Section 1

Biology and threat

Understanding asparagus weeds

Asparagus weeds are hardy plants that thrive in a range of habitats, from moist temperate forests to harsh coastal environments. They grow as vines and scramblers that climb over and smother native herbs, trees and shrubs. Their dense root systems can inhibit native seedling growth and change soil dynamics.

Which *Asparagus* species are weeds in Australia?

Common bridal creeper (*Asparagus asparagoides* (L.) Druce) is the focus of intense control efforts across southern Australia. However, other asparagus species are also weeds of great concern. Seven species of *Asparagus* are recognised as Weeds of National Significance (WoNS): *Asparagus aethiopicus* L., *A. africanus* Lam., *A. plumosus* Baker, *A. scandens* Thunb., *A. declinatus* L., Western Cape bridal creeper (*A. asparagoides* Western Cape form) and common bridal creeper (*A. asparagoides* (L.) Druce).

Several other species of *Asparagus* are also recognised as new and emerging weeds in Australia: *A. falcatus* L., *A. retrofractus* L. and *A. virgatus* Baker. Edible asparagus (*A. officinalis* L.) has also become weedy in some areas.

The only *Asparagus* species that is native to Australia is *A. racemosus* Willd.

Naming asparagus weeds – scientific vs. common names

Using common names for asparagus weeds can be very confusing, as one common name can refer to a number of species, and each species has more than one common name. For example, *A. africanus* and *A. plumosus* can both be called climbing asparagus, and these two species together with *A. scandens* and *A. aethiopicus* can all be called asparagus fern.

Two forms of *A. asparagoides* (bridal creeper) occur in Australia – the common form and Western Cape form. As both of these forms are currently classified with the same scientific name, this manual will refer to each by their common name. See pages 8, 9 and 21 for more information on the two forms.

To avoid confusion, scientific names are used for all species, except bridal creeper, throughout this manual.

Common names associated with each of the key asparagus weeds described in this manual

Asparagus aethiopicus	ground asparagus, basket asparagus, asparagus fern, Sprengeri's fern, bush asparagus, emerald asparagus
Asparagus africanus	climbing asparagus, ornamental asparagus, asparagus fern
Asparagus plumosus	climbing asparagus fern, ferny asparagus
Asparagus scandens	asparagus fern, climbing asparagus, climbing fern, snakefeather
Asparagus declinatus	bridal veil, asparagus fern
Asparagus asparagoides	common bridal creeper, Western Cape bridal creeper, smilax

How did they become weeds?

The asparagus weeds listed as WoNS were introduced to Australia from southern and eastern Africa in the mid to late 1800s mainly for ornamental purposes such as hanging baskets and garden plants. Indeed, *A. aethiopicus* is commonly known as basket asparagus, and the flowers and foliage of *A. declinatus* (bridal veil) and *A. asparagoides* (bridal creeper) were commonly used in weddings. While the weedy asparagus species are no longer traded commercially, several species are still likely to be traded among home gardeners and many are still extremely common in gardens.

Due to their ability to easily disperse and establish in many environments, asparagus weeds have spread from gardens into native bushland where they cause major negative impacts.

Management note: Asparagus weeds can be difficult to control because: a) they generally have large underground reserves, and b) several species have fine or waxy foliage that impede herbicide uptake. After control, active restoration may be necessary because root mats can persist and continue to cause impacts long after plants have been killed. Any new outbreaks should be quickly controlled to ensure extensive root mats do not develop.

What do they look like?

Above ground

Most asparagus weeds have wiry, twining stems that can clamber over native vegetation. Some species (e.g. *A. aethiopicus* and *A. africanus*) have sharp spines along these stems. True leaves are reduced to small bracts or scales, while the branches are modified into leaf-like structures known as cladodes. The cladodes (leaves) vary among species, from very fine and needle-like (e.g. *A. declinatus*) to wide, thick leaf-like structures (e.g. *A. asparagoides*). The above ground foliage

Shauna Potter

Needle-like 'leaves' of A. declinatus compared to thick 'leaves' of A. asparagoides

may either dry off each summer or stay alive year round, depending on the species or climatic conditions. For example, the above ground foliage of *A. declinatus* and both forms of bridal creeper generally dies back each summer and re-sprouts the following autumn but, in cool, moist conditions, some plants may retain foliage all year.

Asparagus weeds have small, white or cream coloured flowers. They form fleshy berries that vary in colour depending on the species. Flowering and fruiting times can vary greatly with climate and location. The asparagus weeds described in this manual are bisexual, meaning that the male (stamens) and female (pistils) parts are contained within each flower.

Below ground

All asparagus weeds can form large root masses (rhizomatous roots), which persist year round and can be up to 85% of the plant's biomass. This allows the weeds to withstand harsh conditions, including drought and fire.

