November.
**Fruit/seed:** Winged fruit (samara) 3.5–5.5 cm long, matures January–April.
**Dispersal, establishment & growth:** Diaspore: seed. Wind-dispersed locally.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Naturalised. Introduced from Europe.
**Botanical subregions:** CT; Vic., Tas., S.A.
**Distribution Sydney area:** Jenolan Caves.
**Select locations:** Jenolan Caves.

### Habitat

**Habitat:** On hillside and in gullies, mainly SE aspect.
**Altitude:** 800 m **Annual rainfall:** 1000 mm
**Typical local abundance:** Dominant.
**Vegetation:** Moist eucalypt forest.
**Substrate:** Limestone and basalt. Soil very fertile–fertile. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; mid–light shade.

### Conservation

**Conservation:** Thoroughly naturalised over about 25 ha at Jenolan Caves, completely taking over from existing vegetation. Thought to have originated from a few trees planted in 1960 (J. Dellow, Herbarium note).

## Aptenia cordifolia * AIZOACEAE

Heartleaf Ice Plant

### Life history

**Growth form:** Spreading or scrambling perennial herb forming mats to 1 m diameter.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** December–February, June–August.
**Fruit/seed:** Fruit: a hygroscopic capsule 9–12 mm long with many seeds.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Naturalised exotic, native to S Africa.
**Botanical subregions:** NC **CC** SC CWS; S.A.
**Distribution Sydney area:** Coast and Nepean River.
**Select locations:** Grose Vale, Long Bay, La Perouse, Douglas Park, Nepean River, Wollongong (1912).

### Habitat

**Habitat:** Rocky hillsides, road cuttings, soil dumps and fill.
**Altitude:** 0–120 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Occasional.
**Vegetation:** Near rainforest, weedy sites.
**Substrate:** Rocky hillsides on sandstone, roadside soil dumps and fill. Infertile soil.
**Exposure:**

### Conservation

**Conservation:** Impact unknown.

## Carpobrotus edulis * AIZOACEAE

Hottentot Fig

### Life history

**Growth form:** Prostrate perennial with stems to 2 m long.
**Vegetative spread:** Spreads locally by rooting at nodes of long trailing stems.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** April, August–September.
**Fruit/seed:** Subglobose, succulent, berry-like fruit 2.5–3 cm diam., yellowish, dehiscent, with numerous seeds embedded in mucilage.
**Dispersal, establishment & growth:** Diaspore: fragmented pieces of stem, seed? Bird, vegetative and possibly animal dispersal (Carr *et al.* 1992).
**Fire response:** Unlikely to burn because of succulent nature.
**Interaction with other organisms:** Fruit edible to humans.

### Distribution

**Status/origin:** Exotic, native to S Africa.
**Botanical subregions:** **CC** SC; Vic., Tas., S.A., W.A.
**Distribution Sydney area:** Coastline.
**Select locations:** Cooper Park, Long Bay, Lady Robinsons Beach (1913), Five Islands.

### Habitat

**Habitat:** Exposed rocky foreshores and ridges, coastal sand dunes.
**Altitude:** 0–20 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Coastal heath, ground stratum.
**Substrate:** Sand over sandstone. Infertile soil. Water table mostly low, moisture supply intermittent.
**Exposure:** Exposed; no shade.

### Conservation

**Conservation:** Impact unknown.

## Carpobrotus glaucescens AIZOACEAE

Pigface

### Life history

**Growth form:** Prostrate perennial with fleshy triquetrous leaves and rooting at nodes of long trailing stems.
**Vegetative spread:** Spreads locally by rooting at nodes of long trailing stems.
**Longevity:** Short-lived, less than 5 years (Clarke 1989).
**Primary juvenile period:**
**Flowers:** June–January.
**Fruit/seed:** Succulent, berry-like fruit 2–3 cm long with numerous seeds embedded in mucilage.
**Dispersal, establishment & growth:** Diaspore: probably seed, dispersed by animals (Clarke 1989), also vegetative distance dispersal by fragmented pieces of stem.
**Fire response:** Probably rarely burnt, but unlikely to burn because of succulent nature.
**Interaction with other organisms:** Fruit edible by humans.

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, Vic.
**Distribution Sydney area:** Coastline.
**Select locations:** Norah Head, Bondi, Cape Solander, Lake Illawarra.

### Habitat

**Habitat:** Coastal sand dunes and sandstone cliffs.
**Altitude:** 0–50 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Dune and seacliff scrub. At the upper limit of saltmarsh, probably above all but storm tides. In open sandy communities (Adam 1981).
**Substrate:** Coastal sand dunes and sandstone cliffs. Infertile soil. Water table mostly low, moisture supply intermittent, brackish. Intolerant of waterlogging (Clarke 1989).
**Exposure:** Exposed, no shade. Seedlings shade intolerant, sun tolerant (Clarke 1989).

### Conservation

**Conservation:** Conservation status unknown.

## Galenia pubescens * (G. secunda) AIZOACEAE

### Life history

**Growth form:** Prostrate or decumbent perennial herb.
**Vegetative spread:** No.
**Longevity:** Perennial.
**Primary juvenile period:**
**Flowers:** December.
**Fruit/seed:** Fruit dry capsule 3 mm long. Seed 1 mm long, shiny black.
**Dispersal, establishment & growth:**
**Fire response:** Does not burn easily — can be killed if sufficient fuel available.
**Interaction with other organisms:** Recorded as toxic to stock.

### Distribution

**Status/origin:** Naturalised exotic, native to S Africa.
**Botanical subregions:** NC CC SC CWS SWP NFWP; Vic., S.A.
**Distribution Sydney area:** Coast.
**Select locations:** Only records for area — Botany Bay (north shore) (1977), Windang (1969).

### Habitat

**Habitat:** Grassy areas near shoreline.
**Altitude:** 0–20 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Grassy disturbed sites.
**Substrate:** Earth, rubble. Water table permanently low, moisture supply intermittent.
**Exposure:**

### Conservation

**Conservation:** Recent exotic introduction, not very common but often locally abundant around mining areas (Harden 1990).

## Lampranthus multiradiatus * AIZOACEAE

### Life history

**Growth form:** Decumbent or ± erect perennial shrub.
**Vegetative spread:** Spreads by rooting at nodes.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit: a capsule with many seeds.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to S Africa.
**Botanical subregions:** CC; S.A., W.A.
**Distribution Sydney area:**
**Select locations:** Cape Banks (1961).

### Habitat

**Habitat:**
**Altitude:** 0–20 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Mostly cultivated, rarely naturalised.

## Lampranthus tegens * AIZOACEAE

### Life history

**Growth form:** Spreading prostrate shrub rooting at the nodes.
**Vegetative spread:** Local spreading by rooting at nodes. Distance dispersal possible by broken fragments taking root.
**Longevity:**
**Primary juvenile period:**
**Flowers:** September–December, peak September.
**Fruit/seed:** Fruit: capsule with many seeds.
**Dispersal, establishment & growth:** Diaspore: seeds, stem fragments? Possibly water-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** This species was described from Australia and though possibly originating from South Africa, attempts to equate it with known African species have not been successful (Jacobs, see Harden 1990). There would appear to be a possible case that it is an Australian species and in any case it should be protected here as the only known populations of the species (Paul Adam pers. comm.).
**Botanical subregions:** CC; Vic.
**Distribution Sydney area:** Parramatta & Lane Cove Rivers.
**Select locations:** Ermington, Homebush Bay, Concord (1904), Lane Cove River.

### Habitat

**Habitat:** Mudflats and other sites submerged by very high tides.
**Altitude:** 0–2 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Saltmarsh with *Suaeda australis* & *Sarcocornia quinqueflora* or *Juncus kraussii* rushland.
**Substrate:** Mudflats and fill causeways, receiving infrequent tidal inundation. Soil fertile, water table mostly high, moisture supply intermittent, saline.
**Exposure:** No shade.

### Conservation

**Conservation:** Rare saltmarsh species needing protection.

## Macarthuria neocambrica AIZOACEAE

### Life history

**Growth form:** Diffuse herb to 20 cm high.
**Vegetative spread:** No vegetative spread.
**Longevity:**
**Primary juvenile period:**
**Flowers:** May, September (few records).
**Fruit/seed:** Fruit: globose capsule 2 cm long. Seeds 1.5 mm long, black, with small white aril.
**Dispersal, establishment & growth:** Diaspore: seed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC**; Qld, ?N.T.
**Distribution Sydney area:** Coast south to Wybung Head.
**Select locations:** Southern limit, Munmorah SRA (only record for the area).

### Habitat

**Habitat:** Coastal headlands.
**Altitude:** 0–50 m **Annual rainfall:** 1200–1400 mm
**Typical local abundance:** Occasional.
**Vegetation:** Heath of *Banksia aemula* and *Xanthorrhoea resinosa*.
**Substrate:** Pleistocene bleached white sand. Very infertile soil. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** No shade.

### Conservation

**Conservation:** Southern limit, Munmorah SRA.

## Mollugo verticillata AIZOACEAE

### Life history

**Growth form:** Diffuse annual herb to 30 cm high.
**Vegetative spread:** No.
**Longevity:** Very short, less than 2 yrs.
**Primary juvenile period:**
**Flowers:** February–March.
**Fruit/seed:** Capsule 3–4 cm long, with numerous brown seeds.
**Dispersal, establishment & growth:** Diaspore: seed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** **CC**; Qld.
**Distribution Sydney area:** Penrith area, Normanhurst, rare.
**Select locations:** Yarramundi Crossing, Emu Plains, Normanhurst.

### Habitat

**Habitat:** Disturbed sites, edge of river, along railway track.
**Altitude:** 0–50 m **Annual rainfall:** 800–1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Disturbed sites, possibly originally along the Hawkesbury-Nepean River.
**Substrate:** Sandy soil, infertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** In NSW only found in **CC**, rare, not conserved in any reserve.
Vulnerable.

## Sesuvium portulacastrum AIZOACEAE

### Life history

**Growth form:** Succulent prostrate herb with stems to 1 m rooting at the nodes.
**Vegetative spread:** Rooting at nodes, and probably dispersed vegetatively by pieces of stem.
**Longevity:** Annual or short-lived perennial.
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit: capsule 8 mm long. Seeds 1.5 mm long, smooth black.
**Dispersal, establishment & growth:** Diaspore: seed, stem fragments.
**Fire response:** In habitat unlikely to be burnt.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; LHI, Qld, N.T., W.A.
**Distribution Sydney area:** Coast north of Tuggerah Lakes.
**Select locations:** Tuggerah Lakes, entrance to Lake Macquarie.

### Habitat

**Habitat:** Foreshore, and intertidal zone mudflats, foredunes, strand lines.
**Altitude:** 0–5 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Mudflat herbs.
**Substrate:** Sand or mud. Soil fertile or infertile, saline. Water table mostly high, plants partly in water at high tide.
**Exposure:** Exposed, no shade.

### Conservation

**Conservation:** Conservation status unknown.

## Tetragonia nigrescens * AIZOACEAE

### Life history

**Growth form:** Slightly succulent, annual or perennial herb with underground tuber.
**Vegetative spread:**
**Longevity:** Annual or perennial, probably short-lived.
**Primary juvenile period:**
**Flowers:** March.
**Fruit/seed:** Fruit: capsule enclosed in floral tube which becomes bony on drying, matures November.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to S Africa.
**Botanical subregions:** NC CC.
**Distribution Sydney area:** Coastline, Sydney.
**Select locations:** Watsons Bay (1919), Maroubra Bay (1916, 1933).

### Habitat

**Habitat:** Coastal foredune.
**Altitude:** 0–20 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:** Dune sand, ground stratum.
**Substrate:** Infertile soil.
**Exposure:**

### Conservation

**Conservation:** Rare coastline exotic.

## Tetragonia tetragonoides AIZOACEAE

New Zealand Spinach

### Life history

**Growth form:** Prostrate spreading annual or short-lived perennial herb.
**Vegetative spread:**
**Longevity:** Annual or short-lived perennial.
**Primary juvenile period:**
**Flowers:** Yellow, at any time.
**Fruit/seed:** Subglobose woody fruit, 10–12 mm diameter, winged. Seeds numerous, light brown.
**Dispersal, establishment & growth:** Diaspore: fruit, enclosed in fruiting calyse (?).
**Fire response:** Vigorous growth ?from seed, after high intensity fire at Killarney Hts, spread 1.5 m in 6.5 months — after 2 years plant still alive but in poor condition (L.McD.).
**Interaction with other organisms:** Green plants poisonous if eaten (Everist 1974). High levels of soluble oxalate recorded associated with sheep death (Cunningham *et al.* 1981), though rarely eaten by stock (Auld & Medd 1987). Livestock prefer to leave it until the stems and leaves are dry and presumably low in oxalate; used by early explorers as a cooked 'Spinach-like' vegetable (Everist 1974).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NWS CWS NWP SWP NFWP SFWP; LHI, Qld, Vic., Tas., S.A., W.A., N.Z.
**Distribution Sydney area:** Sea coasts and margins of salt marshes.
**Select locations:** Neilsen Park, Concord, Tempe, Botany Bay, Tempe.

### Habitat

**Habitat:** Sea coasts and margins of salt marshes.
**Altitude:** 0–10 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Upper margins of saltmarsh, or sea cliffs e.g. with *Westringia fruticosa*, estuarine strand lines.
**Substrate:** Sands, silts or in rocky crevices at base of sea cliffs. Water table mostly high, ?saline.
**Exposure:**

### Conservation

**Conservation:** Probably adequately conserved.

## Trianthema portulacastrum * AIZOACEAE

Giant Pigweed

### Life history

**Growth form:** Procumbent or ascending annual herb.
**Vegetative spread:** No.
**Longevity:** Annual.
**Primary juvenile period:** Less than 1 year.
**Flowers:**
**Fruit/seed:** Fruit: capsule with 3–12 seeds.
**Dispersal, establishment & growth:** Diaspore: seed. Forms dense mats in some areas as a spring and summer weed (Auld & Medd 1987).
**Fire response:**
**Interaction with other organisms:** Poisoning of hungry stock recorded but the plant is not palatable and rarely eaten (Everist 1974).

### Distribution

**Status/origin:** Exotic, native to Indonesia, America, Africa.
**Botanical subregions:** CC NWS NWP; Qld, W.A., N.T.
**Distribution Sydney area:** Flemington.
**Select locations:** Only Sydney record Flemington Saleyards (1969).

### Habitat

**Habitat:** Damp places, often near rivers.
**Altitude:** 0–50 m **Annual rainfall:** 800 mm
**Typical local abundance:** Frequent.
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Rare in area, probably no longer growing at Flemington Saleyards. Weed of cultivation from tropical regions.

## **Trianthema triquetra** AIZOACEAE

### Life history

**Growth form:** Prostrate or ascending herb with stems 20–60 cm long.
**Vegetative spread:**
**Longevity:** Annual.
**Primary juvenile period:**
**Flowers:** March–April.
**Fruit/seed:** Fruit: capsule with 2 black seeds.
**Dispersal, establishment & growth:** Diaspore: seed.
**Fire response:** Killed.
**Interaction with other organisms:** Probably introduced to CC with stock. Suspected of poisoning stock; contains saponin (Hurst 1942), and sometimes HCN (Everist 1974).

### Distribution

**Status/origin:** Naturalised in CC. Probably introduced from Western NSW with stock.
**Botanical subregions:** **CC*** CWS NWP NFWP; Qld, N.T., S.A., W.A., pantrop.
**Distribution Sydney area:** Flemington Saleyards.
**Select locations:** Recorded for Flemington Saleyards only.

### Habitat

**Habitat:** Saleyards.
**Altitude:** 0–5 m **Annual rainfall:** 1000 mm
**Typical local abundance:** Occasional.
**Vegetation:** Probably with introduced weeds.
**Substrate:** Sandy and/or saline soils. Moisture supply intermittent, fresh or saline.
**Exposure:**

### Conservation

**Conservation:** As a result of re-development of Flemington Saleyards probably no longer growing in CC.

## **Zaleya galericulata** subsp. **australis** AIZOACEAE

Hogweed

### Life history

**Growth form:** Annual or perennial herb.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** March.
**Fruit/seed:** Capsule 5 mm long. Seeds 2 mm diameter, black.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Naturalised in CC. Probably intoduced from Western NSW.
**Botanical subregions:** **CC*** NWS CWS SWS NWP SWP NFWP; Qld.
**Distribution Sydney area:** Flemington Saleyards.
**Select locations:** Flemington Saleyards only.

### Habitat

**Habitat:** Saleyards.
**Altitude:** 0–50 m **Annual rainfall:** 1000 mm
**Typical local abundance:**
**Vegetation:** Probably with introduced weeds.
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** As a result of re-development of Flemington Saleyards probably no longer growing in CC.

## Achyranthes aspera AMARANTHACEAE

Chaff Flower

### Life history

**Growth form:** Erect or spreading herbaceous annual or biennial to 1 m high.
**Vegetative spread:** No.
**Longevity:** Annual or biennial.
**Primary juvenile period:** 1 year.
**Flowers:**
**Fruit/seed:** Fruit cylindrical, 1-seeded.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; LHI, Qld, N.T., W.A., trop.
**Distribution Sydney area:** Coast.
**Select locations:** Darlinghurst (1927). (Limited data, specimens on loan.)

### Habitat

**Habitat:** Waste ground.
**Altitude:** **Annual rainfall:**
**Typical local abundance:**
**Vegetation:**
**Substrate:** Sandstone.
**Exposure:**

### Conservation

**Conservation:** CC is the southern limit.

## Alternanthera angustifolia AMARANTHACEAE

### Life history

**Growth form:** Prostrate to ascending ephemeral herb.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Probably insect pollinated (Cook 1990).
**Fruit/seed:** Fruit indehiscent, compressed, 1-seeded.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NWP; N.T., S.A.
**Distribution Sydney area:**
**Select locations:** (Limited data, specimens on loan)

### Habitat

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

### Conservation

**Conservation:** Conservation status unknown.

## Alternanthera denticulata AMARANTHACEAE

Lesser Joyweed

### Life history

**Growth form:** Prostrate or decumbent annual herb rooting at nodes.
**Vegetative spread:** Local limited spread.
**Longevity:** Very short, less than 1 year.
**Primary juvenile period:**
**Flowers:** November–December (Price 1963). Probably insect pollinated (Cook 1990).
**Fruit/seed:** Indehiscent, 1-seeded fruit, maturing December–August (limited data).
**Dispersal, establishment & growth:** Diaspore: fruit, also fragmented stem nodes provide propagules for vegetative dispersal, e.g. by floods. Growth rate slow.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** All divisions except NFWP; all States.
**Distribution Sydney area:** Western Sydney, Bathurst area.
**Select locations:** Dora Creek, Shane Park, Annangrove, Carlingford, Agnes Banks, Mount Annan, Mount Pleasant (Bathurst).