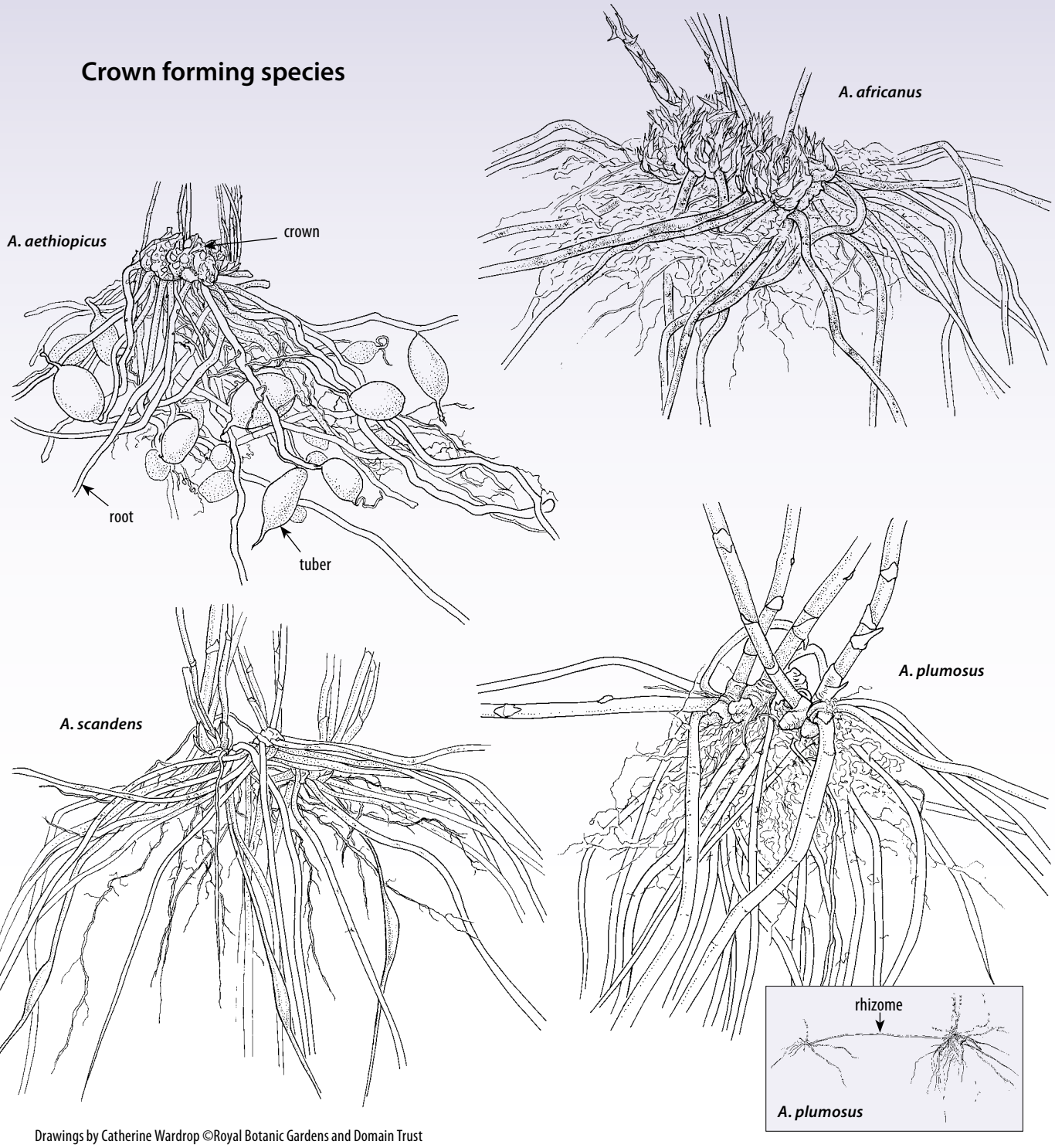
Some species form 'crowns' at the base of the stems, with a root mass radiating out from the crown. Other species form extensive root mats just under the soil surface. Asparagus roots often have many large tubers that act as storage organs to provide plants with nutrients and moisture (see pages 4 and 5 for root description).

Management note: It is important to know what is going on underground in order to plan your management and select the most effective control techniques.

What's going on underground?

Crown	A compressed group of underground rhizomes (stem mass) that forms a central growing point for stems.
Rhizome	An underground stem, growing horizontally, that can vegetatively reproduce by sending out roots and shoots from its nodes. ▪ **Asparagus plants readily re-shoot from rhizomes.**
Roots	Used for nutrient uptake and storage (not reproductive). Often fibrous in asparagus species. Assist in anchoring rhizome and tubers.
Tubers (below ground)	Enlarged structures on roots used to store nutrients. Tubers in *Asparagus* species only act as storage organs and form when sections of the root swell. They can be produced anywhere along the root but do not have growing points (nodes). Tubers store nutrients when plants are dormant, thereby permitting survival from one year to the next. ▪ **Plants can only re-shoot from the rhizomes, not the tubers. But be aware that rhizome fragments can re-shoot.**

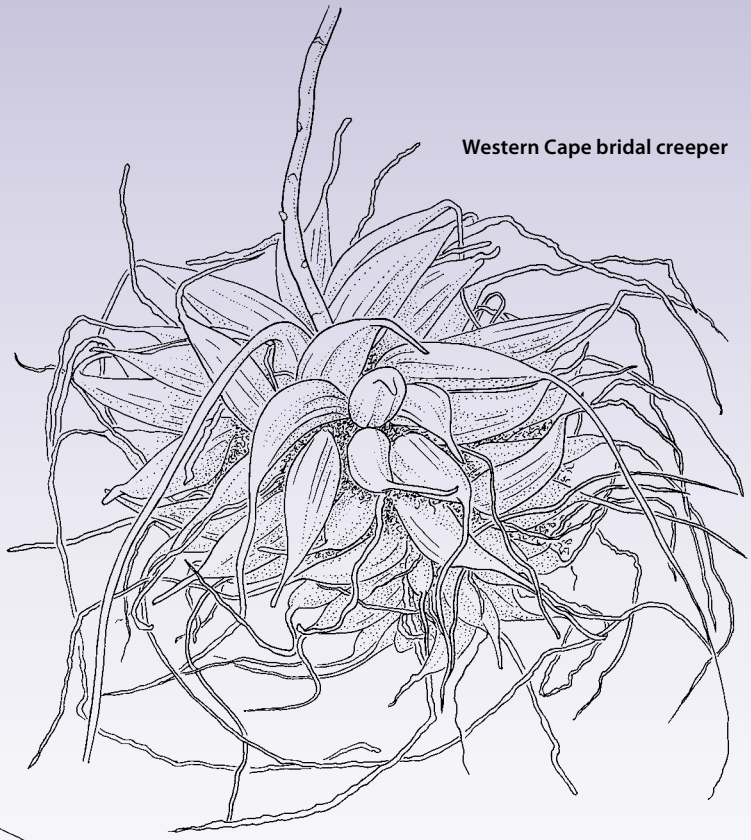
Crown forming species



Drawings by Catherine Wardrop ©Royal Botanic Gardens and Domain Trust

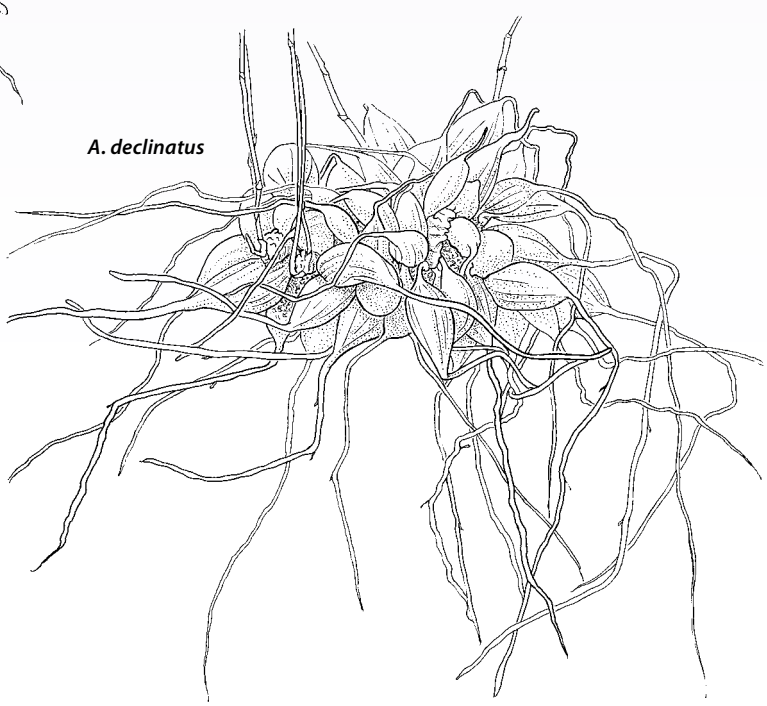
Mat forming species

Western Cape bridal creeper



Common bridal creeper

A. declinatus



Drawings by Catherine Wardrop ©Royal Botanic Gardens and Domain Trust

Identifying asparagus weeds

Distinguishing between five asparagus weeds and Australia's native asparagus

Species	*A. aethiopicus* (ground asparagus)	*A. declinatus* (bridal veil)	*A. scandens* (asparagus fern)
Habit	Perennial, low growing herb with sprawling or arching stems arising from a crown  Hillary Cherry	Creeping or climbing plant up to 3 m tall with annual twining stems and perennial rhizomes and tubers  Shauna Potter	Perennial, low growing herb with twining stems up to 3 m high  Matt Sheehan
Cladodes (leaves) and stems	Flattened with distinct midrib; single or clustered (2–5), up to 20 mm long; no hairs; pale green  Stems up to 2 m long; green to brown, rounded but ridged along length, with many small branches and short sharp spines  Glen Sanders	Needle-like, soft, greyish-green or bluish-green; in groups of 3 along stem, up to 20 mm long Stems with many side branches that bear cladodes giving a fern-like appearance. Stems smooth (no thorns)  Shauna Potter	Lance-shaped, flat with distinct midrib, in groups of 3 and deep green, 5–15 mm long and 0.5–1 mm wide Stems branch in one flat plane. Stems smooth (no thorns)  Glen Sanders
Flowers	Creamy white to pale pink in elongated clusters of 4–8  Ros Shepherd	Greenish white; solitary or in pairs; on short stalks  Glen Sanders	White to pinkish-white; solitary or 2–3 per axil on short stalks  Murray Fagg
Fruits	Glossy berries 5–8 mm in diameter; initially green turning bright red when mature; contain a single black seed 3–4 mm in diameter  Hillary Cherry	Spherical or ovoid berry 8–15 mm in diameter; initially green turning pale bluish-grey or whitish-translucent when mature; contain 2–14 black seeds  Colin Wilson	Fleshy, globular berries 5–7 mm diameter; initially green turning to orange-red when mature; contain one black seed  Shauna Potter
Roots	Dense mat of underground stems (rhizomes) and fleshy tubers scattered along roots; stems arise from a central crown  Hillary Cherry	Dense mat of fibrous rhizomes, with clusters of thick bulb-like ribbed tubers to 6 cm long; stems arise from the length of rhizomes  Kerinne Harvey	Short rhizomes with fibrous roots, often with narrow tubers; stems arise from a small central crown  Biosecurity SA

Species	*A. plumosus* (climbing asparagus fern)	*A. africanus* (climbing asparagus)	*A. racemosus* (native asparagus)
Habit	Perennial climber with stems 5 m or more in length  Ian Hutton	Perennial climber with stems up to 5 m long  Hillary Cherry	A slender, shrub or climbing, perennial vine that can grow up to 4 m long  Sheldon Navie
Cladodes (leaves) and stems	Needle-shaped, fine and thread-like in clusters of ten or more; to 7 mm long, 0.5 mm wide Stems, green to red-brown, spineless or with scattered spines; with twining branches in a flattened plane  Sheldon Navie	Spine-like and cylindrical; in clusters of 6–12, up to 15 mm long; with sharp tips; appears fern-like Stems hairless, often bearing thorns or spines 2–10 mm long; twining and become woody and thick with age   Hillary Cherry	Spine-like and linear; in clusters of 3–6; 10–30 mm long, 0.2–0.5 mm wide Stems slender to 2 cm in diameter; with some curved spines 1–5 mm long   Sheldon Navie
Flowers	Greenish-white; single or paired in axils, along lateral branches	Greenish-white; solitary or in clusters of up to 6, on short stalks  Sheldon Navie	Minute, white flowers on short, spiky stems; single or paired, 4–6 mm in diameter
Fruits	Globular berry 4–5 mm in diameter; initially green turning bluish-black to black with maturity; contain 1–3 black seeds  Sheldon Navie	Globular berry 5–6 mm in diameter; initially green turning orange-red and shrivelled with maturity; contain a black single seed  Sheldon Navie	Globular berry 5–6 mm in diameter; red when mature; contain a single black seed
Roots	Fibrous and fleshy, root swelling but without distinct tubers; with short rhizomes; stems arise from a central crown  Hillary Cherry	Fibrous, fleshy, root swelling but without distinct tubers; with short rhizomes; stems arise from a central crown  Hillary Cherry	Fibrous with long tubers