### Habitat

**Habitat:** Margins of wetlands, fresh or occasionally saline.
**Altitude:** 0–800 m **Annual rainfall:** 600–1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Ground stratum in grassy woodland or herbland e.g. with *Eucalyptus tereticornis*. Sometimes a weed of pastures and waste places.
**Substrate:** Sandy river banks, alluvial flats and clay areas. Fertile soil. Water table mostly high, moisture supply intermittent. Brackish or fresh.
**Exposure:** No shade.

### Conservation

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

## Alternanthera nana AMARANTHACEAE

Hairy Joyweed

### Life history

**Growth form:** Herb with prostrate or ascending stems.
**Vegetative spread:** Yes.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Probably insect pollinated (Cook 1990).
**Fruit/seed:** Fruit indehiscent, compressed, 1-seeded.
**Dispersal, establishment & growth:** Growth rate slow.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC NT CT ST NWS SWS; Qld.
**Distribution Sydney area:** Western Sydney.
**Select locations:** Agnes Banks, Mt Annan (J. Howell 1992).

### Habitat

**Habitat:** Wetland.
**Altitude:** **Annual rainfall:**
**Typical local abundance:**
**Vegetation:** Grassy woodland e.g. with *Eucalyptus moluccana, Eucalyptus tereticornis.*
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Alternanthera philoxeroides * AMARANTHACEAE

Alligator Weed

### Life history

**Growth form:** Stoloniferous, aquatic, semi-aquatic or terrestrial perennial herb forming dense floating or rooted mats.
**Vegetative spread:** Stolons 10 m long, rooting at nodes and forming mats.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** February, probably insect-pollinated (Cook 1990).
**Fruit/seed:** Fruit indehiscent, 1-seeded. Seeds not viable (Griffiths 1989).
**Dispersal, establishment & growth:** Diaspore: pieces of stem dispersed by water. Grows prolifically in summer.
**Fire response:**
**Interaction with other organisms:** Aligator Weed Flea-beetle *Agasides hygrophila* introduced in 1976 and reduced floating mats on Georges River but not effective on river banks (Griffiths 1989). Larvae of moth *Vogtia malloi* liberated in 1977 and soon became established but introduction of beetle *Agasicles hygrophila* achieved more spectacular results (Common 1990).

### Distribution

**Status/origin:** South America, thought to have been accidentally introduced to Australia in ships' ballast released in Newcastle Harbour and Botany Bay about 1944 (Griffiths 1989).
**Botanical subregions:** NC CC SWS.
**Distribution Sydney area:** Coastal lakes and rivers.
**Select locations:** Budgewoi Lake (1988), Narara (1988), Woy Woy Creek (1988), Georges River, Glenfield (1983), Georges Hall (1982), Moorebank (1988), Camden (1988).

### Habitat

**Habitat:** On stream banks and in shallow water.
**Altitude:** 0–50 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent–dominant.
**Vegetation:**
**Substrate:** Alluvial sand and silt, above high tide mark (at Budgewoi Lake). Fresh–saline, rafts can survive in water up to 30% as salty as sea water (Griffiths 1989).
**Exposure:** No shade.

### Conservation

**Conservation:** May crowd out other species, proclaimed noxious throughout NSW.

## **Alternanthera pungens** * (A. repens) AMARANTHACEAE

Khaki Weed

### Life history

**Growth form:** Prostrate ephemeral or perennial herb with deep taproot; stems softly hairy to 60 cm long.
**Vegetative spread:** Prostrate trailing stems rooting at nodes enables plant to form mats. Spread by cultivation from pieces of taproot or stem.
**Longevity:** Deep woody taproot capable of producing new aerial growth annually.
**Primary juvenile period:**
**Flowers:** Spring–summer. February, probably insect-pollinated (Cook 1990).
**Fruit/seed:** Fruit indehiscent, 1-seeded, surrounding bracts forming a burr-like structure. Seeds c. 1.5 mm diam, round (Parsons 1973). Prolific seeder (Smith 1983).
**Dispersal, establishment & growth:** Diaspore: burr, dispersed by animals and on clothes and rubber tyres. Seeds germinate in spring, deep taproot and creeping stems are produced during late spring and summer when flowers and seeds develop, aerial growth dies in autumn and new growth is produced from the crown again in spring (Parsons 1973).
**Fire response:**
**Interaction with other organisms:** Sharply pointed bracts of the flowers make the plant objectionable in recreation areas (Parsons 1981).

### Distribution

**Status/origin:** Exotic, native to Central and South America; first recorded in NSW 1898 (Parsons 1981), further introductions from South Africa during or after the Boer War (Smith 1983). Possible spread through contaminated fodder used for horses (Parsons 1981).
**Botanical subregions:** NC CC NT NWS CWS SWS NWP SWP; Qld.
**Distribution Sydney area:** Western Sydney.
**Select locations:** Flemington Saleyards (1969), Penrith (1969), Doonside (1984), Bents Basin (1983).

### Habitat

**Habitat:** Roadsides and wasteland. Readily colonises disturbed ground.
**Altitude:** 0–100 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Rare.
**Vegetation:** With grasses and weeds e.g. *Cirsium vulgare, Senecio madagascariensis.*
**Substrate:** Sandy or clayey soil, probably from Wianamatta Shale.
Able to establish on wide range of soil types (Parsons 1973).
**Exposure:** Full sun.

### Conservation

**Conservation:** Rare in Sydney area, mainly in drier parts of the State.

## **Amaranthus albus** * AMARANTHACEAE

Tumbleweed

### Life history

**Growth form:** Annual herb to 1 m high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:**
**Fruit/seed:** Membranous fruit with spiny bracts, mature February–April.
**Dispersal, establishment & growth:** Diaspore: probably fruit, also mature plants may break off at ground level and tumble across open ground (Auld & Medd 1987).
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Naturalised exotic, introduced from Europe.
**Botanical subregions:** CC CT ST CWS SWS SWP NFWP.
**Distribution Sydney area:** Sydney suburbs.
**Select locations:** Botanic Gardens, Summer Hill (1899), Flemington, Richmond (1975), Casula, Campbelltown, Blayney.

### Habitat

**Habitat:** Roadsides, railways, disturbed sites.
**Altitude:** 0–1000 mm **Annual rainfall:** above 600 mm
**Typical local abundance:** Rare.
**Vegetation:** Probably with other weeds of disturbed sites.
**Substrate:** Earthworks.
**Exposure:**

### Conservation

**Conservation:** An uncommon weed of disturbed sites.

## Amaranthus cruentus * AMARANTHACEAE

Redshank

### Life history

**Growth form:** Erect annual herb, often more than 1 m high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:** May.
**Fruit/seed:** Membranous fruit, 3 mm long, maturing August; contains numerous, small, brown, disc-shaped, shiny seeds (Everist 1974).
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:** Poisonous to hungry stock (Everist 1974).

### Distribution

**Status/origin:** Exotic, introduced from America or Asia.
Possibly a contaminant of bird seed (Harden 1990).
**Botanical subregions:** CC SWS.
**Distribution Sydney area:** Sydney suburbs.
**Select locations:** Summer Hill (1970–71) only record.

### Habitat

**Habitat:** Spontaneous in garden.
**Altitude:** 0–100 m **Annual rainfall:** 1000 mm
**Typical local abundance:**
**Vegetation:** Cultivated exotics.
**Substrate:** Garden soil.
**Exposure:**

### Conservation

**Conservation:** Uncommon weed of closely settled areas (Harden 1990).

## Amaranthus deflexus * AMARANTHACEAE

Spreading Amaranth

### Life history

**Growth form:** Prostrate to scrambling perennial herb.
**Vegetative spread:**
**Longevity:** Perennial.
**Primary juvenile period:**
**Flowers:** February.
**Fruit/seed:** Membranous fruit 1 mm long, maturing February. Seeds glossy.
**Dispersal, establishment & growth:** Diaspore: fruit/seed, possibly animal-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, introduced from Europe.
**Botanical subregions:** CC ST.
**Distribution Sydney area:**
**Select locations:** Cowan (1921), Epping Railway Platform (1982), Flemington Saleyards (1968).

### Habitat

**Habitat:** Disturbed sites possibly associated with railways and livestock.
**Altitude:** 0–200 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional.
**Vegetation:**
**Substrate:** Cracks in paving stones (at Flemington).
**Exposure:**

### Conservation

**Conservation:** Uncommon weed.

## Amaranthus hybridus * AMARANTHACEAE

Slim Amaranth

### Life history

**Growth form:** Erect or slightly spreading annual herb to 1.5 m high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:**
**Flowers:** Late January–April (Price 1963).
**Fruit/seed:** Membranous fruit 2 mm long, mature April, August.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic species of cosmopolitan origin.
**Botanical subregions:** NC CC SC ST SWP; Qld, Vic., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Wollombi, Richmond, Wahroonga, Ermington, Royal Botanic Gardens (1903), Cooks River (1911), Summer Hill, lower Kowmung River.

### Habitat

**Habitat:** Weed of cultivation and disturbed areas e.g. along railway lines, vacant blocks, river flats, saleyards.
**Altitude:** 0–300 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent.
**Vegetation:**
**Substrate:** Cultivated soil, sandy soil, fill material.
**Exposure:**

### Conservation

**Conservation:** Weed of cultivation, not invasive of bushland.

## Amaranthus lividus * AMARANTHACEAE

### Life history

**Growth form:** Procumbent to erect perennial herb to 80 cm high.
**Vegetative spread:**
**Longevity:** Perennial.
**Primary juvenile period:**
**Flowers:** January–March.
**Fruit/seed:** Membranous fruit, 2 mm long, maturing January–March.
**Dispersal, establishment & growth:** Dispore: fruit/seed, possibly animal-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic species occurring in Africa, America, Asia, Europe.
**Botanical subregions:** NC CC.
**Distribution Sydney area:** Sydney suburbs.
**Select locations:** Royal Botanic Gardens (1902, 1922, 1936, 1975), Paddington, Waterloo, Flemington Saleyards.

### Habitat

**Habitat:** Suburban streets, vacant land.
**Altitude:** 0–200 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Rare.
**Vegetation:**
**Substrate:** Disturbed sites, probably sandy soil.
**Exposure:**

### Conservation

**Conservation:** Uncommon weed of suburban areas.

## **Amaranthus macrocarpus** var. **macrocarpus** AMARANTHACEAE

Dwarf Amaranth

### Life history

**Growth form:** Erect annual to 30 cm high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:**
**Fruit/seed:** Fruit indehiscent, spongy, black or brown, matures March–April.
**Dispersal, establishment & growth:** Diaspore: fruit/seed, possibly animal-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Probably introduced from western NSW with livestock.
**Botanical subregions:** NC* CC* NWS CWS NWP SWP; Qld.
**Distribution Sydney area:** Few records.
**Select locations:** Royal Botanic Gardens (1914), Flemington Saleyards (1969), Glenfield Research Station (1974), the only records.

### Habitat

**Habitat:** Sites with high livestock usage.
**Altitude:** 0–200 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent–uncommon.
**Vegetation:**
**Substrate:** Recorded near manure heap.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## **Amaranthus macrocarpus** var. **pallidus** AMARANTHACEAE

Dwarf Amaranth

### Life history

**Growth form:** Erect annual to 30 cm high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit indehiscent, spongy.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NWS CWS NWP NFWP; Qld, Eur.
**Distribution Sydney area:**
**Select locations:** Royal Botanic Gardens (1898), Cowan (1921).

### Habitat

**Habitat:** Reported as a weed in pots (Royal Botanic Gardens), and along railway line.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Possibly introduced sporadically from other parts of the State. No recent collections. Conservation status unknown.

## Amaranthus powellii * AMARANTHACEAE

Powell's Amaranth

### Life history

**Growth form:** Erect annual herb to 1 m high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:** February–April.
**Fruit/seed:** Membranous fruit 3–5 mm long, matures February–June.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Tropics.
**Botanical subregions:** NC CC SC CT ST NWS; Vic., Tas., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Windsor, Dundas, Hornsby, Flemington Saleyards, Camden, Kiama, Bathurst, Blayney, Mt Wilson, Jenolan Caves (1900).

### Habitat

**Habitat:** Disturbed sites and cultivated areas.
**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent.
**Vegetation:**
**Substrate:** Probably clay soils.
**Exposure:**

### Conservation

**Conservation:** Impact unknown.

## Amaranthus quitensis * AMARANTHACEAE

South American Amaranth

### Life history

**Growth form:** Erect annual herb often more than 1 m high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:**
**Fruit/seed:** Membranous fruit 1.5–2.5 mm long, matures March–June.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic from South America.
**Botanical subregions:** NC CC NWS.
**Distribution Sydney area:** Flemington (only).
**Select locations:** Flemington Saleyards (1969, 1970, 1972).

### Habitat

**Habitat:** Saleyards.
**Altitude:** 0–100 m **Annual rainfall:** 900 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Weed of summer crops in Lower Hunter Valley (Auld & Medd 1987).

## Amaranthus retroflexus * AMARANTHACEAE

Redroot Amaranth

### Life history

**Growth form:** Erect annual herb to 1 m high.
**Vegetative spread:** No.
**Longevity:** Annual.
**Primary juvenile period:** Less than 1 year.
**Flowers:** February–March.
**Fruit/seed:** Membranous fruit 3 mm long, maturing April.
**Dispersal, establishment & growth:** Diaspore: fruit/seed, possibly animal-dispersed. Flowers at various sizes according to conditions.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic from America.
**Botanical subregions:** CC CT ST SWS NWP SWP; S.A.
**Distribution Sydney area:** Few localities.
**Select locations:** Cheltenham (1949), Flemington Saleyards, Wolgan Valley, Glanmire.

### Habitat

**Habitat:** Weed of roadsides and cultivation.
**Altitude:** 0–800 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent.
**Vegetation:**
**Substrate:** Cultivated paddocks, gardens, saleyards.
**Exposure:**

### Conservation

**Conservation:**

## Amaranthus spinosus * AMARANTHACEAE

Needle Burr

### Life history

**Growth form:** Erect annual herb to 1 m high.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:** October–November (Price 1963).
**Fruit/seed:** Membranous fruit 2 mm long, maturing August.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, introduced from tropics.
**Botanical subregions:** NC CC ; Qld.
**Distribution Sydney area:** Lane Cove to Hawkesbury River.
**Select locations:** Peats Ferry (1887), Hawkesbury River (1912), Hornsby (1915), Lane Cove River (1889).

### Habitat

**Habitat:** Weed.
**Altitude:** 0–200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Weed — all records pre 1915, probably uncommon.

## Amaranthus viridus * AMARANTHACEAE

Green Amaranth

### Life history

**Growth form:** Spreading annual herb to 40 cm high.
**Vegetative spread:**
**Longevity:** Less than 1 year.
**Primary juvenile period:** Less than 1 year.
**Flowers:** January–April (Price 1963), peak February–March.
**Fruit/seed:** Membranous fruit 2 mm long, matures March, May, August.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:** Crushed and used as a healing poultice in Asia (Low 1990). Occasionally cooked and eaten as spinach; killed fowls in Brisbane area (Everist 1974).

### Distribution

**Status/origin:** Exotic, origin uncertain, now widespread throughout warmer parts of the world (Auld & Medd 1987).
**Botanical subregions:** **CC** SC CWS NWP SWP; LHI, Qld, N.T., S.A., trop.
**Distribution Sydney area:** Sydney suburbs.
**Select locations:** Hornsby, Cheltenham, Balgowlah, RBG (1914, 1936, 1972, 1975, 1983), Museum of Applied Arts & Sciences (1895), Ashfield, Mascot, Richmond.

### Habitat

**Habitat:** Roadsides, embankments, gardens.
**Altitude:** 0–200 m **Annual rainfall:** above 600 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Probably with other weeds of disturbed sites.
**Substrate:** Garden soils, clay.
**Exposure:**

### Conservation

**Conservation:** Common garden weed.

## Deeringia amaranthoides AMARANTHACEAE

### Life history

**Growth form:** Climber to 4 m high or sometimes a small shrub.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** December–May.
**Fruit/seed:** Fruit: red berry in December–August, 4–5 mm diameter, with many black shiny seeds.
**Dispersal, establishment & growth:** Diaspore: berry, possibly bird-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** CWS; Qld, Asia.
**Distribution Sydney area:** Widespread.
**Select locations:** Capertee River, Bilpin (Green Scrub), Coxs River, Razorback, Werong Beach, Cambewarra, Upper Kangaroo Valley.

### Habitat

**Habitat:** Hillsides near creeks.
**Altitude:** 0–700 m **Annual rainfall:** above 600 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest and dry scrub.
**Substrate:** Basalt, quartzite, shaley sandstone. Fertile soil. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Regionally rare in Illawarra region (Mills 1988).

## Froelichia gracilis * AMARANTHACEAE

### Life history

**Growth form:** Erect to ascending herb to 25 cm high with woody taproot.
**Vegetative spread:** Probably not.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Feb.
**Fruit/seed:** Fruit hard and burr-like, 1-seeded, matures February.
**Dispersal, establishment & growth:** Diaspore: probably fruit.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, naturalised, introduced from America.
**Botanical subregions:** CC.
**Distribution Sydney area:** Localised.
**Select locations:** Agnes Banks (1982), Kanimbla Valley (1982).

### Habitat

**Habitat:** Riverbank.
**Altitude:** 0–700 m **Annual rainfall:** 700–900 mm
**Typical local abundance:** Frequent.
**Vegetation:**
**Substrate:** Floodplain soil, probably sandy alluvium, fertile.
**Exposure:**

### Conservation

**Conservation:** Recently recorded as naturalised, potential unknown.

## Gomphrena celosioides * AMARANTHACEAE

Gomphrena Weed

### Life history

**Growth form:** Prostrate to ascending herb with thick fleshy taproot.
**Vegetative spread:**
**Longevity:** Annual or possibly short-lived perennial.
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit compressed indehiscent, 1-seeded.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:** Poisonous to horses (Everist 1974).

### Distribution

**Status/origin:** Exotic, native to America.
**Botanical subregions:** NC CC SC NWS CWS SWS NWP SWP; Qld.
**Distribution Sydney area:** Western Sydney.
**Select locations:** Flemington (1969), Doonside, Campbelltown.

### Habitat

**Habitat:** Roadsides, cultivated or disturbed areas.
**Altitude:** 0–100 m **Annual rainfall:** 700–1000 mm
**Typical local abundance:**
**Vegetation:** Weeds of disturbance.
**Substrate:** Clay soils from Wianamatta Shale.
**Exposure:** Full sun.

### Conservation

**Conservation:** Widespread weed (Harden 1990).

## Guilleminea densa * AMARANTHACEAE

Small Matweed

### Life history

**Growth form:** Perennial, prostrate hairy herb with swollen woody rootstock.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** February–March.
**Fruit/seed:** Fruit: a membranous, dehiscent bladder-like sac with one seed, 0.6 mm long. Matures Febrary–March.
**Dispersal, establishment & growth:** Diaspore: probably seed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to America.
**Botanical subregions:** NC CC NWS; Qld.
**Distribution Sydney area:** Coastal.
**Select locations:** Putty Beach (1988), only record for area.

### Habitat

**Habitat:** Mown disturbed sites, roadsides, caravan parks (Harden 1990).
**Altitude:** 0–50 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Mown grassland.
**Substrate:** Sandy soils.
**Exposure:**

### Conservation

**Conservation:** Recent introduction to the area.

## Nyssanthes diffusa AMARANTHACEAE

Barbwire Weed

### Life history

**Growth form:** Erect to spreading annual or biennial herb.
**Vegetative spread:** No.
**Longevity:** 1–2 years.
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit membranous, indehiscent, enclosed in persistent spiny perianth. Matures October–March.
**Dispersal, establishment & growth:** Diaspore: probably fruit.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT NWS CWS.
**Distribution Sydney area:** Western Sydney and Illawarra.
**Select locations:** Grose Vale, Cobbitty, Razorback, Kowmung River, Mt Annan, Albion Park, Berry.

### Habitat

**Habitat:** Dry rainforest on rocky sites.
**Altitude:** 0–200 m **Annual rainfall:** 600–1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Dry rainforest.
**Substrate:** Shaley sandstone (in Wianamatta group), diatremes. Soil fertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

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

## Nyssanthes erecta — AMARANTHACEAE

### Life history

**Growth form:** Erect to spreading herb.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** February–April.
**Fruit/seed:** Fruit membranous, indehiscent, enclosed in persistent spiny perianth. Matures December.
**Dispersal, establishment & growth:** Diaspore: probably fruit.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CWS; Qld.
**Distribution Sydney area:** Western Sydney, Kiama district.
**Select locations:** Berkshire Park, Minnamurra Creek, Nowra.

### Habitat

**Habitat:** Along creeks, sometimes disturbed areas.
**Altitude:** 0–50 m **Annual rainfall:** 800–1300 mm
**Typical local abundance:** Frequent.
**Vegetation:** Creekside vegetation e.g. with *Angophora floribunda, Acacia parramattensis.*
**Substrate:** Alluvial, fertile soil.
**Exposure:**

### Conservation

**Conservation:** Probably not well conserved.

## Prunus cerasifera * — AMYGDALACEAE

Cherry Plum

### Life history

**Growth form:** Slender deciduous tree.
**Vegetative spread:** No.
**Longevity:** 25–60 years.
**Primary juvenile period:**
**Flowers:** August.
**Fruit/seed:** Fruit fleshy 2–3 cm diameter, cherry-like, red or yellow, flesh juicy and sweet. Shed at maturity, November–January.
**Dispersal, establishment & growth:** Diaspore: fruit, dispersed by car passengers.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Europe (Balkan Peninsula, Turkey and Caspian region).
**Botanical subregions:** CC NT, Vic., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Kangaroo Valley (1934), Yarramalong, Kurmond, Mittagong.

### Habitat

**Habitat:** Along roadsides with past but not frequently repeated disturbance, especially near towns (Smith 1988).
**Altitude:** 0–800 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Roadside weeds.
**Substrate:** Clay loam soils, fertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Indifferent–sheltered.

### Conservation

**Conservation:** Roadside exotic showing little invasive capacity, though able to regenerate *in situ* from its own seeds (Smith 1988).

## Prunus cerasus * AMYGDALACEAE

Sour Cherry

### Life history

**Growth form:** Small deciduous tree.
**Vegetative spread:** Can form clumps by suckering from the roots.
**Longevity:**
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit globose, c.15 mm diameter, ripening to red.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to south-west Asia.
**Botanical subregions:** **CC** NT.
**Distribution Sydney area:** Eastern areas of State (Smith 1988).
**Select locations:** No specimens seen.

### Habitat

**Habitat:** Sites of old orchards or gardens.
**Altitude:** **Annual rainfall:**
**Typical local abundance:** Rare.
**Vegetation:** Old orchards.
**Substrate:** Agricultural sites.
**Exposure:**

### Conservation

**Conservation:** A remnant species of old orchards and gardens (having been planted more as a rootstock for grafted sweet cherries than in its own right) and not becoming naturalised.

## Prunus laurocerasus * AMYGDALACEAE

Cherry Laurel

### Life history

**Growth form:** Evergreen shrub or small tree.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit ovoid, 15–17 mm long becoming black and soft when ripe, endocarp 12 mm long. Shed at maturity, February.
**Dispersal, establishment & growth:** Diaspore: fruit.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Balkan Peninsula, Turkey, Armenia and North Iran.
**Botanical subregions:** NT **CT**.
**Distribution Sydney area:** Upper Blue Mountains.
**Select locations:** Mt Wilson, Katoomba, Orange, Robertson.

### Habitat

**Habitat:** Roadsides and in tall eucalypt forest.
**Altitude:** 800–1000 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional.
**Vegetation:** Tall eucalypt forest with rainforest understorey (Smith 1988).
**Substrate:** Basalt soil, very fertile. Water table mostly low. Non-saline.
**Exposure:**

### Conservation

**Conservation:** Becoming naturalised within 5 km of Robertson and in higher parts of Blue Mountains (Smith 1988).

## Prunus lusitanica * AMYGDALACEAE

Portugal Laurel

### Life history

**Growth form:** Evergreen shrub or small tree.
**Vegetative spread:**
**Longevity:** 25–60 years.
**Primary juvenile period:**
**Flowers:** Late spring to early summer (Harden 1990).
**Fruit/seed:** Fruit fleshy, dark purple, ± ovoid, c. 8 mm long.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Europe.
**Botanical subregions:** CT; Tas.
**Distribution Sydney area:** Mt Wilson (1958) only record.
**Select locations:** Mt Wilson.

### Habitat

**Habitat:** Cultivated.
**Altitude:** 1000 m **Annual rainfall:** 1300 mm
**Typical local abundance:** Rare.
**Vegetation:** Rainforest.
**Substrate:** Basalt soil, very fertile.
**Exposure:**

### Conservation

**Conservation:** Only recorded at one wild site, apparently from seed from a garden at Mt Wilson, not naturalised (Smith 1988).

## Prunus persica * AMYGDALACEAE

Peach, Nectarine

### Life history

**Growth form:** Small–medium sized deciduous tree.
**Vegetative spread:** No.
**Longevity:** 25–60 years.
**Primary juvenile period:**
**Flowers:** August–September.
**Fruit/seed:** Fleshy globose fruit 3–5 cm diameter with endocarp 25–30 mm long. Fruit shed at maturity, January.
**Dispersal, establishment & growth:** Diaspore: fruit, dispersed by car passengers.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to East Asia. Introduced for horticulture.
**Botanical subregions:** NC CC SC NT ST; LHI.
**Distribution Sydney area:** Widespread.
**Select locations:** Beecroft, Cheltenham, Northbridge, Bellevue Hill, Campbelltown, Kangaroo Valley.

### Habitat

**Habitat:** Disturbed areas in sheltered gullies and beside roads.
**Altitude:** 0–300 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Rare.
**Vegetation:**
**Substrate:** Sandstone gullies. Infertile soil.
Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; light–no shade.

### Conservation

**Conservation:** Establishes sporadically along roadsides etc. presumably from seeds as fruit wastes by car passengers (Smith 1988). Sometimes naturalised.

## **Prunus serotina** * AMYGDALACEAE

Wild Black Cherry

### Life history

**Growth form:** Medium–large deciduous tree.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Spring.
**Fruit/seed:** Fruit 8–10 mm diameter, purplish black, sweetish, endocarp 6 mm long (Smith 1988).
**Dispersal, establishment & growth:** Diaspore: fruit.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to North America.
Probably derived from planted trees at 'Leuralla' (Smith 1988).
**Botanical subregions:** CT.
**Distribution Sydney area:** Katoomba, Leura area.
**Select locations:** Leura (1959).

### Habitat

**Habitat:** Along paths and roadsides.
**Altitude:** 800–1000 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Shrubland and disturbed eucalypt forest of *Eucalyptus piperita*.
**Substrate:** Sandstone soils, infertile. Water table mostly low, intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** May cause local problems if allowed to invade bushland.

## **Euroschinus falcata** var. **falcata** ANACARDIACEAE

Ribbonwood

### Life history

**Growth form:** Small to medium-sized tree.
**Vegetative spread:** No vegetative spread.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Unisexual, November–December.
**Fruit/seed:** Fruit egg shaped, 6–8 mm long, purple-black.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:** One record of heavy infestations of white scale and black, sooty fungus (at Keiraville).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld.
**Distribution Sydney area:** Coastal — Gosford, Royal NP, Stanwell Park and southward.
**Select locations:** North Entrance, Upper Causeway (RNP), Keiraville, Calderwood, Bass Point, Albion Park, Minnamurra Falls.

### Habitat

**Habitat:** Coastal rainforest.
**Altitude:** 0–300 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare.
**Vegetation:** Littoral or dry gully rainforest, e.g. littoral rainforest with swampy understorey at North Entrance or with *Eucalyptus tereticornis* at Albion Park.
**Substrate:** Black-grey sandy soil on hind dunes or creek bank alluvium. Soil fertile. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## **Schinus areira** * (S. molle var. areira) ANACARDIACEAE

Pepper Tree

### Life history

**Growth form:** Tree to 10 m high, dioecious or sometimes polygamous.
**Vegetative spread:** No.
**Longevity:** Probably more than 50 years.
**Primary juvenile period:**
**Flowers:** November–December. [August–February, April–June (Price 1963).]
**Fruit/seed:** Fruit: globose drupe 4–6 mm diameter. Matures November–March.
**Dispersal, establishment & growth:** Young plants may be frost-sensitive.
**Fire response:**
**Interaction with other organisms:** Potent cause of hay-fever; leaf, bark, resin and gum have been used medicinallly, the fruits have been used as an adulterant of pepper (Hurst 1942).

### Distribution

**Status/origin:** Exotic, native to South America.
**Botanical subregions:** NC CC SC NWS NWP NSWP; Qld, Vic., S.A., W.A.
**Distribution Sydney area:** Camden area.
**Select locations:** Razorback, Mt Annan.

### Habitat

**Habitat:** Hillsides and along creeks.
**Altitude:** 0–300 m **Annual rainfall:** 700–800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open grassland of *Themeda australis.*
**Substrate:** Volcanic breccia, sandstone strata in Wianamatta Formation. Soil fertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent; light–no shade.

### Conservation

**Conservation:** Frequently cultivated, especially as a shade tree in inland NSW. Occasionally locally naturalised.

## **Toxicodendron succedaneum** * (Rhus succedanea) ANACARDIACEAE

Rhus Tree

### Life history

**Growth form:** Small to medium-sized deciduous tree to 5 m high, dioecious.
**Vegetative spread:** No.
**Longevity:** Probably 20–40 years.
**Primary juvenile period:**
**Flowers:** [Very late September–very early November (Price 1963).]
**Fruit/seed:** Fruit: globose drupe 6–10 mm long, matures May–September.
**Dispersal, establishment & growth:** Diaspore: fruit, bird dispersed. Fruit reported from pellets of Currawongs (Buchanan 1989). Seedlings commonly occur in urban bushland but not known whether many survive to adults.
**Fire response:**
**Interaction with other organisms:** Contains urushiol, a lacquer-like phenolic compound, used for varnishing in Asia, causes severe contact dermatitis (Blackwell 1990).

### Distribution

**Status/origin:** Exotic, native to E Asia, introduced as garden plant.
**Botanical subregions:** CC.
**Distribution Sydney area:** Sydney suburban area.
**Select locations:** Pennant Hills, Garigal NP (rare), Mosman, Lane Cove NP (Clarke 1987).

### Habitat

**Habitat:** Bushland in urban areas.
**Altitude:** **Annual rainfall:**
**Typical local abundance:** Rare–occasional.
**Vegetation:** Seedlings establish in urban bushland.
**Substrate:** Various soils, particularly fertile.
**Exposure:**

### Conservation

**Conservation:** Can cause painfull allergic reactions (Monaghan & McMaugh 1987) and is a declared noxious plant in all areas of the state. Naturalises in suburban gardens. Minor weed problem in urban bushland (McLoughlin & Rawling 1990).

## Actinotus forsythii APIACEAE

### Life history

**Growth form:** Diffuse, wiry, procumbent herb with stems to 50 cm long.
**Vegetative spread:** No.
**Longevity:** Short-lived, generally dies within a year although there are some longer-lived individuals at particular 'wetter' sites (P. Hind pers. comm.).
**Primary juvenile period:** About 9 months.
Flowering in February following winter fire on Newnes Plateau (P. Hind pers. comm.).
**Flowers:** Pink, January–April, September–October (limited data).
**Fruit/seed:** Fruit: 1- seeded mericarp, 2 mm long, matures Jan–May, peak possibly March–April.
**Dispersal, establishment & growth:** Diaspore: fruit? Recruitment fire-related but mainly in autumn regardless of time of fire and possibly triggered by second stimulus (P. Hind pers. comm.). [No success in germinating seeds (P. Hind pers. comm.).] Starts as a rosette, as it branches cauline leaves develop and rosette leaves die back. Thick taproot which withers away as food store is used up for inflorescence.
**Fire response:** Probably killed by fire but usually seen only following fires.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** SC **CT** ST; Vic.
**Distribution Sydney area:** Upper Blue Mountains, rare.
**Select locations:** Clarence, Blackheath, Mt Hay, Narrowneck, Kanangra Walls.

### Habitat

**Habitat:** Heathland on cliff tops, moist conditions.
**Altitude:** 900–1100 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional–rare.
**Vegetation:** Heathland, only noted in burnt areas.
**Substrate:** Very rocky shallow soil on sandstone. Very infertile soil, poorly drained.
Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** Adults reported in exposed situations and in deep shade–mid shade, although perhaps seedlings may require higher light conditions.

### Conservation

**Conservation:** Rare, Newnes Plateau northern limit — localised and poorly known.

## Actinotus gibbonsii APIACEAE

### Life history

**Growth form:** Short-lived herb with ascending or decumbent stems to 30 cm long.
**Vegetative spread:** Reported to form small rosettes that spread rapidly (P. Hind pers. comm.).
**Longevity:** Short-lived, generally dies within a year (P. Hind pers. comm.).
**Primary juvenile period:** Less than 1 year.
**Flowers:** Pink, January, May.
**Fruit/seed:** Fruit: 1-seeded mericarp, 1–1.8 mm long of 2 fruitlets, seeds black with white hairs.
**Dispersal, establishment & growth:** Diaspore: fruit? Recruitment fire-related, recorded from sites burnt in previous year — seedlings appear in autumn regardless of time of fire and possibly triggered by second stimulus (P. Hind pers. comm.). Forms small rosettes that spread rapidly.
Taproot thick, then withers away as plant matures (P. Hind pers. comm.).
[No success in germinating seeds (P. Hind pers. comm.).]
**Fire response:** Probably killed by fire.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** SC NT **CT** ST NWS CWS NWP SWP; Qld.
**Distribution Sydney area:** Newnes Plateau.
**Select locations:** Newnes SF (1 site) (1992).

### Habitat

**Habitat:** Ridge with rock platform.
**Altitude:** 1000 m **Annual rainfall:** above 1000 m
**Typical local abundance:** Occasional–abundant.
**Vegetation:** Heath of *Leptospermum* and *Calytrix*, also occurs in woodland (P. Hind pers. comm.).
**Substrate:** Shallow sandy soil on sandstone, low nutrient.
**Exposure:**

### Conservation

**Conservation:** Rare, not well conserved.

## Actinotus helianthi APIACEAE

Flannel Flower

### Life history

**Growth form:** Herb 30–90 cm high, perennial or appearing to be annual by flowering the first season, sometimes becoming woody.
**Vegetative spread:** No vegetative spread.
**Longevity:** Generally short, 4-5 years. A 'headland' form may survive 15 years unburnt and then survive fire because of its thick 1cm diameter stems.
**Primary juvenile period:** 2–4 years (Benson 1985). Generally attains flowering maturity after two years (1.5 years at North Head Clemens & Franklin 1980).
**Flowers:** White–creamish, in head-like umbels surrounded by bracts 2–4 cm long. Flowers throughout the year, mainly November–May.
**Fruit/seed:** Fruit: 1-seeded mericarp, 3.2–5 mm long with silky hairs.
**Dispersal, establishment & growth:** Diaspore: mericarp, wind-dispersed. Recruitment from soil-stored seedbank. Soil-stored seed may survive for 15 years unburnt (at Mosman). Seeds germinate rapidly after fire or disturbance such as clearing. Very limited germination may occur at undisturbed sites. May need rain for germination. Growth period erratic, probably related to rainfall and light availability. Abundance may indicate recent fire (0-4 years) or disturbance. Vigorous seedling establishment on exposed sand in absence of fire (e.g. at North Head).
**Fire response:** Killed and re-established from soil-stored seed. Old plants of 'headland' form with thick stems (1 cm diameter) may be unaffected (e.g. at Marley).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS NWP; Qld.
**Distribution Sydney area:** Widespread but localised, Coast and Blue Mountains.
**Select locations:** Putty, Gosford, Putty, Broken Bay, Turramurra, Frenchs Forest, North Head, Kurnell, Thirlmere Lakes, Austinmer, Nowra, Springwood, Bell, Mittagong.

### Habitat

**Habitat:** Sandstone ridges.
**Altitude:** 0–1200 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open-forest, and heath on coastal headlands and old dunes.
**Substrate:** Sandy well-drained soils from sandstone or sand dunes. Clay soils on coastal headlands. Very infertile soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent. Light shade–none.