Biology and threat

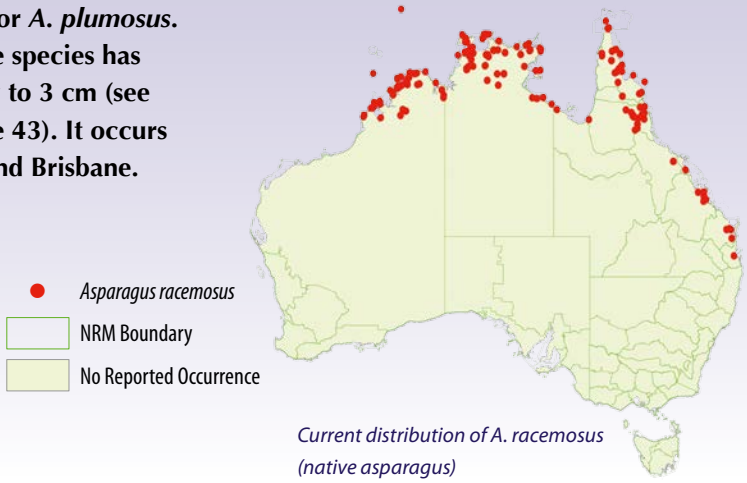
Look out for the native asparagus!

The only *Asparagus* species that is native to Australia is *A. racemosus*. Clear identification between the native and weedy asparagus is imperative because their distribution and habitats can overlap.

***Asparagus racemosus* is a vine or small shrub that can be easily mistaken for *A. africanus* or *A. plumosus*. The key difference is that the native species has longer leaflets (cladodes) that grow to 3 cm (see table on page 7 and photos on page 43). It occurs in northern Australia south to around Brisbane.**

Sheldon Navie

A. racemosus; note long 'leaflets' (cladodes)



Current distribution of A. racemosus (native asparagus)

Distinguishing between common and Western Cape bridal creeper

Common bridal creeper (*Asparagus asparagoides*) is one of southern Australia's worst weeds. It is an aggressive and highly invasive environmental weed that is capable of smothering native ground flora, shrubs and small trees. It forms a thick, tuberous root mass that inhibits growth of other plants and prevents over-storey regeneration. It was generally accepted that the bridal creeper present in Australia originated from a single South African source, but another distinct form of bridal creeper, known as Western Cape bridal creeper, has now been recorded in South Australia (SA) and south-west Victoria (VIC).

This Western Cape form is potentially more damaging than the common form. Western Cape bridal creeper stems and leaves stay alive longer before they naturally dry off in the summer. It also appears resistant to the bridal creeper rust fungus, a biological control agent introduced to help contain and reduce infestations of common bridal creeper.

While taxonomic work is not complete, it is suspected that Western Cape bridal creeper is a different species to common bridal creeper.

Western Cape bridal creeper invades similar habitats to common bridal creeper and can be seen growing alongside the common form. It has the potential to spread into and infest areas where the common form has been controlled.

Important note

It is likely that Western Cape bridal creeper has spread more widely, so land managers should be on the lookout and report suspected infestations to local weed authorities.

Comparing the two forms of bridal creeper

Western Cape bridal creeper looks similar to the common form. Like the common form:

- it is a climbing vine with many twisting stems that can scramble along the ground or climb up to 3 m on supporting vegetation,
- the leaves are broad near the stem and pointed at the tips,
- the stems and leaves grow rapidly during autumn and winter,
- a mass of small, white flowers grow in late winter, followed by green berries in spring that ripen to red,
- as berries ripen, leaves and stems dry off, leaving berries exposed for birds and other animals to eat, and
- large tuberous root system allows the plant to survive the hot, dry summer and regrow after autumn rains.

Compared to the common form, it has larger tubers that grow in a rosette close to the soil surface and larger, darker leaves that are thick, waxy and leathery.

Above ground – leaves and stems

Don't just rely on above ground features for identification, as they can easily be confused with the common form. Dig up the tubers and compare them.

Western Cape bridal creeper

- Larger, flatter and darker green
- Waxy, thick and leathery
- More angular stems
- Resistant to rust fungus (although some rust may appear on leaves but the plant is not impacted)

(NB. technically the leaves are flattened cladodes)

Common form of bridal creeper

- Usually lighter, grass-green
- Soft and shiny
- Less angular stems
- Affected by rust fungus

BUT, in ideal conditions, can look very similar to the Western Cape form; so check the tubers to be sure

Below ground – tubers and roots

Western Cape bridal creeper

- Large, thick tubers (40–75 mm long) arranged in a tight rosette around the rhizomes
- Tubers end in a fine root and grow close to ground surface

Tubers are the best defining characteristic!

Dig them up to be sure you are looking at Western Cape form

Common form of bridal creeper

- Small tubers (to 42 mm long) arranged along branching rhizomes, giving a 'mat-like' appearance
- Tubers do not typically end in a root and usually grow at least 10 cm underground

Where to find asparagus weeds

How do they spread?

Asparagus weeds are mainly spread by birds and other animals, or by water. They reproduce mostly by seed and many species reach reproductive maturity within the first two years. They can spread long distances as they produce large amounts of fleshy fruit that is readily dispersed by birds and some mammals.

Asparagus weeds can also spread vegetatively by rhizomes. They are spread by humans, who still plant them, transport them unintentionally with machinery or dump them in garden waste. They also often re-sprout following control efforts, so follow-up management is critical.

Where do they grow?

Asparagus weeds tolerate a wide range of soils and climates. Most prefer shady, moist conditions, but they can withstand full sun, drought and impoverished soils. Some asparagus weeds, such as Western Cape bridal creeper, *A. scandens* and *A. declinatus*, can tolerate cold winters and frost. Other species, such as *A. plumosus*, successfully invade both sub-tropical and temperate regions (see maps on pages 11–21).