### Conservation

**Conservation:** Probably adequately conserved.

## Actinotus minor APIACEAE

Lesser Flannel Flower

### Life history

**Growth form:** Perennial herb, diffuse, with wiry branches.
**Vegetative spread:** No vegetative spread.
**Longevity:** 25–60 years (D. Keith pers. comm.) Life expectancy may be promoted by periodic fire. Reported as annuals at Hassans Walls.
**Primary juvenile period:** 3 years (Benson 1985), to more than 5 years (D. Keith pers. comm.).
**Flowers:** White, peak January, occasionally throughout the year.
**Fruit/seed:** Fruit: 1-seeded mericarp, 1.9–2.9 mm long, pubescent.
**Dispersal, establishment & growth:** Diaspore: seed, ant-dispersed (Rice & Westoby 1981). Soil-stored seedbank. Recruitment mainly after fire (D. Keith pers. comm.).
**Fire response:** Variable, killed by high intensity fires, but resprouts with lower intensity fires. Secondary juvenile period 1 year (D. Keith pers. comm.). Seedling recruitment following fire.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC CT ST.
**Distribution Sydney area:** Coast and Blue Mountains, widespread. Northern limit Ourimbah.
**Select locations:** Gosford, Pennant Hills, Waterfall, Wilton, Carrington Falls, Tallong, Woodford, Wentworth Falls, Hassans Walls, West Head, Turramurra, Frenchs Forest.

### Habitat

**Habitat:** Ridges and open areas.
**Altitude:** 0–1200 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Common in heathland and sandstone scrub.
**Substrate:** Almost always on sandy soils on Sandstone. Very infertile soils. Water table mostly low, though sites sometimes locally moist; moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Probably well-conserved in sandstone areas.

## Aegopodium podagraria * APIACEAE

Goutweed, Ground Elder

### Life history

**Growth form:** Perennial herb with hollow, grooved stems 50–100 cm high.
**Vegetative spread:** Spreads by far-creeping rhizome.
**Longevity:**
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 3–4 mm long.
**Dispersal, establishment & growth:** Diaspore: mericarp, possibly also vegetative.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Eurasia.
**Botanical subregions:** CT ST.
**Distribution Sydney area:** Fitzroy Falls.
**Select locations:** Fitzroy Falls — no specimens in NSW Herbarium

### Habitat

**Habitat:** Pasture or garden areas.
**Altitude:** 700 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:** Pasture or garden.
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Recorded as potentially troublesome weed in pasture or garden areas near Fitzroy Falls, Canberra and Cooma (Harden 1992).

## Ammi majus * APIACEAE

Bishop's Weed

### Life history

**Growth form:** Erect to spreading annual or biennial herb, 25–75 cm high.
**Vegetative spread:**
**Longevity:** 1–2 years.
**Primary juvenile period:**
**Flowers:** White, August–February (Price 1963).
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–2 mm long, matures January.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:** Livestock grazing the plant and poultry-fed mixtures containing its seed may become photosensitive, leading to cellular damage and inflammation (Auld & Medd 1987).

### Distribution

**Status/origin:** Exotic, native to Europe, Asia and N Africa, probably introduced as garden plant.
**Botanical subregions:** NC CC CT ST NWS CWS SWS NWP SWP NFWP; Qld, Vic., S.A., W.A.
**Distribution Sydney area:**
**Select locations:** Hazelbrook (1921), Bathurst (1904, 1921).

### Habitat

**Habitat:** Weed of cultivated and disturbed ground.
**Altitude:** above 700 m **Annual rainfall:** above 600 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Weed of cultivated and disturbed ground, rare.

## Apium graveolens * APIACEAE

Celery

### Life history

**Growth form:** Erect biennial herb to 1 m high.
**Vegetative spread:** No.
**Longevity:** Less than 2 years.
**Primary juvenile period:**
**Flowers:** White, November–January. Probably insect-pollinated.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), ovoid 1.5–2.5 mm long.
**Dispersal, establishment & growth:** Diaspore: ribbed mericarps. Water-dispersed (Carr *et al.* 1992).
**Fire response:**
**Interaction with other organisms:** Cultivated as a vegetable. Workers in celery-canning industry suffer dermatitis after handling the plant; some people develop a rash after ingestion (Hurst 1942).

### Distribution

**Status/origin:** Exotic, native to Europe, probably introduced as a vegetable.
**Botanical subregions:** CC SWP; Vic., Tas., S.A., W.A., N.T.
**Distribution Sydney area:** Liverpool–Picton.
**Select locations:** Liverpool, Leumeah (1965), Campbelltown, Picton.

### Habitat

**Habitat:** Riverbank.
**Altitude:** 0–200 m **Annual rainfall:** 700–900 mm
**Typical local abundance:** Rare.
**Vegetation:** Probably with other weedy species.
**Substrate:** Sandy soil, moist depressions. Soil fertile, water table mostly high, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Cultivated as a vegetable and locally naturalised in the Liverpool–Picton area.

## **Apium prostratum** subsp. **prostratum** var. **filiforme** APIACEAE

Sea Celery

### Life history

**Growth form:** Biennial or perennial prostrate herb with branches 30–70 cm long, stems hollow, grooved.
**Vegetative spread:** No.
**Longevity:** Biennial or perennial.
**Primary juvenile period:**
**Flowers:** White, October–May. Insect pollinated (Cook 1990).
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.3–2.5 mm long, matures December–May.
**Dispersal, establishment & growth:** Diaspore: ribbed mericarps.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, Vic., Tas., S.A., W.A., N.Z.
**Distribution Sydney area:** Coastline and lake foreshores.
**Select locations:** Narrabeen, Kurnell, Cronulla, Austinmer, Gerringong, Minnamurra River.

### Habitat

**Habitat:** Coastline and lake foreshores.
**Altitude:** 0–10 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Saltmarsh — widespread in the upper marsh — often amongst *Juncus kraussii*. Generally in damper sites but occasionally in dry sandy areas (Adam 1981).
**Substrate:** Fertile soil. Water table permanently high, moisture supply continuous, saline.
**Exposure:**

### Conservation

**Conservation:**

## **Apium prostratum** subsp. **prostratum** var. **prostratum** APIACEAE

Sea Celery

### Life history

**Growth form:** Biennial or perennial prostrate herb with branches 30–70 cm long, stems hollow, grooved.
**Vegetative spread:** No.
**Longevity:** Biennial or perennial.
**Primary juvenile period:**
**Flowers:** White, September–March. Insect pollinated (Cook 1990).
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.3–2.5 mm long.
**Dispersal, establishment & growth:** Diaspore: ribbed mericarps.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CWS; Qld, Vic., Tas., S.A., W.A., N.Z.
**Distribution Sydney area:** Coastline and lake foreshores.
**Select locations:** Wondabyne, Berowra Creek, Narrabeen, Cronulla, Lake Illawarra, St Georges Basin.

### Habitat

**Habitat:** Coastal headlands, cliff flush habitats.
**Altitude:** 0–20 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Frequent.
**Vegetation:** Scattered cliff dwelling herbs.
**Substrate:** Wet soil pockets near cliff base, rocky ledges. Fertile soil. Water table permanently high, moisture supply continuous, saline.
**Exposure:**

### Conservation

**Conservation:** Probably adequately conserved. Ecological differences between *Apium prostratum* var. *prostratum* and *Apium prostratum* var. *filiforme* are not clear.

## **Bupleurum lancifolium** * (B. subovatum, misappl. in NSW) APIACEAE

### Life history

**Growth form:** Erect annual herb, 30–70 cm high, with stem-clasping leaves.
**Vegetative spread:**
**Longevity:** Annual.
**Primary juvenile period:**
**Flowers:** Yellow-green, October–December.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), ovoid to globose 3–5 mm long, matures November (limited data).
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to southern Europe, possibly introduced in 'plant rubbish from Palestine' (W.M. Carne, Herbarium note 1919).
**Botanical subregions:** NC **CC CT** ST CWS; W.A.
**Distribution Sydney area:** Localised records.
**Select locations:** Beecroft (1919), Orange (1912), only records for the area.

### Habitat

**Habitat:** Waste ground.
**Altitude:** 0–900 m **Annual rainfall:** above 1000 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Occasional weed of waste ground.

## **Centella asiatica** APIACEAE

Pennywort

### Life history

**Growth form:** Perennial herb, stems creeping and rooting at the nodes.
**Vegetative spread:** Spreads by stems creeping and rooting at nodes.
**Longevity:** Indeterminate.
**Primary juvenile period:**
**Flowers:** Pink–crimson, or purple or white, November–December.
Insect-pollinated or perhaps autogamous (Cook 1990).
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), matures February–April.
**Dispersal, establishment & growth:** Diaspore: flattened mericarps, dispersal unknown, probably water or animals (Cook 1990). Possibly a coloniser of disturbed sites. Growth rate medium.
**Fire response:** Probably resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT SWS; LHI, all States except N.T., Asia, Pac.
**Distribution Sydney area:** Coast & Hawkesbury River area.
**Select locations:** Pymble, Neilson Park, Centennial Park, Otford, St Albans, Wisemans Ferry, Longneck Lagoon.

### Habitat

**Habitat:** Margins of swamps; damp places by roadsides, foreshores.
**Altitude:** 0–200 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Occasional–frequent. Varies between years, possibly depending on amount of rain (P. Adam pers. comm.).
**Vegetation:** Various — littoral rainforest e.g. with *Eucalyptus botryoides;* or coastal scrub e.g. with *Kunzea ambigua;* or wetland margins with seasonal herbland e.g. *Juncus usitatus,* or herbaceous roadside weedy vegetation, woodland.
**Substrate:** Moderately fertile soils, some clay influence, poorly drained. Loamy clay soils from shales or alluvium, fertile. Water table mostly high, moisture supply continuous, fresh.
**Exposure:** Indifferent or sheltered; light shade–no shade.

### Conservation

**Conservation:** Probably adequately conserved.
Conserved in Western Sydney (Benson & McDougall 1991).

## Centella cordifolia APIACEAE

### Life history

**Growth form:** Creeping perennial herb, rooting at the nodes.
**Vegetative spread:** Spreads by long creeping runners.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** Purple, late summer–autumn.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 4–5 mm wide.
**Dispersal, establishment & growth:** Diaspore: ?mericarp.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC CT; Vic., Tas., S.A., W.A.
**Distribution Sydney area:** Coastal Sydney and Illawarra.
**Select locations:** Penshurst, Picton Lakes, Mt Keira, Long Swamp (Kodela *et al.* 1992), Berry.

### Habitat

**Habitat:** Moist sites; upland mire (Kodela *et al.* 1992).
**Altitude:** 0–620 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Rare–occasional.
**Vegetation:** With sedges and wet heath shrubs.
**Substrate:** Peaty or sandy wet ground.
**Exposure:** Possibly needing light.

### Conservation

**Conservation:** Few records, distribution poorly known.

## Ciclospermum leptophyllum * (Apium leptophyllum) APIACEAE

Slender Celery

### Life history

**Growth form:** Erect annual herb with finely divided leaves.
**Vegetative spread:** No.
**Longevity:** Less than 2 years.
**Primary juvenile period:** Less than 1 year.
**Flowers:** White, throughout the year but mainly October–January. Probably insect-pollinated.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1–3 mm long, matures September–February.
**Dispersal, establishment & growth:** Diaspore: ribbed mericarps.
Establishment probably related to disturbance.
**Fire response:**
**Interaction with other organisms:** Reported to taint milk when grazed by dairy cattle (Auld & Medd 1987).

### Distribution

**Status/origin:** Exotic, native to America.
**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP; Qld, Vic., N.T., S.A.
**Distribution Sydney area:** Coast and western Sydney.
**Select locations:** Devlins Creek, Woollahra, Hawkesbury (1883), Nortons Basin, Leumeah, Mt Annan, Stanwell Park, Shellharbour.

### Habitat

**Habitat:** Railway, roadside and creek banks, wetlands.
**Altitude:** 0–200 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent.
**Vegetation:** Open–barren ground, disturbed sites, or amongst tall herb growth.
**Substrate:** Sandy alluvial soil, clay soil from Wianamatta Shale.
Soil fertile–infertile, water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Indifferent to exposure; mid–light shade.

### Conservation

**Conservation:** Weed of gardens, roadsides and other disturbed areas.

## Conium maculatum * APIACEAE

Hemlock

### Life history

**Growth form:** Robust annual or biennial herb 1–2.5 m high, with long white taproot; strong disagreeable mousy odour when brushed or damaged.
**Vegetative spread:** No.
**Longevity:** 1–2 years.
**Primary juvenile period:**
**Flowers:** August–January, peak November.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 4 mm long, matures September–February.
**Dispersal, establishment & growth:** Diaspore: mericarp. Animal, water and vegetative dispersal (Carr *et al.* 1992). Seeds germinate in autumn, plants develop rapidly in winter and spring, some produce flowering stems in spring and die in summer; others remain vegetative until the second spring and are biennial; establishes rapidly after autumn rains, can preclude other vegetation (Parsons 1976).
**Fire response:**
**Interaction with other organisms:** All parts of the plant are poisonous, particularly almost ripe fruit; responsible for deaths of children and stock (Hurst 1942). Ancient Greeks mixed it into poison cups to execute political prisoners and it was once used as a sedative (Low 1990). Livestock generally do not graze the plant but contaminated fodder may cause problems (Auld & Medd 1987). Extracts used as arrow poisons by North American Indians; used medicinally in treating tumours, ulcers and gout (Parsons 1976).

### Distribution

**Status/origin:** Exotic, native to Europe, Asia, probably a garden escape.
Introduced as garden plant; recorded as being a naturalised noxious weed in 1907 (Parsons 1976).
**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS NWP; Qld, Vic., Tas., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Leichhardt (1907), Pennant Hills, Regentville, Hoxton Park, Albion Park, Little Hartley, Carcoar, Abercrombie Caves, Wollondilly River.

### Habitat

**Habitat:** Creek banks, waste areas.
**Altitude:** 0–1000 m **Annual rainfall:** 600–1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Other weeds of wasteland, riparian vegetation e.g. *Casuarina cunninghamia.*
**Substrate:** Floodplain and riverbank alluvium, fertile soil.
Water table mostly high, moisture supply continuous, fresh.
**Exposure:**

### Conservation

**Conservation:** Weed of disturbed sites. Proclaimed noxious weed in many shires.

## Daucus carota * APIACEAE

Wild Carrot

### Life history

**Growth form:** Erect biennial herb 30–150 cm high.
**Vegetative spread:** No.
**Longevity:** 2 years.
**Primary juvenile period:**
**Flowers:** White or pinkish, November–March.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), ovoid, 3–4 mm long with spines.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Eurasia and North Africa, escape from cultivation.
**Botanical subregions:** NC CC SC NT NWS CWS; Vic., Tas., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Normanhurst (1963), Hornsby, Bathurst (1896).

### Habitat

**Habitat:** Roadside.
**Altitude:** 0–1000 m **Annual rainfall:** above 600 mm
**Typical local abundance:** Frequent.
**Vegetation:** With *Imperata cylindrica, Pteridium esculentum, Lonicera japonica.*
**Substrate:** Probably sandy clay soil, well-drained. Infertile soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Rare escape from cultivation.

## Daucus glochidiatus — APIACEAE

Native Carrot

### Life history

**Growth form:** Annual herb, usually erect, 8–60 cm high.
Appears to include several forms that need further botanical work.
**Vegetative spread:** No.
**Longevity:** Less than 1 year.
**Primary juvenile period:**
**Flowers:** White or pink–crimson, spring–summer.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 3-5 mm long, with barbed prickles, recorded at various times.
**Dispersal, establishment & growth:** Diaspore: mericarp, animal dispersed. Burr-like fruits adhere to wool & clothing.
**Fire response:** Seedlings recorded less than 1 year after fire (Purdie 1977).
**Interaction with other organisms:** Reputed to taint milk if large amount is ingested (Auld & Medd 1987).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** All divisions; all States, N.Z.
**Distribution Sydney area:** Widespread.
**Select locations:** Mt Yengo, Mooney Mooney Creek, St Ives, Nortons Basin, Richmond, Blackheath, Cullen Bullen, Jenolan Caves, Kangaroo Valley, Wingello.

### Habitat

**Habitat:** Wetland.
**Altitude:** 0–1000 m **Annual rainfall:** 700–1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Dry–wet eucalypt open-forest and edge of rainforest.
**Substrate:** Basalt scree and volcanic necks, as well as shale. Very fertile–fertile soil. Water table mosly low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

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

## Eryngium maritimum * — APIACEAE

### Life history

**Growth form:** Robust perennial herb to 50 cm high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Pale mauve, December–May.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 4.5–6 mm long, covered with acutely pointed scales.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Europe.
**Botanical subregions:** NC CC.
**Distribution Sydney area:** Budgewoi north (to Taree).
**Select locations:** Budgewoi (1965).

### Habitat

**Habitat:** Coastal sand dunes.
**Altitude:** 0–10 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:** Coastal sand dunes.
**Exposure:**

### Conservation

**Conservation:** Locally naturalised exotic.

## **Eryngium pandanifolium** * (E. decaisneanum) APIACEAE

### Life history

**Growth form:** Erect perennial herb to 4 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Greenish-white, February–March.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps) 2.5 mm long, covered with bladdery scales.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to tropical South America.
**Botanical subregions:** CC.
**Distribution Sydney area:** Centennial Park.
**Select locations:** Centennial Park (1913, 1953).

### Habitat

**Habitat:** Swamp margins.
**Altitude:** 0–50 m **Annual rainfall:** 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Edge of *Melaleuca* swamp.
**Substrate:** Silt, infertile. Water table permanently high, moisture supply continuous, fresh.
**Exposure:**

### Conservation

**Conservation:** Appears to be very locally naturalised exotic.

## **Eryngium rostratum** (E. ovinum) APIACEAE

Blue Devil

### Life history

**Growth form:** Annual or short-lived perennial herb (thistle-like), upper parts often metallic blue.
**Vegetative spread:**
**Longevity:** Annual or short-lived perennial.
**Primary juvenile period:**
**Flowers:** Blue, November–January. Leaves wither when plant is flowering.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps) 2.5–4 mm long covered with acute bladdery scales and crowned by persistent sepals, matures December (limited data).
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NT CT ST CWS SWS NWP SWP; all States.
**Distribution Sydney area:** Bathurst area and Dividing Range, also Richmond, Riverstone.
**Select locations:** Valley of the western Blue Mtns, Wallerawang, Hill End, Bathurst, Blayney, Wombeyan Caves, Richmond (1906), Riverstone.

### Habitat

**Habitat:** Moist, cool sites.
**Altitude:** 800–1000 m **Annual rainfall:** 800–1100 mm
**Typical local abundance:** Occasional.
**Vegetation:** Pastures and woodland.
**Substrate:** Heavy soils.
**Exposure:**

### Conservation

**Conservation:** Possibly rare, mostly old records.

## Eryngium vesiculosum — APIACEAE

Prostrate Blue Devil or Prickfoot

### Life history

**Growth form:** Perennial herb (thistle-like) with prostrate branches to 30 cm long.
**Vegetative spread:** Limited.
**Longevity:** Short-lived.
**Primary juvenile period:**
**Flowers:** Blue, December–March.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps) 5–6 mm long, covered with blunt bladdery scales, matures May (limited data).
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NT **CT** ST NWS SWS; Vic., Tas., N.Z.
**Distribution Sydney area:** Valleys of the western Blue Mountains, rare.
**Select locations:** Lidsdale, Hartley Vale, Mt Victoria.

### Habitat

**Habitat:** Moist sites, edges of swamps.
**Altitude:** 700–800 m **Annual rainfall:** 800–1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** Grassy meadow, edge of swamp.
**Substrate:** Alluvial soil, fertile. Water table mostly high, non-saline.
**Exposure:**

### Conservation

**Conservation:** Rare, mostly old records.

## Foeniculum vulgare * — APIACEAE

Fennel

### Life history

**Growth form:** Erect biennial or perennial herb 1–2.5 m high with stout branched taproot.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:** 1.5–2 years.
**Flowers:** Yellow, December–very early May (Price 1963).
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 4–10.5 mm long, matures February–May. Seeds aromatic.
**Dispersal, establishment & growth:** Diaspore: mericarp. Germinates at almost any time of the year, flowering stems produced from the perennial crown each spring (Parsons 1976). Distributed by vehicles, machinery, coats of animals, water and as a contaminant of agricultural produce. Also spread by the transport of pieces of the crown by earth moving machines (Cunningham *et al.* 1981). Grows from late winter to autumn, then dies back and flowers in following season. Animal and water-dispersed (Carr *et al.* 1992). Spread by water in particular, once established it excludes other vegetation; strong smell discourages grazing by animals (Parsons 1976).
**Fire response:** Probably resprouts from base.
**Interaction with other organisms:** Cultivars used as a vegetable.
Seeds have been used as a flavouring and in ancient medicines (Parsons 1976).

### Distribution

**Status/origin:** Exotic, native to Eurasia. Introduced as a garden/herbal plant.
**Botanical subregions:** NC **CC** SC NT **CT** ST NWS CWS NWP NFWP; Qld, Vic., Tas., S.A., W.A.
**Distribution Sydney area:** Coast and Western Sydney.
**Select locations:** Middle Harbour Creek, Northbridge, Centennial Park (1909), Marsfield, Richmond, Mount Annan, Menangle Park, Wollongong.

### Habitat

**Habitat:** Roadsides and waste places. Along many creeks and drains (Parsons 1976).
**Altitude:** 0–200 m **Annual rainfall:** above 600 mm
**Typical local abundance:** Frequent.
**Vegetation:** With roadside weeds e.g. *Bidens, Sida, Paspalum,* but capable of forming dense infestations which exclude other vegetation.
**Substrate:** Clay, fertile soils from Wianamatta Shale. Moisture supply intermittent.
**Exposure:** Full sun.

### Conservation

**Conservation:** Widespread, common weed, not invasive of bushland areas.

## Hydrocotyle algida APIACEAE

Pennywort

### Life history

**Growth form:** Small prostrate herb with creeping rhizomes.
**Vegetative spread:** Yes.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** November–January.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1–1.7 mm long, 1.5–2 mm wide.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CT ST; Vic.
**Distribution Sydney area:** South from Ben Bullen State Forest.
**Select locations:** Ben Bullen SF (Harden 1992), (Limited data, specimens on loan).

### Habitat

**Habitat:** Mossy areas or in running water.
**Altitude:** above 800 m **Annual rainfall:** above 800 mm
**Typical local abundance:**
**Vegetation:** Eucalypt forest.
**Substrate:** Shales and granites.
**Exposure:**

### Conservation

**Conservation:** Ben Bullen (northern limit), poorly known.

## Hydrocotyle bonariensis * APIACEAE

### Life history

**Growth form:** Perennial herb, with rhizomes, stems creeping and rooting at the nodes.
**Vegetative spread:** Spreads extensively by rhizomes running along or beneath the soil surface, vigorous coloniser species.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** White–creamy yellow, October–June, peak October–February.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–2 mm long, 2.5–3 mm wide, matures February–June.
**Dispersal, establishment & growth:** Diaspore: probably mericarp or stem fragments. Growth rate quick. Coloniser.
**Fire response:** Resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to South America.
**Botanical subregions:** NC CC SC; LHI, Qld, Vic., S.A., W.A.
**Distribution Sydney area:** Coastal foreshores.
**Select locations:** Mooney Mooney Creek, Bayview, Narrabeen (1941), Manly, La Perouse, Kurnell, Lake Illawarra.

### Habitat

**Habitat:** Estuaries, coastline, sand dunes and fringes of saltmarsh, cliff tops.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Dominant–frequent.
**Vegetation:** Coastal dune and upper saltmarsh. Large plants are found in moister communities and smaller more succulent specimens in drier, more sandy sites (Adam 1981). Has possibly displaced *Selliera radicans* in clifftop habitats (P. Adam, pers. comm.).
**Substrate:** Sandy soil from sand dunes or sandstones, also filled areas, infertile. Moisture supply intermittent, saline. Drought tolerant (Clarke 1989).
**Exposure:** Exposed–indifferent; can grow in understory to *Casuarina glauca* so is reasonably shade-tolerant. Seedlings shade-tolerant, sun-tolerant (Clarke 1989).

### Conservation

**Conservation:** A vigorous invasive weed species, secondary sand coloniser (Clarke 1989).

## **Hydrocotyle geraniifolia** APIACEAE

Forest Pennywort

### Life history

**Growth form:** Creeping or climbing herb with stems to several metres long.
**Vegetative spread:** Stems spread several metres radiating from central rootstock, and rooting at nodes near base.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, November–January.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2–2.5 mm long, 3.5–3.8 mm wide, matures February–April (limited data).
**Dispersal, establishment & growth:** Coloniser.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT **CT**; Vic., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Gunderman, Boorai Creek, Glenbrook, Mt Banks, Royal NP, Nortons Basin, Bundanoon.

### Habitat

**Habitat:** Sheltered places.
**Altitude:** 0–1000 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:**
**Vegetation:** Tall moist eucalypt open-forest with herbaceous ground cover.
**Substrate:** Deep soils from shales and sandstones e.g. Narrabeen Group. Soil fertile. Water table mostly high.
**Exposure:** Sheltered situations, mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Hydrocotyle laxiflora** (includ. H. acutiloba) APIACEAE

Stinking Pennywort

### Life history

**Growth form:** Dioecious, perennial herb to 15 cm high, creeping and rooting at the nodes. Includes *H. acutiloba* and is a taxon often misidentified.
**Vegetative spread:** Creeping rhizomes spreading often more than 1 m.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Pale green, with an offensive odour, October–April.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–2 mm long, 1.8–2.5 mm wide, matures February–May.
**Dispersal, establishment & growth:** Dispersal — no special morphology (Westoby *et al.* 1990). Coloniser.
**Fire response:**
**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 (rarely) and western Blue Mountains.
**Select locations:** Cheltenham, Menangle, Mittagong, Hartley, Hampton, Megalong, Turondale.

### Habitat

**Habitat:** Moist places.
**Altitude:** 0–1000 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Woodland and with herbaceous understorey e.g. *Eucalyptus dives–Eucalyptus viminalis* or *E. fastigata–Eucalyptus radiata.*
**Substrate:** Sandy loam from Devonian metamorphic, granite or sandstone. Infertile soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations in light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## **Hydrocotyle geraniifolia** APIACEAE

Forest Pennywort

### Life history

**Growth form:** Creeping or climbing herb with stems to several metres long.
**Vegetative spread:** Stems spread several metres radiating from central rootstock, and rooting at nodes near base.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, November–January.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2–2.5 mm long, 3.5–3.8 mm wide, matures February–April (limited data).
**Dispersal, establishment & growth:** Coloniser.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT **CT**; Vic., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Gunderman, Boorai Creek, Glenbrook, Mt Banks, Royal NP, Nortons Basin, Bundanoon.

### Habitat

**Habitat:** Sheltered places.
**Altitude:** 0–1000 m **Annual rainfall:** 1000–1400 mm
**Typical local abundance:**
**Vegetation:** Tall moist eucalypt open-forest with herbaceous ground cover.
**Substrate:** Deep soils from shales and sandstones e.g. Narrabeen Group. Soil fertile. Water table mostly high.
**Exposure:** Sheltered situations, mid shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Hydrocotyle laxiflora** (includ. H. acutiloba) APIACEAE

Stinking Pennywort

### Life history

**Growth form:** Dioecious, perennial herb to 15 cm high, creeping and rooting at the nodes. Includes *H. acutiloba* and is a taxon often misidentified.
**Vegetative spread:** Creeping rhizomes spreading often more than 1 m.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Pale green, with an offensive odour, October–April.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–2 mm long, 1.8–2.5 mm wide, matures February–May.
**Dispersal, establishment & growth:** Dispersal — no special morphology (Westoby *et al.* 1990). Coloniser.
**Fire response:**
**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 (rarely) and western Blue Mountains.
**Select locations:** Cheltenham, Menangle, Mittagong, Hartley, Hampton, Megalong, Turondale.

### Habitat

**Habitat:** Moist places.
**Altitude:** 0–1000 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Woodland and with herbaceous understorey e.g. *Eucalyptus dives–Eucalyptus viminalis* or *E. fastigata–Eucalyptus radiata.*
**Substrate:** Sandy loam from Devonian metamorphic, granite or sandstone. Infertile soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations in light shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Hydrocotyle peduncularis APIACEAE

### Life history

**Growth form:** Small, creeping herb, rooting at nodes, with aerial stems arising from nodes.
**Vegetative spread:** Spreads by creeping stems below or above ground in litter, occasionally mat-forming.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Spring–Autumn.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1 mm long and wide, matures April (limited data).
**Dispersal, establishment & growth:** Coloniser.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST; Qld, Vic., Tas.
**Distribution Sydney area:** Widespread.
**Select locations:** North Ryde, Neilson Park, Penrose (P. Kodela pers. comm.). (Limited data, specimens on loan).

### Habitat

**Habitat:** Occasional weed of gardens (Harden 1992).
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:** Sclerophyll forest and swamps.
**Substrate:** Moist sites e.g. upland mire (P. Kodela pers. comm.).
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Hydrocotyle tripartita APIACEAE

Pennywort

### Life history

**Growth form:** Small, slender perennial herb, creeping and rooting at least at the lower nodes.
**Vegetative spread:** Yes, spreads by creeping stems, occasionally mat-forming.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** Greenish, yellowish or purplish, throughout the year but mainly November–March.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1 mm long, 2 mm wide.
**Dispersal, establishment & growth:** Coloniser.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT ST NWS; Qld, Vic., Tas., S.A., N.Z.
**Distribution Sydney area:** Widespread.
**Select locations:** Agnes Banks, Menangle, Mt Keira, Albion Park. (Limited data, specimens on loan.)

### Habitat

**Habitat:** Margins of streams, swamp depressions.
**Altitude:** 0–500 m **Annual rainfall:** 750–1800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Eucalypt forest, margins of rainforest.
**Substrate:** Damp places, sandy soil, water table mostly high, non-saline.
**Exposure:** Shaded to open sites.

### Conservation

**Conservation:** Conservation status unknown.

## **Hydrocotyle verticillata** (H. vulgaris) APIACEAE

Shield Pennywort

### Life history

**Growth form:** Perennial herb with rhizomes; stems creeping and rooting at the nodes.
**Vegetative spread:** Rhizomes running below surface of sand or soil and rooting at nodes.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Creamy-yellow, November–April.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2 mm long, 2.5–3 mm wide.
**Dispersal, establishment & growth:** Coloniser.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC; Qld, Vic., S.A.
**Distribution Sydney area:** Georges River.
**Select locations:** Casula (only NSW Herbarium record).

### Habitat

**Habitat:** Freshwater swamps, lagoons and along streams and rivers, sometimes partially submerged.
**Altitude:** 0–20 m **Annual rainfall:** 800 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:** In mud on edge of lagoon.
**Exposure:**

### Conservation

**Conservation:** Uncommon, probably inadequately conserved.

## **Lilaeopsis polyantha** APIACEAE

### Life history

**Growth form:** Perennial, emergent herb, stems creeping and rooting at the nodes.
**Vegetative spread:** Spreads by creeping stems.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** White, November and March.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps) 1.5–3.5 mm long, matures March.
**Dispersal, establishment & growth:** Diaspore: corky mericarp, released when dry and dispersed by wind to accumulate in nearby mud cracks but also possibly dispersed long distances by birds (Affolter, 1985), possibly also spread by vegetative fragments.
**Fire response:**
**Interaction with other organisms:** Possibly grazed by waterbirds (Affolter 1985).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT CT ST SWS; Qld, Vic.,Tas., S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Avoca Lagoon, Dee Why Lagoon (P. Adam), Richmond (1992), Penrose (P. Kodela).

### Habitat

**Habitat:** Lagoon margins, upland mire (P. Kodela pers. comm.).
**Altitude:** 0–620 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Rare–frequent.
**Vegetation:** Herbland.
**Substrate:** Alluvial sand, infertile. Fresh or brackish water to 30 cm deep or on wet mud on the margins of water bodies. Water table mostly high, moisture supply continuous, brackish–fresh.
**Exposure:** Indifferent to exposure. Usually full sun (0–30 % canopy cover) (Peter Lister pers. comm.)

### Conservation

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

## **Oreomyrrhis eriopoda** APIACEAE

Australian Carraway

### Life history

**Growth form:** Perennial herb, 5–50 cm high, with slender taproot.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** White or tinged pink, summer.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 3–6 mm long, 15–25 per umbel, matures November–January.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC SC NT ST CWS SWS; Vic., Tas., S.A.
**Distribution Sydney area:** Western Blue Mountains.
**Select locations:** Mt Coridudgy, Mt Wilson, Blackheath, Mandurama, Mt Bindo, Mittagong.

### Habitat

**Habitat:** Woodland at higher elevation.
**Altitude:** 700–1100 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Rare.
**Vegetation:** Woodland with herbaceous understorey e.g. with *Eucalyptus pauciflora–Eucalyptus dalrympleana.*
**Substrate:** On red loam from metamorphics or sedimentary. Soil infertile.
Water table permanently low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Probably inadequately conserved, mostly old records.

## **Pastinaca sativa** subsp. **sativa** * APIACEAE

Parsnip

### Life history

**Growth form:** Erect stout biennial herb to 1.8 m high, with swollen taproot.
**Vegetative spread:** No.
**Longevity:** 2 years.
**Primary juvenile period:**
**Flowers:** Yellow, November–April.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 5–7 mm long.
**Dispersal, establishment & growth:** Diaspore: mericarp, possibly wind-dispersed.
**Fire response:**
**Interaction with other organisms:** Widely grown as a vegetable.

### Distribution

**Status/origin:** Exotic, introduced as a vegetable from Europe.
**Botanical subregions:** NC NT CT ST; Vic., Tas., S.A.
**Distribution Sydney area:** Naturalised in cooler areas.
**Select locations:** Abercrombie Caves, Lake Conobolas.

### Habitat

**Habitat:** Riverflats, roadsides.
**Altitude:** 700–900 m **Annual rainfall:** 700–1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** Cleared, grassy.
**Substrate:** Moist ground on alluvium. Water table mostly high, moisture supply continous, fresh.
**Exposure:**

### Conservation

**Conservation:** Naturalised in cooler areas, in wasteland and on roadsides.

## Platysace clelandii APIACEAE

### Life history

**Growth form:** Sprawling shrub 30–60 cm high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, August–February.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps),1.5 mm long, 2–2.2 mm wide, matures August, December–January, May (limited data).
**Dispersal, establishment & growth:**
**Fire response:** Possibly resprouts.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC CT.
**Distribution Sydney area:** Hornsby Plateau.
**Select locations:** Running stream, Putty, Culoul Range, Wisemans Ferry, Colo Gorge, Yarramun Creek, Marramarra NP, Muogamarra NR.

### Habitat

**Habitat:** Dry hillsides.
**Altitude:** 0–800 m **Annual rainfall:** 800–1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** Eucalypt open-forest e.g. *Angophora costata, Syncarpia glomulifera.*
**Substrate:** Low-moderate nutrient sandy soils from sandstone or Narrabeen series. Water table permanently low, moisture supply intermittent, well drained. May possibly be somewhat salt-tolerant — often growing within a few metres of shore in Hawkesbury River area.
**Exposure:** Sheltered, mid–light shade.

### Conservation

**Conservation:** Local endemic species nationally coded 2RCa (Briggs & Leigh 1988).

## Platysace ericoides APIACEAE

### Life history

**Growth form:** Semi-prostrate or diffuse shrub 10–50 cm high. A variable species warranting further investigation.
**Vegetative spread:**
**Longevity:** ?short.
**Primary juvenile period:**
**Flowers:** White or cream, November–January, peak November.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–2.3 mm long, dispersed immediately at maturity, January.
**Dispersal, establishment & growth:** Diaspore: mericarp. Probably soil-stored seedbank.
**Fire response:** Variable response: Stems killed and generally resprouts from base (Benson 1981). Secondary juvenile period 1 year. Plants killed at Myall Lakes (Fox 1988).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT CT NWS CWS NWP; Qld.
**Distribution Sydney area:** Widespread. Plateaus north and south of Sydney.
**Select locations:** Putty, Colo Heights, Kenthurst (L.McD.), Ku-ring-gai, Kurnell, Voyager Point, Campbelltown, Burragorang, Hilltop.

### Habitat

**Habitat:** Dry ridges.
**Altitude:** 0–900 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Local abundance frequent.
**Vegetation:** Sclerophyll heath, scrub and forests e.g. with *Eucalyptus eximia, Angophora floribunda.*
**Substrate:** Substrate low nutrient sandstone soils. Sandy soils, shallow (Kenthurst, L.McD.), sometimes deep, often from sandstone. Soil infertile–very infertile.
Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent in light–no shade.