What impacts do they cause?

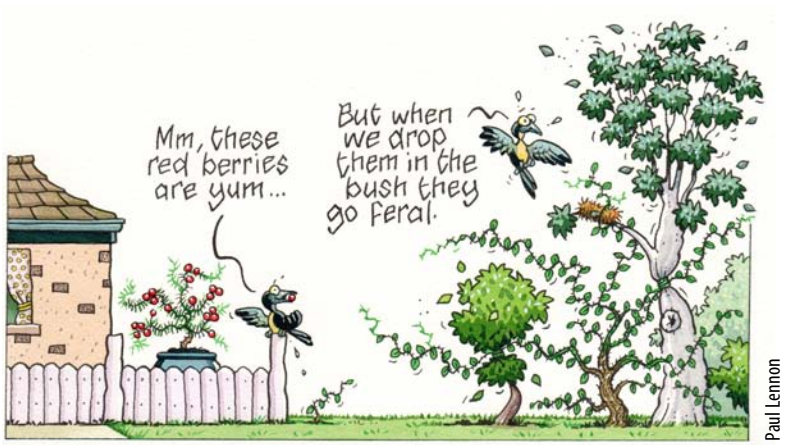
Asparagus weed infestations expand quickly due to the rapid growth of root systems, even under harsh conditions, and can form monocultures and displace native plants. Above ground biomass may:

- dominate the ground and shrub layer (e.g. *A. aethiopicus*, *A. scandens*, *A. declinatus*, Western Cape bridal creeper and common bridal creeper) and/or the canopy layer (e.g. *A. africanus*, *A. plumosus*),
- restrict movement of some native animals and thereby reduce their access to food and dens,
- provide harbour for exotic animals, such as foxes and rabbits, and
- alter rates of litter decomposition and nutrient cycling, due to the large amount of foliage shed by some asparagus weeds each summer.

Below the ground, the often impenetrable root mats can:

- impede the growth of native seedlings,
- alter the composition and ultimately reduce the diversity of organisms in the soil and litter, and
- compete for water and nutrients with native plants.

Due to their impacts, asparagus weeds are listed as a Key Threatening Process (KTP) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) within the category: 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants'.



Paul Lennon

Biology, ecology and impacts of asparagus weeds in Australia

Asparagus aethiopicus

Asparagus aethiopicus is predominantly known as ground asparagus but other common names include basket asparagus, asparagus fern, Sprengeri's fern, bush asparagus and emerald asparagus. It was previously known as *A. densiflorus* 'Myers' in Australia, but this is now considered to be a different species not known to be recorded in Australia (Navie and Adkins 2008). *Asparagus aethiopicus* has also been known as *Protasparagus aethiopicus* (L.) Oberm. and *P. densiflorus* (Kunth) Oberm. Cultivars of *A. aethiopicus* also exist and include 'Sprengeri', 'Meyersii' and 'Variegata'. The cultivar 'Sprengeri' is considered to be the invasive form of *A. aethiopicus* throughout Queensland (QLD). The other cultivars are not known to be naturalised in Australia. More research is required to determine what forms may have naturalised in Australia, and whether cultivars are sterile.

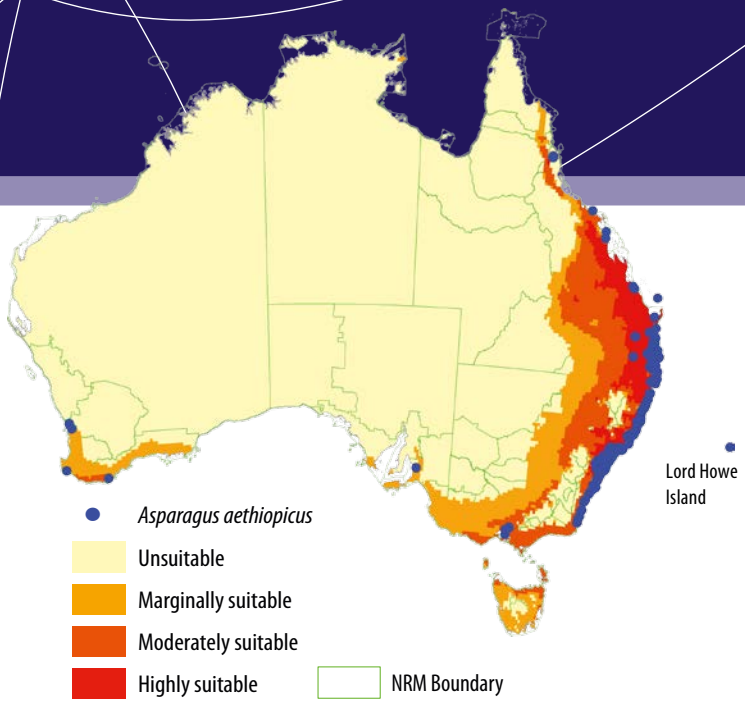
Origin and distribution

Asparagus aethiopicus was introduced to Australia from the Cape Province of South Africa and has been cultivated extensively as an ornamental plant. It has since escaped from gardens to become a major environmental weed in the south and east of Australia (including Lord Howe Island where it was introduced during the 1930s), New Zealand, Hawaii, Caribbean, Europe, parts of North America.

Climate modelling indicates that *A. aethiopicus* has the potential to spread more widely in coastal QLD, and infill coastal areas in New South Wales (NSW) (Scott and Batchelor 2006).

Habitat in Australia

Asparagus aethiopicus occurs in warm coastal regions with rainfall from 500–1500 mm. It is drought tolerant and can survive in hot, dry



Current and potential distribution (Scott and Batchelor 2006) of Asparagus aethiopicus

locations. While frost may damage the foliage, plants are quick to recover from the rhizomes. *Asparagus aethiopicus* occurs in a vast range of native habitats, including coastal headlands and sandy foredunes, littoral rainforests, heathlands, open woodlands, riparian areas and wetlands including estuarine edges, salt marshes and swamps. It can grow in the forks of trees, in birds nest ferns and amongst rocks or leaf-litter.