### Conservation

**Conservation:** Probably adequately conserved. Mittagong southern limit.

## Platysace lanceolata APIACEAE

### Life history

**Growth form:** Diffuse or erect shrub, 60–150 cm high. Very variable in leaf form and has sometimes been divided into varieties on the basis of leaf shape. Hybridizes with *P. stephensonii* (Harden 1992)
**Vegetative spread:** No vegetative spread.
**Longevity:** Probably less than 25 years. [Present but rare in area not burnt for 23 years (at Elouera), not burnt for 20 years (at Mosman) and not burnt for 13 years (at Field of Mars).]
**Primary juvenile period:**
**Flowers:** White or creamy, Nov–Jul.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–2 mm long, 1,5–2.1 mm wide, dispersed immediately at maturity.
**Dispersal, establishment & growth:** Diaspore: mericarp. Soil-stored seedbank (Fox 1988). Recruitment after fire or disturbance and sometimes in absence of fire (Lion Is).
**Fire response:** Variable response: resprouting reported at North Head (Clemens and Franklin 1980), at Darkes Forest (D. Keith pers. comm.), at Elouera (1985) accompanied by numerous seedling growth. Killed and re-established from soil-stored seedbank at Myall Lakes (Fox 1988).
May fruit within 2 years of high intensity fire but 4 years of low intensity fire Bradley (1972).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST NWS CWS SWS SWP; Qld, Vic.
**Distribution Sydney area:** Widespread, coastal plateaus and Blue Mountains.
**Select locations:** Gosford, Hornsby, Kurnell, Mt Kembla, Mt Coricudgy, Wallacia, Mt Wilson, Kanangra, Mittagong, Budderoo.

### Habitat

**Habitat:** Steep rocky slopes and dry ridges.
**Altitude:** 0–1000 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent.
**Vegetation:** Heath or less commonly eucalypt open-forest.
**Substrate:** Often on rock outcrops on sandy soil from sandstone, infertile–very infertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent situations, light shade–full sun.

### Conservation

**Conservation:** Probably adequately conserved.

## Platysace linearifolia — APIACEAE

### Life history

**Growth form:** Erect or spreading shrub 40–150 cm high.
**Vegetative spread:** Spreads by root suckering, possibly induced by fire in some sites.
**Longevity:** 10–40 years, though root suckering and resprouting may possibly promote indefinite longevity. Plants 0.5 m high recorded in bush unburnt for 23 years (at Elouera) and 13 years (at Field of Mars).
**Primary juvenile period:** 3–4 years (Benson 1985).
**Flowers:** White, January–June.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2 mm long, dispersed immediately at maturity, February–April.
**Dispersal, establishment & growth:** Diaspore: mericarp, probably ant-dispersed, has ant-adapted food body (Westoby *et al.* 1990). Soil-stored seedbank, main growth period September–March.
**Fire response:** Variable. Killed by high intensity fires but may resprout after low intensity fires on coast. Resprout and root-sucker more frequently in Blue Mountains and Colo area, also Woronora Plateau (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC CT; Qld.
**Distribution Sydney area:** Widespread, coastal plateaus and Blue Mountains.
**Select locations:** Bucketty, Warrah, Ku-ring-gai NP, Roseville, Davidson–Garigal NP, Audley, Austinmer, Bilpin, Springwood, Blackheath, Kanangra, Barren Grounds.

### Habitat

**Habitat:** Ridges and hillsides.
**Altitude:** 0–1100 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Typical local abundance frequent.
**Vegetation:** Very abundant in DSF. Shrubby woodland and open-forest particularly Sydney sandstone complex.
**Substrate:** Gravelly–sandy loam from sandstone, soil infertile–very infertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent situations, light–no shade.

### Conservation

**Conservation:** Adequately conserved.

## Platysace stephensonii — APIACEAE

### Life history

**Growth form:** Small shrub, 25–50 cm high.
**Vegetative spread:** No.
**Longevity:** Probably short-lived, less than 10 years.
**Primary juvenile period:**
**Flowers:** October–January, peak December.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.7–2 mm long, 1.5–2 mm wide, matures Jan.
**Dispersal, establishment & growth:** Diaspore: mericarp. Dispersal: ant-adapted food body (Westoby *et al.* 1990).
**Fire response:** Probably resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC.
**Distribution Sydney area:** Coast, Broken Bay–Bundeena, Point Perpendicular.
**Select locations:** Ku-ring-gai Chase NP, Garigal NP (L.McD.), Belrose, La Perouse, Bundeena, Point Perpendicular.

### Habitat

**Habitat:** Rocky outcrops on sandstone ridges.
**Altitude:** 0–100 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Heath and open areas e.g. with *Baeckea diosmifolia, Banksia oblongifolia, Allocasuarina distyla.*
**Substrate:** Rocky sandstone outcrops and ridges, possibly associated with disturbance. Skeletal low nutrient soils. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Exposed–indifferent, light shade or none.

### Conservation

**Conservation:** Local endemic species, nationally coded 3RC (Briggs & Leigh 1988).

## Trachymene anisocarpa APIACEAE

### Life history

**Growth form:** Erect robust annual or perennial herb 120–250 cm high with stout taproot.
**Vegetative spread:** Probably not.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, cream or pink, July–April.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 3.5 mm long.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST; Vic., Tas., W.A.
**Distribution Sydney area:** Illawarra.
**Select locations:** Port Kembla (1960).

### Habitat

**Habitat:** Swampy areas.
**Altitude:** 20 m **Annual rainfall:** 1200 mm
**Typical local abundance:** Occasional.
**Vegetation:**
**Substrate:** Sandy soil.
**Exposure:**

### Conservation

**Conservation:** Rare, conservation status unknown.

## Trachymene incisa subsp. incisa APIACEAE

### Life history

**Growth form:** Erect herb to 60 cm high, with thick perennial rootstock.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White or pinkish, September–April, peak November.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps, one often aborted), 2–3.3 mm long, matures September–April.
**Dispersal, establishment & growth:** Diaspore: mericarp; recruitment not fire-related, seedlings 2 cm high noted at Agnes Banks in November 1992 in undisturbed bush.
**Fire response:** Variable response: Resprouted from ground level at Agnes Banks (Benson 1981) and other places. Killed by fire at Myall Lakes (Fox 1988).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT NWS; Qld.
**Distribution Sydney area:** Coast and western Sydney.
**Select locations:** Toukley, Dee Why, Berry Island, Hurstville (1889), East Hills, Leumeah, Campbelltown, Appin, Agnes Banks.

### Habitat

**Habitat:** Sandy soils.
**Altitude:** 0–100 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent.
**Vegetation:** Dry eucalypt woodland or scrub.
**Substrate:** Sandy soil from alluvium, windblown deposit or sandstone, very infertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** Indifferent to exposure, light shade–no shade.

### Conservation

**Conservation:** Conservation status unknown.

## **Trachymene procumbens** APIACEAE

### Life history

**Growth form:** Weak herb with slender rootstock, with stems to 30 cm long.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, summer–autumn.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps, one may abort), 3 mm long, 4 mm wide.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld.
**Distribution Sydney area:** Coast.
**Select locations:** Early record from Manly (Harden 1992).

### Habitat

**Habitat:** Coast.
**Altitude:** 0–50 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Uncommon, Manly southern limit, status uncertain, possibly extinct.

## **Trachymene saniculifolia** (Didiscus scapiger) APIACEAE

### Life history

**Growth form:** Perennial robust herb to 50 cm high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** White–pinkish, December-January.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 1.5–3 mm long.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CT; Asia.
**Distribution Sydney area:** Western Blue Mountains.
**Select locations:** Jenolan Caves (Blakely 1899), Boyd River Crossing, Kanangra Boyd N.P. (Fairley & Moore 1989).

### Habitat

**Habitat:**
**Altitude:** 800 m **Annual rainfall:** 900–1000 mm
**Typical local abundance:**
**Vegetation:** Woodland.
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Very restricted — only known population is in Kanangra Boyd NP.

## Xanthosia atkinsoniana APIACEAE

### Life history

**Growth form:** Perennial herb to 60 cm high with woody base.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White–pinkish, November–April, peak December–January.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2.5 mm long, matures January–March.
**Dispersal, establishment & growth:**
**Fire response:** Resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NT CT ST; W.A.
**Distribution Sydney area:** Blue Mountains.
**Select locations:** Putty, Mt Kindarun, Mt Coricudgy, Bilpin, Mt Irvine, Clarence, Blackheath, Mittagong, Penrose, Marulan.

### Habitat

**Habitat:** Open-forest on ridges.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Open eucalypt forest e.g. *Angophora costata, Eucalyptus punctata, E. sieberi.*
**Substrate:** Sandy soils or sand over clay from sandstone sometimes on edge of wet areas. Infertile soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Xanthosia dissecta APIACEAE

Cut-leaved Xanthosia

### Life history

**Growth form:** Tufted subshrub to 15 cm high, with woody rootstock.
**Vegetative spread:**
**Longevity:** 5–20 years (D. Keith pers. comm.).
**Primary juvenile period:** Primary juvenile period more than 5 years (D. Keith pers. comm.).
**Flowers:** White, August.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2 mm long, matures December.
**Dispersal, establishment & growth:**
**Fire response:** Resprouts at ground level or below. Secondary juvenile period 1 year (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC SC CT ST; Vic., Tas.
**Distribution Sydney area:** Upper Blue Mountains and Bulli (1 record).
**Select locations:** Wentworth Falls, Blackheath, Boyd Crossing, Bulli Lookout.

### Habitat

**Habitat:** Upland swamps.
**Altitude:** 0–1000 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Rare.
**Vegetation:** Wet heath and sedge swamps e.g. with *Xyris, Restio, Leptospermum.*
**Substrate:** Sandy soil from sandstone, very infertile. Water table permanently high, moisture supply continuous, fresh.
**Exposure:**

### Conservation

**Conservation:** Uncommon, Blackheath northern limit, conservation status unknown.

## **Xanthosia pilosa** (incl. X. vestita) APIACEAE

### Life history

**Growth form:** Erect or diffuse variable shrub 30-65 cm high. Sometimes with very stout rootstock (L.McD.). Plants generally tomentose but this varies, and there are various forms apparent but more work is needed.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Pale green–creamy white, at any time, peak October–November.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 2 mm long.
**Dispersal, establishment & growth:** Diaspore: fruit, ant-dispersed (Westoby *et al.* 1981).
**Fire response:** Various response. Different forms, one killed, another resprouts from base or below — both seen in Garigal NP (L.McD.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT** ST; Qld, Vic., Tas.
**Distribution Sydney area:** Widespread — Coast and Blue Mountains.
**Select locations:** Mt White, Woy Woy, Galston, Dee Why, Cordeaux Dam, Kurrajong Heights, Springwood, Mt Victoria, Belmore Falls, Kanangra, Penrose.

### Habitat

**Habitat:** Sandy soil near creeks.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Eucalypt open-forest e.g. with *Eucalyptus piperita.*
**Substrate:** Sandy soils on sandstone hillsides and gullies sometimes near wet cliffs, very infertile soils. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations, mid shade.

### Conservation

**Conservation:** Probably adequately conserved.
Conserved in Western Sydney (Benson & McDougall 1991).

## **Xanthosia tridentata** APIACEAE

Rock Xanthosia

### Life history

**Growth form:** Diffuse perennial shrub to 30 cm high.
**Vegetative spread:** No.
**Longevity:** Less than 20 years (D. Keith pers. comm.).
**Primary juvenile period:** Less than 6 years (Benson 1985, D. Keith pers. comm.).
**Flowers:** Pale green–cream, September–February, peak November.
**Fruit/seed:** Fruit: schizocarp (of 2, 1-seeded mericarps), 3 mm long.
**Dispersal, establishment & growth:** Diaspore: fruit, ant-dispersed (Rice & Westoby 1981).
**Fire response:** Killed and re-establish from soil-stored seed (D. Keith pers. comm.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** **CC** SC **CT** ST; Vic., Tas., W.A.
**Distribution Sydney area:** Widespread — coastal and Lower Blue Mountains.
**Select locations:** Mt White, Oxford Falls, Pennant Hills, Manly, Kentlyn, Wilton, Mt Keira, Bilpin, Springwood, Woodford.

### Habitat

**Habitat:** Rocky sandstone hillsides.
**Altitude:** 0–600 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional.
**Vegetation:** Eucalypt woodland and scrub e.g. with *Eucalyptus gummifera, E. sieberi, E. racemosa, E. piperita, Angophora costata* sometimes in regrowth vegetation.
**Substrate:** Rocky sandstone hillsides or sides of gullies, grey, sandy, very infertile soils, sometimes damp. Water table mostly low, moisture supply intermittent, fresh. Sometimes poorly drained.
**Exposure:** Light–no shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Alyxia ruscifolia APOCYNACEAE

Prickly Alyxia

### Life history

**Growth form:** Erect shrub to 2.5 m high.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** Spring–Autumn.
**Fruit/seed:** Fruit, orange berries 8–11 mm diam, matures in April.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; LHI, Qld, N.T., N.G., Moluccas.
**Distribution Sydney area:** West of Wollongong.
**Select locations:** Goondarrin Creek, west of Wollongong in Water Board Catchment Area (only record in area).

### Habitat

**Habitat:** Rainforest near creek.
**Altitude:** 330–400 m **Annual rainfall:** above 1600 mm
**Typical local abundance:** Occasional, total population probably less than 50 plants.
**Vegetation:** Warm temperate rainforest, simple Notophyll Vine-forest e.g. *Ceratopetalum–Acmena–Doryphora* association.
**Substrate:** Upper Narrabeen Group geology. Soil fertile.
**Exposure:** Southern aspect.

### Conservation

**Conservation:** Localised disjunct population, southern limit; previous southern record Willams River. Most of the rainforest in the area was visited but this was the only location where the species was seen; the species has not yet been seen anywhere else in Illawarra (K. Mills 1982 pers. comm.). Regionally rare in Illawarra region (Mills 1988).

## Mandevilla laxa * APOCYNACEAE

Chilean Jasmine

### Life history

**Growth form:** Woody climber with milky latex.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** November–January.
**Fruit/seed:** Fruit: follicle 25–40 cm long, matures Autumn. Seed dispersed in late Autumn (Rowell 1970).
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Bolivia & Argentina, introduced as garden plant.
**Botanical subregions:** NC CC NWS.
**Distribution Sydney area:** Grown in gardens and naturalised in a few places around Sydney.
**Select locations:** Northbridge (1952), Ku-ring-gai Chase (rare).

### Habitat

**Habitat:** Creekbanks.
**Altitude:** 0–100 m **Annual rainfall:** above 1100 mm
**Typical local abundance:** Rare.
**Vegetation:** Amongst *Rubus discolor.*
**Substrate:** Alluvial soil from sandstone, fertile.
**Exposure:**

### Conservation

**Conservation:** Probably unlikely to become a major weed.

## Melodinus australis APOCYNACEAE

Southern Melodinus

### Life history

**Growth form:** Tall woody climber with twining stems, milky latex, and yellow flowers.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Summer–autumn.
**Fruit/seed:** Fruit: orange berry, 4–5 cm long with seeds embedded in pulp.
**Dispersal, establishment & growth:** Diaspore: berry, probably bird-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC; Qld.
**Distribution Sydney area:** Coast, Gosford to Illawarra.
**Select locations:** Gosford, Mt Avoca, Bola Creek, Mt Keira, Mt Kembla, Dapto West (southern limit).

### Habitat

**Habitat:** Gullies.
**Altitude:** 0–100 m **Annual rainfall:** above 1600 mm
**Typical local abundance:** Frequent.
**Vegetation:** Warm temperate rainforest.
**Substrate:** High nutrient soils. Clay soils from ? alluvium, soil fertile.
**Exposure:**

### Conservation

**Conservation:** Rare, southern limit Mt Kembla. Conservation status unknown.

## Nerium oleander * APOCYNACEAE

Oleander

### Life history

**Growth form:** Shrub to 4 m high with watery sap.
**Vegetative spread:** Recorded suckering from roots at Ingleside (L. Schaeper pers. comm.)
**Longevity:** ? 30–40 years.
**Primary juvenile period:**
**Flowers:** Pink, reddish or white, November–April.
**Fruit/seed:** Fruit: follicles 8–15 cm long, 5–10 mm wide; seeds numerous, tufted.
**Dispersal, establishment & growth:** Diaspore: seed, wind and probably water-dispersed.
**Fire response:**
**Interaction with other organisms:** Reports of accidental poisoning of humans and stock, causing death (Hurst 1942). Contains digitalis-like glycosides, proved too toxic for medical use, causes increased contactility of heart muscle; all parts toxic to animals, particularly the seeds (Blackwell 1990). Smoke should not be inhaled if plants burnt (Harden 1992). Unpalatable to stock (Everist 1974).

### Distribution

**Status/origin:** Exotic, native to Mediterranean. Cultivated as an ornamental.
**Botanical subregions:** NC CC NWS.
**Distribution Sydney area:** Only naturalised record, Deep Creek (Narrabeen 1980); widely planted.
**Select locations:** Deep Creek (Narrabeen 1980).

### Habitat

**Habitat:** Roadside.
**Altitude:** 0–40 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Naturalised status not confirmed — often planted in semi-wild sites.

## Parsonsia brownii — APOCYNACEAE

Mountain Silkpod

### Life history

**Growth form:** Tall climber.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** November–April.
**Fruit/seed:** Fruit: capsule 5–10 cm long, separating to release numerous plumed seeds, mature January–April (limited data).
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC SC NT CT ST; Vic., Tas.
**Distribution Sydney area:** Upper Blue Mountains, Robertson area.
**Select locations:** Mt Coricudgy, Mt Wilson, Blackheath, Robertson Nature Reserve, Fitzroy Falls, Kangaroo Valley.

### Habitat

**Habitat:** Rainforest or moist gullies near waterfalls.
**Altitude:** 500–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Frequent.
**Vegetation:** Warm temperate rainforest e.g. with *Doryphora*.
**Substrate:** Basalt soils or enriched sandstone, soil very fertile–fertile. Water table mostly high, moisture supply continuous, fresh.
**Exposure:**

### Conservation

**Conservation:** Conservation status unknown.

## Parsonsia lanceolata — APOCYNACEAE

### Life history

**Growth form:** Climber with stems to 4 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** March (one record).
**Fruit/seed:** Fruit: capsule 6–12 cm long separating to release numerous plumed seeds. Green capsule recorded in March.
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT NWS CWS NWP; Qld.
**Distribution Sydney area:** Landsdowne is only record for the Sydney area.
**Select locations:** Lansdowne Park, Lansdowne (1992).

### Habitat

**Habitat:** Woodland.
**Altitude:** 50 m **Annual rainfall:** 1000 mm
**Typical local abundance:**
**Vegetation:** Mid strata in Cumberland Plain Woodland e.g. *Eucalyptus moluccana, E. tereticornis.*
**Substrate:** Clay soil from Wianamatta Shale, fertile. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Only one locality, southern limit, not protected. Relatively large number of old records (outside CC) suggests that species was more common in 1890–1920 period possibly a result of clearing forest and opening up to light. Subseqent rarity suggests grazing and loss of habitat have reduced the relative occurrence.

## **Parsonsia sp. A** (incorr. P. leichhardtii) APOCYNACEAE

Black Silkpod

### Life history

**Growth form:** Twiner to 5 m high, with watery sap.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** February–July.
**Fruit/seed:** Fruit: capsule 7–10 cm long, separating to release numerous plumed seeds, matures Oct.
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC NT CT.
**Distribution Sydney area:** Blue Mountains, Illawarra, rare.
**Select locations:** Mt Wilson, Newnes, Mountian Lagoon, Berambing, Upper Avon Dam.

### Habitat

**Habitat:** Deep gullies.
**Altitude:** 0–1000 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Occasional–rare.
**Vegetation:** Warm temperate rainforest e.g. *Ceratopetalum–Doryphora.*
**Substrate:** Basalt or enriched sandstone, soil very fertile–fertile, fresh.
**Exposure:**

### Conservation

**Conservation:** Upper Avon Dam — southern limit. Conservation status unknown.

## **Parsonsia straminea** var. **straminea** APOCYNACEAE

Common Silkpod

### Life history

**Growth form:** Tall woody vine climbing by adventitious roots and twining stems.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** November-June, peak February.
**Fruit/seed:** Fruit: capsule 10–20 cm long, separating to release numerous plumed seeds. Matures September–December. Seeds dispersed by wind.
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind dispersed (Westoby *et al.* 1990). Plants grow vigorously in Autumn.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CT CWS; Qld.
**Distribution Sydney area:** Coast and eastern edge of Tablelands. Widespread.
**Select locations:** Catherine Hill Bay, Calga, Narrabeen, Bola Creek, Otford, Albion Park, Cambewarra, Richmond, Mountain Lagoon, Mt Coricudgy, Belmore Falls.

### Habitat

**Habitat:** Levee banks, fertile sites.
**Altitude:** 0–900 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Rainforest or edges of rainforest, sometimes in floodplain forest.
**Substrate:** Basalt soil, sometimes sandy soil, very fertile–fertile.
Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered, mid shade.

### Conservation

**Conservation:** Probably adequately conserved.

## Vinca major * APOCYNACEAE

Periwinkle

### Life history

**Growth form:** Trailing herbaceous perennial with blue–purple flower and milky sap.
**Vegetative spread:** Trailing stems to 1 m long which may root at tips (Auld & Medd 1987).
**Longevity:**
**Primary juvenile period:**
**Flowers:** Spring–summer.
**Fruit/seed:** Fruit: follicle 5 cm long usually in pairs, seeds not winged.
**Dispersal, establishment & growth:** Diaspore: seeds ? — also stem segments with roots, dispersed by humans in dumped garden waste.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Mediterranean. Frequently cultivated as an ornamental.
**Botanical subregions:** NC CC SC NT CT ST SWS SWP; LHI, Vic., Tas.
**Distribution Sydney area:** Widespread.
**Select locations:** Douglas Park, Katoomba.

### Habitat

**Habitat:** Disturbed areas, riverbanks.
**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Rare–frequent.
**Vegetation:**
**Substrate:** Riverbank on sandstone.
**Exposure:**

### Conservation

**Conservation:** Occasionally naturalised near habitation.

## Ilex aquifolium * AQUIFOLIACEAE

Holly

### Life history

**Growth form:** Shrub or small tree to 10 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Autumn.
**Fruit/seed:** Bright red drupe, 7–10 mm diam. Fruit weight 0.3 g, 3 seeds per fruit (extra data on seed and pulp characteristics in French 1991).
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to Europe, introduced as ornamental.
**Botanical subregions:** CT; S.A.
**Distribution Sydney area:** Occasionally naturalised in Blue Mountains.
**Select locations:** Mt Wilson (1896, 1929).

### Habitat

**Habitat:** Naturalised on edge of rainforest gullies.
**Altitude:** 900 m **Annual rainfall:** 1200 mm
**Typical local abundance:**
**Vegetation:** Rainforest.
**Substrate:** Basalt. Very fertile soil.
**Exposure:**

### Conservation

**Conservation:** Localised exotic, current situation not known.

## Astrotricha crassifolia — ARALIACEAE

### Life history

**Growth form:** Shrub to 2 m high.
**Vegetative spread:** Capable of root suckering, root connections weak.
**Longevity:** Probably indefinite.
**Primary juvenile period:**
**Flowers:** September–December.
**Fruit/seed:** Fruit: 2 mericarps, not winged, mature November–December.
**Dispersal, establishment & growth:**
**Fire response:** Resprouts from rootstock and root suckers.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC.
**Distribution Sydney area:** Gosford area and Woronora — rare.
**Select locations:** Warrah, Mt Wondabyne (Brisbane Water NP), Patonga, Woronora Dam, Hacking River.

### Habitat

**Habitat:** Dry ridgetop.
**Altitude:** 0–300 m **Annual rainfall:** above 1200 mm
**Typical local abundance:** Rare
**Vegetation:** Shrubby woodland e.g. with *Hakea, Banksia, Xylomelum.*
**Substrate:** Shallow to deep sandy loam from sandstone. Very infertile soil. Water table permanently low. moisture supply intermittent, fresh.
**Exposure:** In light shade.

### Conservation

**Conservation:** Rare local endemic with restricted distribution and uncommon at these sites, possibly should be on national rare species list. Condition of population on Hacking River, presumably in Royal N.P., not known.

## Astrotricha floccosa — ARALIACEAE

### Life history

**Growth form:** Shrub to 3 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** September–December, peak October.
**Fruit/seed:** Fruit: 2 mericarps, not winged, mature October–December, peak October.
**Dispersal, establishment & growth:** Diaspore: seed, seedling recruitment mainly after fire. Plants, presumably from post fire recruitment, conspicuous 3–5 years after fire.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC.
**Distribution Sydney area:** Coast and adjacent plateaus north of Port Jackson, also Casula. Gosford–Port Jackson, Lower Blue Mountains on monocline.
**Select locations:** Pearl Beach, Patonga, Ku-ring-gai Chase NP, Bayview, Narrabeen, Mosman, Grassy Hill, Hawkesbury Lookout, Springwood.

### Habitat

**Habitat:** Hillsides and often steep rocky slopes.
**Altitude:** 0–400 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Dry eucalypt forest e.g. with *Eucalyptus umbra–E. paniculata.*
**Substrate:** Sandy loam from sandstone often influenced by Narrabeen Group Shales or Shale lenses. Infertile soil. Water table permanently low, well drained, moisture supply intermittent, fresh.
**Exposure:** In exposed situations, light shade.

### Conservation

**Conservation:** Local Sydney endemic probably well conserved.

## Astrotricha latifolia ARALIACEAE

### Life history

**Growth form:** Shrub to 3 m high. Forms between *A. floccosa* and *A. latifolia* occur.
**Vegetative spread:** Probably not.
**Longevity:** Probably short, less than 10 years.
**Primary juvenile period:**
**Flowers:** November–December, peak October.
**Fruit/seed:** Fruit: 2 mericarps, not winged, mature November–December, peak December.
**Dispersal, establishment & growth:** Germination possibly associated with soil disturbance, plants reported from road verge disturbed 4–5 years previously.
**Fire response:** Probably killed.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC NT **CT**; Qld.
**Distribution Sydney area:** Widespread, coastal sandstone plateaus north of Sydney and lower Blue Mountains and south west.
**Select locations:** Olney, Patonga, Cheltenham, Kentlyn, Nortons Basin, Kangaroo Valley, Minnamurra Falls, Boorai Creek, Hawkesbury Lookout, Mt Irvine.

### Habitat

**Habitat:** Gullies or lower hillslopes.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 m
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Open-forest. Moist eucalypt forest e.g. with *Syncarpia glomulifera, Eucalyptus saligna, E. pilularis*, sometimes in rainforest.
**Substrate:** Colluvial sandy soils on sandstone, basalt or shale, very fertile–infertile soil. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** In sheltered situations, mid–light shade.

### Conservation

**Conservation:** Conservation status unknown.

## Astrotricha ledifolia ARALIACEAE

### Life history

**Growth form:** Shrub 1–2 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** November–December, peak November.
**Fruit/seed:** Fruit: 2 mericarps, not winged, mature November–January, peak November.
**Dispersal, establishment & growth:** Germination possibly associated with soil disturbance.
**Fire response:** Regrowth only from surviving rootstocks, no seedlings recorded less than 1 year after fire (Purdie 1977).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** **CT** ST; Vic.
**Distribution Sydney area:** Upper Blue Mountains, Bathurst area, Wingello, rare.
**Select locations:** West of Bell, Clarence, Sunny Corner, between Bathurst and Orange, Wombeyan Caves, Wingello.

### Habitat

**Habitat:** Stony soils, sometimes disturbed ground e.g. edge of road cutting.
**Altitude:** above 700 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Occasional.
**Vegetation:** Eucalypt open-forest.
**Substrate:** Stony or sandy soil, or deep loam, sometimes from sandstones. Soil fertile–infertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Exposed situations in light–no shade.

### Conservation

**Conservation:** Rare in the area, northern limit Clarence.
Conservation status unknown.

## **Astrotricha linearis** ARALIACEAE

### Life history

**Growth form:** Shrub to 1.5 m high, branchlets covered with a close indumentum.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** October–December.
**Fruit/seed:** Fruit: 2 mericarps, not winged.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** SC CT ST CWS: Vic.
**Distribution Sydney area:**
**Select locations:** North from Bathurst (1822).

### Habitat

**Habitat:**
**Altitude:** 0–800 m **Annual rainfall:** above 900 mm
**Typical local abundance:**
**Vegetation:** Heath, dry eucalypt woodland.
**Substrate:** Sandstone.
**Exposure:**

### Conservation

**Conservation:** Only record for Sydney area is an early collection by Allan Cunningham.

## **Astrotricha longifolia** (inland form) ARALIACEAE

### Life history

**Growth form:** Shrub to 3 m high.
**Vegetative spread:** No.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** November–January.
**Fruit/seed:** Fruit: 2 mericarps, not winged.
**Dispersal, establishment & growth:**
**Fire response:** Probably resprouts at ground level or below.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NT CT ST NWS NWP SWP; Qld.
**Distribution Sydney area:** Upper Blue Mountains; populations intermediate between inland and coastal forms occur in northern Sydney e.g. Galston Gorge and lower Blue Mountains (Harden 1992)
**Select locations:** Newnes Plateau, Bell–Lithgow Road, Burragorang Lookout, Hilltop.

### Habitat

**Habitat:** Ridgetops or sides of valleys.
**Altitude:** 600–1100 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Eucalypt open-forest e.g. with *Eucalyptus macrorhyncha* or moister conditions with *Callicoma* thickets.
**Substrate:** Gullies on sandstone. Stony loam to sandy clay from sandstone, soil infertile. Water table mostly low, moisture supply possibly continuous, fresh.
**Exposure:** In sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## **Astrotricha obovata** (A. sp. A) ARALIACEAE

### Life history

**Growth form:** Erect to spreading shrub 0.6–1.0 m high, suckering from base.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** November–December.
**Fruit/seed:** Fruit: 2 mericarps, not winged, matures December.
**Dispersal, establishment & growth:** Recorded from disturbed sites near roads.
**Fire response:** Probably resprouts.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC.
**Distribution Sydney area:** Northern Blue Mountains.
**Select locations:** Howes Valley, Gospers Mtn, Colo Heights, Putty, Bucketty, Mogo Creek, Kulnura.

### Habitat

**Habitat:** Sandy soil sometimes disturbed sites.
**Altitude:** 0–700 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Dry Eucalypt woodland e.g. with *Angophora costata, A. bakeri.*
**Substrate:** Sandy soil from sandstone. Sometimes rocky slope. Very infertile soil. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Probably adequately conserved. Southern limit Colo Heights.

## **Cephalaralia cephalobotrys** ARALIACEAE

Climbing Panax

### Life history

**Growth form:** Climber, often quite tall or scrambling shrub.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** March.
**Fruit/seed:** Fruit: succulent, black drupe, 5 mm diameter, matures May–July.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CT; Qld.
**Distribution Sydney area:** Mainly coast, rare.
**Select locations:** Mt Coricudgy, Mountain Lagoon, Gosford, Bulli, Macquarie Pass, Barren Grounds, Minnamurra Falls.

### Habitat

**Habitat:**
**Altitude:** 0–1100 m **Annual rainfall:** above 1100 mm
**Typical local abundance:** Rare.
**Vegetation:** Warm temperate rainforest e.g. with *Doryphora.*
**Substrate:** Basalt or talus slope, soil very fertile–fertile. Water table mostly high, moisture supply intermittent, fresh.
**Exposure:** In mid shade.

### Conservation

**Conservation:** Rare, conservation status unknown.

## Hedera helix * ARALIACEAE

English Ivy

### Life history

**Growth form:** Woody climber or creeper to 20 m with aerial roots along stem.
**Vegetative spread:** Capable of rooting from stems and spreading.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** December–March. February–March (Price 1963).
**Fruit/seed:** Fruit 5–10 mm diam, dull to black, matures June–September.
**Dispersal, establishment & growth:** Diaspore: fruit, recorded in regurgitated pellets of Pied Currawong (Buchanan 1989).
**Fire response:**
**Interaction with other organisms:** Fruit reported from pellets of Currawongs (Buchanan 1989). Leaves and fruit poisonous if eaten.

### Distribution

**Status/origin:** Exotic, native to Europe & N Africa. Introduced as an ornamental.
**Botanical subregions:** SC NT CT ST; Vic.
**Distribution Sydney area:** Occasionally naturalised, usually near habitation.
**Select locations:** Wolgan Gap, Mt Wilson (1949), Robertson, Barrengarry Mountain.

### Habitat

**Habitat:** Disturbed sites, usually near habitation.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent.
**Vegetation:** Disturbed areas of rainforest of *Doryphora sassafras*.
**Substrate:** Sandstone, basalt soils, fertile–infertile.
**Exposure:**

### Conservation

**Conservation:** Minor bushland weed.

## Polyscias elegans ARALIACEAE

Celery Wood, Silver Basswood

### Life history

**Growth form:** Tree to 30 m high with a trichotomously branched crown (Floyd 1982), sparingly branched, leaflets aromatic with odour of celery when crushed.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Purple, not scented, April–August.
**Fruit/seed:** Fruit: purple-black succulent berry, 7 mm diameter containing 2 seeds. Matures April–June.
**Dispersal, establishment & growth:** Diaspore: berry, probably bird-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, NG.
**Distribution Sydney area:** Coastal Illawarra, north from Jervis Bay.
**Select locations:** Werong Beach, Otford, Albion Park, Bass Point, Minnamurra Falls.

### Habitat

**Habitat:** Littoral rainforest.
**Altitude:** 0–200 m **Annual rainfall:** above 1400 mm
**Typical local abundance:** Rare.
**Vegetation:** Littoral rainforest e.g. with *Acmena smithii, Cassine australis, Livistona australis.*
**Substrate:** Clay soil from shale strata, marine sands, fertile. On volcanic soils where it develops best but also on poorer sedimentary soils (Floyd 1982). Water table mostly low, moisture supply intermittent, fresh.
**Exposure:**

### Conservation

**Conservation:** Generally uncommon in the area.

## Polyscias murrayi ARALIACEAE

Pencil Cedar, Umbrella Tree

### Life history

**Growth form:** Tree to 24 m high, sparingly branched on upper trunk.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** March–April.
**Fruit/seed:** A succulent berry, 4 mm long, purple-blue when ripe, matures March–June.
**Dispersal, establishment & growth:** Diaspore: berry, probably bird-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC; Qld, Vic.
**Distribution Sydney area:** Coast and Lower Blue Mountains.
**Select locations:** Gosford (Strickland SF), Otford, Macquarie Pass, Jamberoo, Berambing, Bilpin, Woodford.

### Habitat

**Habitat:** Sheltered gullies.
**Altitude:** 0–500 m **Annual rainfall:** above 1100 mm
**Typical local abundance:** Occasional–rare.
**Vegetation:** Warm temperate rainforest e.g. Coachwood, *Sassafras*, *Acmena*, disturbed rainforest.
**Substrate:** Colluvial or alluvial sandy soil in gullies, fertile. Non-saline.
**Exposure:** Sheltered situations.

### Conservation

**Conservation:** Conservation status unknown.

## Polyscias sambucifolia ARALIACEAE

Elderberry Panax

### Life history

**Growth form:** Shrub 1–3 m high. 3 subspecies described in Flora of NSW Vol. 3 (Harden 1992), all recorded for Sydney area.
**Vegetative spread:** Limited vegetative spread possible by root suckers, perhaps 2–3 m.
**Longevity:** Indefintite.
**Primary juvenile period:**
**Flowers:** December–February.
**Fruit/seed:** Succulent drupe 4 mm long, steely blue when ripe. Mature January-February. Fruit weight 0.114 g, 2 seeds per fruit (extra data on seed and pulp characteristics in French 1991).
**Dispersal, establishment & growth:** Diaspore: fruit. Dispersal — vertebrate-adapted (Westoby *et al.* 1990), probably bird-dispersed e.g. Currawongs. Commonly grows on disturbed sites and may persist in disturbed urban bushland. Generally survives cutting at ground level.
**Fire response:** Stems killed and regenerates from basal sprouts and root suckers (Fox 1988).
**Interaction with other organisms:** Fruit reported from regurgitated pellets of Currawongs (Buchanan 1989). Foodplant of moth caterpillar *Cryptoptila australana* (Coupar 1992).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST; Qld, Vic., Tas*.
**Distribution Sydney area:** Widespread, Coast and Blue Mountains.
**Select locations:** Gosford, Narrabeen, Neilsen Park, Liverpool, Mt Coricudgy, Burralow Creek, Clarence, Colo Vale, Mt Flora, Bundanoon Creek.