Environmental impacts

Asparagus aethiopicus creates vigorous thickets of foliage that forms dense spiny mats. It can quickly invade disturbed sites in open sun or partial shade. Plants can form monocultures that smother and displace native herbs and shrubs, and can form impenetrable root mats below the ground that may impede the growth of native seedlings. The above ground biomass can dominate the native ground and shrub layer. Large amounts of below ground biomass may allow the weed to persist in harsh conditions, while enabling strong competition with native species.

In south-eastern QLD, *A. aethiopicus* is ranked among the top 25 most invasive plant species and it is one of the most significant garden escapes invading coastal habitats (Batianoff and Butler 2002). In NSW, it is ranked 4th among 340 of the worst environmental weeds, based on its threat and impact on biodiversity (Downey *et al.* 2010).

Biology and threat

Hillary Cherry

Foredune invasion of Asparagus aethiopicus, Coffs Harbour, NSW

Hillary Cherry

Asparagus aethiopicus fruits and foliage

Biology and ecology

Asparagus aethiopicus is a low growing scrambler with prostrate, prickly stems that grow up to 2 m long, and arise from a central underground crown (cluster of short rhizomes; see page 4). The cladodes (leaves) are flattened and lance-shaped, growing in clusters of 2–5. Plants are perennial, retaining above ground foliage year round. Small, watery tubers form along the roots and act as storage organs, but these tubers are not capable of vegetative reproduction.

Spread is primarily by seed, but vegetative growth also occurs from the short rhizomes that comprise the central crown. Reproductive maturity occurs within the first two years, with staggered flowering occurring across plants from spring to autumn. Timings vary with climatic conditions and soil moisture. Peak fruit production occurs from autumn to winter, but plants may flower and fruit year round in favourable conditions. Seedlings can germinate at any time if water is available, but typically there is a major flush of germination in spring and a smaller one in autumn. Germination rates are higher than several other asparagus weeds (>98%), with a high mean seedling emergence (94.5%) (Vivian-Smith and Gosper 2010).

Although seed dormancy is rare, some seeds may survive for three or more years in the soil. Experiments have shown that seedlings can emerge for up to 1000 days after sowing (Vivian-Smith and Gosper 2010). Seeds are also viable while the fruit is still immature (i.e. green). Plants mature early (approx 1.5 years) and produce large numbers of flowering stems (average of 60 per plant) (Vivian-Smith and Gosper 2010). Under favourable environmental conditions, mature plants can produce a large amount of fruit (up to 600 mature fruits observed on one plant; Bowden and Rogers 1996).

The fruits are relatively large (to 9 mm), attractive and bright red when ripe and have a high mineral content that makes them desirable to animals**.** It is readily dispersed by birds and lizards. Birds help disperse the fruits long distances depositing them in undisturbed vegetation, where they can germinate and grow. *Asparagus aethiopicus* is also dispersed by humans, who spread rhizomes and fruits in dumped garden waste.

These characteristics provide considerable management challenges, such as dealing with rapid germination and emergence following bird dispersal to non-infested sites and its robust, underground storage capacity. In contrast, managers do not need to contend with a long-lived seed bank due to low dormancy in this species.

Seasonal patterns for *Asparagus aethiopicus*

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering	■	■	■	■	▒	▒	▒	▒	▒	■	■	■
Fruiting	▒	▒	▒	■	■	■	■	▒	▒	▒	▒	▒
Germination	■	■	■	■	■	▒	▒	▒	▒	■	■	■

■ Generally present

▒ Present in suitable conditions

Asparagus africanus

Asparagus africanus is most commonly known as climbing asparagus, but is also known as asparagus fern or ornamental asparagus. It was previously called *Protasparagus africanus* (Lam.) Oberm.

Origin and distribution

Asparagus africanus was introduced to Australia as a garden ornamental from southern Africa and has escaped from cultivation to become a major weed of natural vegetation. The earliest naturalised specimens were collected from the Ipswich area, west of Brisbane in the 1940s. The distribution of *A. africanus* extends from central west QLD and along the coast from northern QLD to central NSW. It is particularly common in coastal districts near settlements.

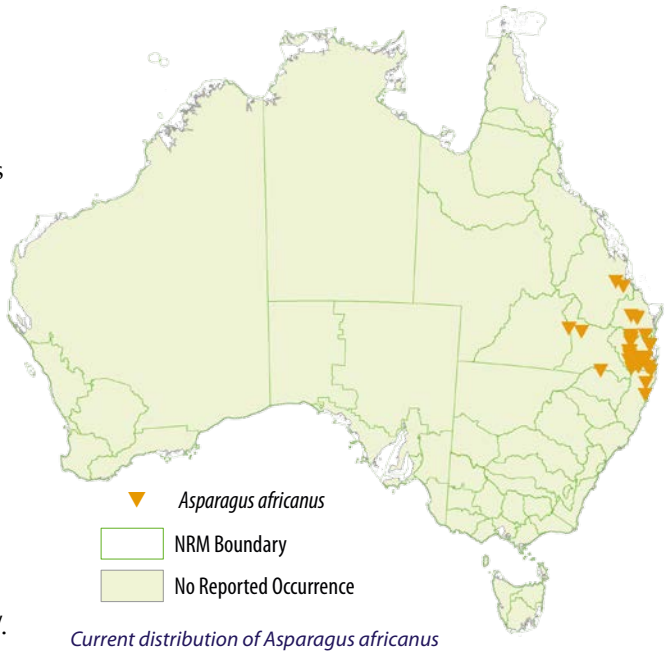
Climate modelling indicates that *A. africanus* could expand its range in coastal regions from far north QLD to southern VIC, as well as coastal areas of SA and south-west Western Australia (WA), although there is low confidence in the current model and further work should be done (Scott and Batchelor 2006).

Habitat in Australia

Asparagus africanus occurs in a range of habitats, but is primarily a weed of sub-tropical to tropical forests, rainforest margins, littoral rainforests, hind dunes, open woodlands, riparian corridors, mangroves, brigalow scrub (*Acacia harpophylla*) and wet eucalypt forests. It also invades urban bushland and roadsides and is commonly found in ecotone areas (the transition area between two plant communities), disturbed bushland, parks and gardens. It is moderately tolerant to drought stress.

Environmental impacts

Asparagus africanus grows quickly and produces dense thickets of foliage that can climb and dominate the canopy layer, smother native herbs and shrubs and form monocultures, which in turn can alter the functioning of the native ecosystem.



Current distribution of Asparagus africanus

Infestations are quick to expand, as the well developed root system enables rapid growth, even under harsh conditions such as drought or impoverished soils. The fibrous roots form dense mats just below the soil surface that may interfere with the germination and seedling survival of native plants (Navie and Adkins 2008).

In south-eastern QLD, *A. africanus* is ranked among the top ten most invasive plants, and extensive infestations of *A. africanus* threaten remnant brigalow scrub (Batianoff and Butler 2002) which is listed (Brigalow – *Acacia harpophylla* dominant and co-dominant) as an endangered ecological community under the EPBC Act.

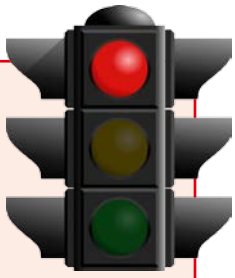
Biology and ecology

Asparagus africanus is a long-lived climber or scrambling sub-shrub that can form woody stems. The stems grow in a twining fashion and develop large, sharp spines. Stems originate from a basal crown (up to 60 cm in diameter) consisting of short, fleshy rhizomes (see page 4 for root and stem structure). Plants are perennial, retaining above ground foliage year round. Unlike *A. aethiopicus*, the roots do not form distinct tubers but develop

thick swellings along the root structure. The root mass is thick and forms a fibrous mat below the soil.

Mature *A. africanus* plants can produce as many as 21,000 seeds per year and immature fruits can contain viable seed (Stanley 1994). In cultivation, plants reach reproductive maturity at 3–4 years of age (Vivian-Smith and Gosper 2010), but field observations indicate reproductive maturity can occur within 1–2 years. Seed survival is typically up to three years in the soil, but under favourable environmental conditions, seeds can survive longer (Stanley 1994). The round fruit contains a single seed (occasionally two) and fruit production peaks in summer, but fruit can often remain on the plant throughout the year. The fruit turns from green to orange to orange-red as it matures.

Asparagus africanus is readily dispersed by many birds, including silvereyes (*Zosterops lateralis*) and southern figbirds (*Sphecotheres viridis vieilloti*), but is also spread from rhizomes in dumped garden waste (Stanley 1994).



The only *Asparagus* species that is native to Australia is *A. racemosus* and its distribution overlaps with both *A. africanus* and *A. plumosus*.

Clear identification between the native and weedy asparagus species is imperative. See pages 7, 8 and 43 for photos and information on *A. racemosus*.

Kerinne Harvey

Invasion of Asparagus africanus, Tinchi Tamba Wetlands, Brisbane

Sheldon Navie

Asparagus africanus fruits and foliage

Seasonal patterns for *Asparagus africanus*

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering	■	■	■							■	■	■
Fruiting	■	■	■	■	■	■	▒	▒	▒	▒	▒	▒
Germination			■	■	■							

■ Generally present

▒ Present in suitable conditions

Asparagus plumosus

Asparagus plumosus is most commonly known as climbing asparagus fern, but is also known as ferny asparagus. Previous scientific names have included *A. plumosus* var. *nanus* Hort. and *Protasparagus plumosus* (Baker) Oberm. It has been incorrectly called *A. setaceus* (Kunth) Jessop.

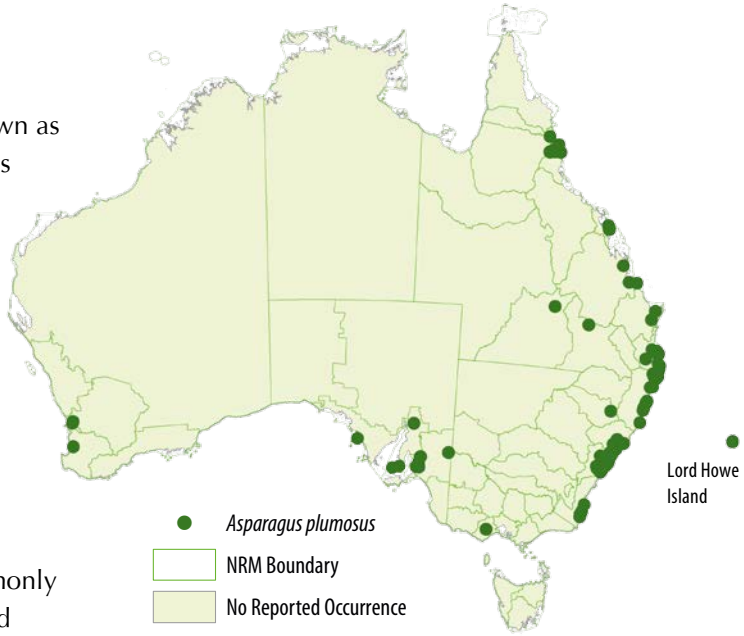
Origin and distribution

Asparagus plumosus is a native of southern and eastern Africa (Kenya, Zambia and South Africa), but is often cultivated elsewhere as an ornamental plant and commonly used in floral arrangements. It has naturalised in the southern United States of America (USA) (California and Florida), Puerto Rico and some Pacific Islands (Hawaii and Tonga). In Australia, it is mainly found in southern and eastern coastal regions, predominantly near major urban areas such as Brisbane, Sydney and Adelaide. It is also naturalised in other parts of NSW, south-west WA, southern VIC, north and central QLD, Lord Howe Island and Norfolk Island.