### Habitat

**Habitat:** Forest.
**Altitude:** 0–1000 m **Annual rainfall:** above 900 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Tall open-forest and open-forest, in or on the margins of rainforest.
**Substrate:** Usually on heavier soils or in gullies.
**Exposure:** Sheltered, mid-shade.

### Conservation

**Conservation:** Probably adequate overall, though vulnerable in Western Sydney (Benson & McDougall 1991).

## **Tetrapanax papyrifer** * ARALIACEAE

Rice Paper Plant

### Life history

**Growth form:** Shrub to 4 m high.
**Vegetative spread:** Readily suckers from stolons to form clumps.
**Longevity:** Indefinite.
**Primary juvenile period:**
**Flowers:** May–June (Price 1963).
**Fruit/seed:** Drupe.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:** Stem pith used in Asia for making rice-paper.

### Distribution

**Status/origin:** Exotic, native to E Asia, introduced as an ornamental.
**Botanical subregions:** CC ?CT.
**Distribution Sydney area:** Sporadically naturalised as a garden escape.
**Select locations:** Austinmer, Kangaroo Valley (1938).

### Habitat

**Habitat:** Old gardens.
**Altitude:** 0–200 m **Annual rainfall:** above 1200 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Sporadically naturalised as a garden escape but not clear whether spread is by seed or just by stolon.

## **Araujia sericiflora** * (A. hortorum) ASCLEPIADACEAE

Moth Plant

### Life history

**Growth form:** Twiner with milky juice.
**Vegetative spread:** No
**Longevity:** ?10–20 years.
**Primary juvenile period:**
**Flowers:** December–March, peak January–February.
**Fruit/seed:** Fleshy, pear-shaped fruits 5–8 cm long splitting to release numerous seeds, mature April–May. Seeds with an apical tuft of long silky hairs (Hurst 1942).
**Dispersal, establishment & growth:** Diaspore: plumed seed dispersed by wind; and possibly water-dispersed (Carr *et al.* 1992).
Readily establishes in moist soil in low light conditions, below-canopy species.
**Fire response:** Probably killed.
**Interaction with other organisms:** Suspected of being poisonous to cattle and poultry (Auld & Medd 1987). Foodplant of butterfly caterpillar *Danaus plexippus* (Coupar 1992). Moths attracted by the scent (phenylacetaldehyde) are occasionally trapped by the proboscis in a slit of the anther and die a lingering death (Common 1990). Seed poisonous to poultry (Hurst 1942).

### Distribution

**Status/origin:** Exotic, native to Peru. Probably introduced as garden ornamental.
**Botanical subregions:** NC CC SC NWS SWP; Qld, Vic.
**Distribution Sydney area:** Coast and Cumberland Plain.
**Select locations:** Early records Kiama (1908), Windsor (1911), Ashfield (1917), Eastwood, Richmond, Bass Hill, Menangle, Kangaroo Valley, Berry, Nowra.

### Habitat

**Habitat:** Naturalised climber on fences and shrubs, banks of creeks or rivers, remnant bush or waste land.
**Altitude:** 0–200 m **Annual rainfall:** 700–1400 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Rainforest, wet eucalypt open-forest, woodland.
**Substrate:** Clay soils, commonly from Wianamatta Shale, floodplains. Soil very fertile–fertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered, light shade.

### Conservation

**Conservation:** Increasingly common weed in remnant bushland, particularly in unburnt sites, growing over native shrubs and producing copious amounts of seed.

## Asclepias curassavica * ASCLEPIADACEAE

Blood Flower

### Life history

**Growth form:** Perennial herb to 1 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Red and orange-yellow, February–April.
**Fruit/seed:** Fruit: follicle 6–9 cm long, matures April, releasing numerous plumed seeds. Seeds 5-6 mm long (Hurst 1942).
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:** Food-plant for Wanderer Butterfly (Clyne 1990). Poisonous to guinea pigs, sheep and cattle (Hurst 1942).

### Distribution

**Status/origin:** Exotic, native to Central America. Garden escape.
**Botanical subregions:** NC CC; Qld, S.A., W.A.
**Distribution Sydney area:** Suburban area.
**Select locations:** Peakhurst (1966), Balmain (1974).

### Habitat

**Habitat:** Neglected garden, paddock.
**Altitude:** 0–100 m **Annual rainfall:** above 1000 mm
**Typical local abundance:** Rare.
**Vegetation:** Neglected garden, paddock.
**Substrate:** Clay soil from Wianamatta Shale. Soil fertile, non-saline.
**Exposure:**

### Conservation

**Conservation:** Rarely naturalised in Sydney area.

## Cynanchum elegans ASCLEPIADACEAE

### Life history

**Growth form:** Glabrous climber with cork-woody bark.
**Vegetative spread:** Resprouts from rootstock after cutting (NPWS 1992) but the extent of any spread is unknown.
**Longevity:** Probably long-lived.
**Primary juvenile period:**
**Flowers:** August–February.
**Fruit/seed:** Fruit: pointed follicle 4–6 cm long with up to 25 seeds. Seeds 6 mm long with tuft of hair at one end, mature December–May.
**Dispersal, establishment & growth:** Diaspore: seed, probably wind-dispersed.
**Fire response:** Not known, but may resprout.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC CWS.
**Distribution Sydney area:** Cobbitty–Jamberoo.
**Select locations:** Native Vineyard (Cobbitty ), Razorback, Charcoal Creek (Wollongong), Berkely Hills, Mt Keira, Balgownie, West Dapto, Jamberoo.

### Habitat

**Habitat:** Dry rainforest.
**Altitude:** 0–200 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Occasional — range from 1–28 individuals per site in Illawarra (NPWS 1992).
**Vegetation:** Dry vine-thicket or dry rainforest e.g. with *Streblus brunonianus, Guioa semiglauca.*
**Substrate:** Shale amphitheatre (Cobbitty). Skeletal clay loam on volcanics (Illawarra). Fertile soil. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** No shade.

### Conservation

**Conservation:** Coded 2ECi by Briggs & Leigh (1988).
Regarded as locally extinct (Benson & McDougall 1991) but rediscovered at Cobbitty (NPWS 1992). Recently discovered at Wollongong (NPWS 1992). Threatened by urban development and grazing.

## **Gomphocarpus fruticosus** * (Asclepias fruticosa) ASCLEPIADACEAE

Narrow-leaved Cotton Bush

### Life history

**Growth form:** Shrub 0.3–2 m high, branches pubescent.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, August–February.
**Fruit/seed:** Fruit: large inflated follicle covered with soft green spines, splitting to release plumed seeds in February–December.
**Dispersal, establishment & growth:** Diaspore: seed. Wind dispersed, possibly also water dispersed.
**Fire response:**
**Interaction with other organisms:** Food-plant for caterpillars of Wanderer Butterfly (Clyne 1990). Poisonous to guinea pigs and sheep but unpalatable (Hurst 1942).

### Distribution

**Status/origin:** Exotic, native to South Africa. Introduced to Sydney before 1844 as an unsuccessful source of 'cotton'. Allan Cunningham reported in his diary on 12.1.1816 '*Gomphocarpus fruticosus* introduced into this Colony, many years ago, is now becoming a pest to the farmer, over running his lands, to a very considerable extent'. It grew wild in 'great quantities' at Homebush and by the roadsides around Sydney (Meredith 1844). Now relatively uncommon, could its original abundance here have been reduced by the introduction of the Wanderer Butterfly in the nineteenth century? (D. Benson).
**Botanical subregions:** NC **CC** SC **CT** NWS CWS; Qld, Vic., S.A., W.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Yengo Ck, Calga, Grose Vale (1912), Luddenham, Machins Crater, Glenbrook, Lane Cove NP, Ku-ring-gai Chase NP, Kurnell, Faulconbridge, Campbelltown, Macquarie Pass, Wombeyan Caves.

### Habitat

**Habitat:** Various, cleared weedy sites, roadside.
**Altitude:** 0–800 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Woodland, open-forest, cleared weedy sites, behind saltmarsh.
**Substrate:** Various soils from sandstone, shale, volcanic necks. Soil fertile–infertile, water table mostly low–permanently low, moisture supply intermittent, fresh.
**Exposure:** Shade: light–none.

### Conservation

**Conservation:** Naturalised weed of cultivated sites, not invasive of bush.

## Gomphocarpus physocarpus * ASCLEPIADACEAE

Balloon Cotton Bush

### Life history

**Growth form:** Shrub 0.5–2 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** White, December–May.
**Fruit/seed:** Fruit: large inflated follicle covered with soft green spines and splitting to release plumed seeds in December–January.
**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:** Possibly hybridizes with *G. fruticosus* (Harden 1992) Food-plant for caterpillars of Wanderer Butterfly (Clyne 1990). Poisonous to sheep and cattle (Hurst 1942), but unpalatable and rarely grazed.

### Distribution

**Status/origin:** Exotic, native to S Africa. Occasionally naturalised.
**Botanical subregions:** NC CC CWS; Qld, S.A.
**Distribution Sydney area:** Widespread.
**Select locations:** Goulburn River, Woy Woy (1912), Ku-ring-gai Chase NP, Georges River (1910), Casula, Menangle.

### Habitat

**Habitat:** Roadsides, waste places and pastures.
**Altitude:** 0–100 m **Annual rainfall:** Above 600 mm
**Typical local abundance:**
**Vegetation:**
**Substrate:**
**Exposure:**

### Conservation

**Conservation:** Occasionally naturalised exotic.

## Marsdenia flavescens ASCLEPIADACEAE

Hairy Milk Vine

### Life history

**Growth form:** Tall twiner with slightly yellowish, milky latex.
**Vegetative spread:** No.
**Longevity:** Probably about 10–50 years.
**Primary juvenile period:**
**Flowers:** December–February.
**Fruit/seed:** Fruit is a narrow follicle 4–6 cm long, splitting to release plumed seeds in May.
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind-dispersed (Westoby *et al.* 1990).
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT; Qld, Vic.
**Distribution Sydney area:** Coast Western Blue Mountains.
**Select locations:** Razorback, Albion Park, Macquarie Pass, Cambewarra, Kanangra.

### Habitat

**Habitat:** Rocky sheltered sites.
**Altitude:** 0–1000 m **Annual rainfall:** 700–1200 mm
**Typical local abundance:** Occasional.
**Vegetation:** In vine thicket and dry rainforest.
**Substrate:** Sandstone, possibly limestone. Soil fertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; mid shade.

### Conservation

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

## Marsdenia rostrata — ASCLEPIADACEAE

Common Milk Vine

### Life history

**Growth form:** Robust twiner with copious milky latex.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** October–January.
**Fruit/seed:** Fruit is a broad pointed follicle about 5 cm long, splitting to release plumed seeds.
**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:** Poisonous to pigs, sheep and cattle but unpalatable when fresh; leaves toxic when dry or fresh (Hurst 1942).

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC NT CT ST CWS; LHI, Qld, Vic.
**Distribution Sydney area:** Most common along coast.
**Select locations:** Kincumber, Collaroy, Cobbitty, Razorback, Albion Park, Bass Point, Fitzroy Falls, Saddleback, Glen Alice.

### Habitat

**Habitat:** Sheltered gullies.
**Altitude:** 0–800 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent.
**Vegetation:** Rainforest either *Doryphora–Ceratopetalum* or drier with *Streblus, Notelaea.*
Near the sea in sheltered places.
**Substrate:** Deep sandy soils, generally from sandstone, fertile–infertile. Non-saline.
**Exposure:** Sheltered situations; mid shade.

### Conservation

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

## Marsdenia suaveolens — ASCLEPIADACEAE

Scented Marsdenia

### Life history

**Growth form:** Variable in habit, twining when in forests, often a small shrub when in heath.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** October–February, peak December.
**Fruit/seed:** Fruit is a pointed follicle 5–10 cm long, splitting to release plumed seeds in August–January.
**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed.
**Fire response:** Resprouts. Plants 20 cm high fruiting prolifically 5 months after very high intensity fire in Bantry Bay (June 1991, L.McD.).
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC CC SC CT.
**Distribution Sydney area:** Widespread on sandstone plateaus.
**Select locations:** Cowan Creek, Beecroft, Kentlyn, Woronora River, Culoul Range, Mountain Lagoon, Mulgoa, Bargo, Currant Mountain Gap, Wentworth Falls, Bundanoon.

### Habitat

**Habitat:** Sandstone gullies.
**Altitude:** 0–1000 m **Annual rainfall:** above 800 mm
**Typical local abundance:** Frequent.
**Vegetation:** Moist eucalypt forest e.g. with *Eucalyptus pilularis, Syncarpia glomulifera, Eucalyptus piperita.*
**Substrate:** Sandy alluvial soil from sandstone, infertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Sheltered situations; mid shade.

### Conservation

**Conservation:** Conserved in Western Sydney (Benson & McDougall 1991).
Probably adequately conserved.

## **Marsdenia viridiflora** (Leichhardtia leptophylla) ASCLEPIADACEAE

Native Pear

### Life history

**Growth form:** Woody twiner with potato-like tuber up to 10 cm diameter.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** November.
**Fruit/seed:** Fruit: ovoid follicle 4–8 cm long, splitting to release plumed seeds. Mature in Autumn.
**Dispersal, establishment & growth:** Diaspore: plumed seed, wind-dispersed.
**Fire response:** May resprout.
**Interaction with other organisms:** Aborigines ate immature fruit (baked) and tubers.

### Distribution

**Status/origin:** Native.
**Botanical subregions:** CC NWS CWS; Qld.
**Distribution Sydney area:** Western Sydney, particularly Fairfield area, rare.
**Select locations:** Chester Hill, Villawood, Smithfield, Lansdowne Park, Rooty Hill (1914), Razorback southern limit.

### Habitat

**Habitat:** Open areas in remnant shale woodland.
**Altitude:** 0–100 m **Annual rainfall:** 900–1000 mm
**Typical local abundance:** Rare.
**Vegetation:** *Themeda* grassland with e.g. *Eucalyptus tereticornis, Bursaria spinosa, Themeda.*
**Substrate:** Gravelly shale, fertile soil from Wianamatta Shale. Water table permanently low, moisture supply intermittent, fresh.
**Exposure:** No shade.

### Conservation

**Conservation:** Rare species needing protection.
Vulnerable in Western Sydney (Benson & McDougall 1991). All Cumberland Plain sites now lost except Lansdowne and perhaps Razorback. Should probably be on rare and endangered list.

## **Tweedia coerulea** * (Oxypetalum coeruleum) ASCLEPIADACEAE

### Life history

**Growth form:** Stiff herb or subshrub to 1 m high.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:**
**Fruit/seed:** Fruit: follicle 9–13 cm long with plumed seeds.
**Dispersal, establishment & growth:**
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Exotic, native to America, introduced as an ornamental.
**Botanical subregions:** NC CC SC NT NWS CWS SWS; Qld.
**Distribution Sydney area:** Grown as an ornamental, sometimes naturalised.
**Select locations:** Limited data, no specimens found in Herbarium.

### Habitat

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

### Conservation

**Conservation:** Impact unknown.

## Tylophora barbata — ASCLEPIADACEAE

Bearded Tylophora

### Life history

**Growth form:** Slender woody climber.
**Vegetative spread:** No.
**Longevity:**
**Primary juvenile period:**
**Flowers:** September–May. November–February (Forster 1992).
**Fruit/seed:** Fruit: slender follicle 5–7 cm long, rarely seen, seeds plumed. Matures March. Seed 5–7 mm long, c. 3 mm wide; coma c. 25 mm long (Forster 1992).
**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed (Westoby *et al.* 1990).
**Fire response:** Probably resprouts.
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC** SC **CT** ST; Vic.
**Distribution Sydney area:** Restricted to coastal areas (Forster 1992).
**Select locations:** Lovetts Bay, Homebush Bay, Ingleburn, Douglas Park, Mt Kembla, Shellharbour, Kangaroo Valley, Mt Coricudgy, Mt Tomah, Wildes Meadow.

### Habitat

**Habitat:** Sheltered moist gullies.
**Altitude:** 0–1000 m **Annual rainfall:** above 700 mm
**Typical local abundance:** Frequent–occasional.
**Vegetation:** Moist open-forest e.g. with *Syncarpia glomulifera* and rainforest.
**Substrate:** Sandy loam from shale-enriched sandstone or clayey soil from breccia and basalt, skeletal soil from slate, very fertile–fertile. Water table mostly low, moisture supply intermittent, fresh.
**Exposure:** Mid–light shade.

### Conservation

**Conservation:** Probably well-conserved. Conserved in Western Sydney (Benson & McDougall 1991). Commonly encountered — not rare, endangered or threatened at this stage (Forster 1992).

## Tylophora woollsii — ASCLEPIADACEAE

### Life history

**Growth form:** Slender woody climber.
**Vegetative spread:**
**Longevity:**
**Primary juvenile period:**
**Flowers:** Probably April. Flowers have been recorded in March (Forster 1992).
**Fruit/seed:** Fruit slender follicle to 7.5 cm long, with plumed seeds. Seed c. 7 mm long, 2 mm wide; coma c. 1 cm long (Forster 1992).
**Dispersal, establishment & growth:** Diaspore: seed, wind-dispersed.
**Fire response:**
**Interaction with other organisms:**

### Distribution

**Status/origin:** Native.
**Botanical subregions:** NC **CC**.
**Distribution Sydney area:** Known from only two collections. 'Parramatta' collected in the 1860's and Clouds Creek near Dorrigo in 1964 (ouside Sydney area) (Leigh, Boden & Briggs 1984).
**Select locations:** Only collection in area is TYPE collection from Parramatta by William Woolls (1869).

### Habitat

**Habitat:** Probably moist eucalypt forest.
**Altitude:** 0–100 m **Annual rainfall:**
**Typical local abundance:**
**Vegetation:** Probably moist eucalypt forest. Rainforest margins (Forster 1992).
**Substrate:** Probably fertile, shale soils.
**Exposure:**

### Conservation

**Conservation:** An extremely rare plant coded 2E– by Briggs & Leigh (1988). Now extinct at Parramatta and probably elsewhere in Western Sydney (Benson & McDougall 1991). Now restricted to north-eastern NSW; suggested coding 3E, an exceptionally rare plant (Forster 1992).

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