Climate modelling indicates that it is a potential threat to coastal regions of QLD, potentially extending north to Cape York, although there is low confidence in the current model and further work should be done (Scott and Batchelor 2006).

Habitat in Australia

Asparagus plumosus is found in fertile soils of tropical, sub-tropical and warm temperate region rainforests, littoral rainforests, *Casuarina* forests, forest margins, riparian areas, hind dune forests, urban bushland and open woodlands, generally in areas of 500–1500 mm annual rainfall. *Asparagus plumosus* tolerates low light and moist conditions, allowing it to invade rainforests. It also tolerates sandy soils and saline environments, such as saltmarsh communities. It is commonly found along roadsides and in disturbed sites, parks and gardens. Infestations are often isolated and may be the result of rhizomes spread by garden dumping rather than from seed.



Current distribution of Asparagus plumosus

Environmental impacts

Asparagus plumosus has the potential to significantly alter habitats by dominating and destroying the canopy layer. It can produce large rhizome clusters (crowns) that penetrate deeper into the soil as they grow, making them especially difficult to dig out. These large underground crowns and root systems may alter native regeneration. On Lord Howe Island, invasion of *A. plumosus* is potentially impacting the native habitat of the endangered woodhen (*Gallirallus sylvestris*).

Asparagus plumosus is ranked among the top 60 most invasive environmental weeds in south-east QLD (Batianoff and Butler 2002), where it is a particular concern in dry rainforests (Navie and Adkins 2008). It was also ranked among the top twenty environmental weeds during a survey conducted on the North Coast region of NSW (Navie and Adkins 2008).

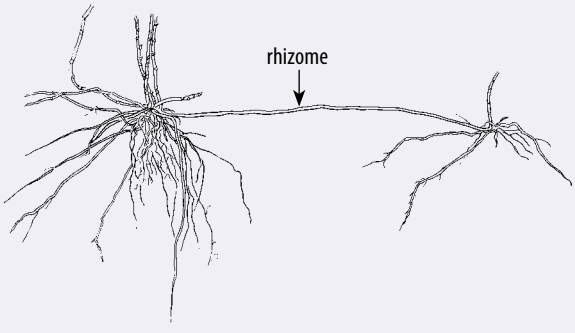
Biology and threat

Biology and ecology

Asparagus plumosus is a twining vine, with green to reddish-brown stems that become woody with age. Stems may have small, sharp recurved spines. Plants are perennial, retaining above ground foliage year round. The fibrous and fleshy roots branch from a rhizomatous crown at the base of stems. The roots do not form distinct tubers but may thicken along the root structure. The branches are arranged in a flat plane and have whorls of tiny, fine rounded cladodes, arranged in tight clusters of 8–15 per whorl, giving the plant a feathery appearance.

The flowers are small and greenish-white and occur singly or in pairs on branchlet tips. Flowers are produced from spring through to early autumn, but plants may not flower in the first year. Reproductive maturity generally occurs after two years and up to four years depending upon light availability. Fruits are black, fleshy berries that ripen from autumn to winter. Seeds germinate from autumn to spring and seedlings develop rapidly.

Seeds are primarily dispersed by birds, but are also spread in water and plants can spread vegetatively by rhizomes in garden refuse.



Drawing by Catherine Wardrop ©Royal Botanic Gardens and Domain Trust

Asparagus plumosus rhizome

Ian Hutton

Invasion of Asparagus plumosus, Lord Howe Island

Sheldon Navie

Asparagus plumosus fruits and foliage

Sheldon Navie

A. plumosus (left) with shorter, finer cladodes and A. africanus (right)

Seasonal patterns for *Asparagus plumosus*

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering	■	■	■	■						■	■	■
Fruiting				■	■	■	■	■	■			
Germination	▒	▒	▒	■	■	■	■	■	■	■	■	■

■ Generally present

▒ Present in suitable conditions

Asparagus scandens

Asparagus scandens is commonly known as asparagus fern, but is also known as climbing asparagus, climbing fern and snakefeather. The previous scientific name was *Myrsiphyllum scandens* (Thunb.) Oberm.

Origin and distribution

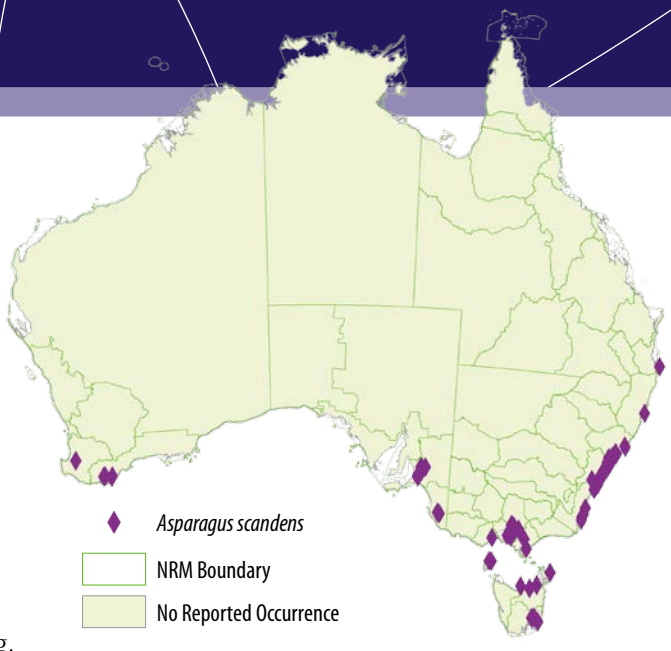
Asparagus scandens was introduced as a garden ornamental from southern Africa. Infestations are widely scattered within Australia but are increasing, particularly in southern VIC. Infestations also occur in northern Tasmania (TAS), SA (with emerging populations in the Adelaide Hills), around Sydney, and isolated infestations in south-west WA, near Denmark and Albany. At least 15 years ago, *A. scandens* was rampant on Lord Howe Island, but it is currently being controlled. It has also naturalised in New Zealand and Central America.

The distribution of *A. scandens* predominantly occurs in areas close to human habitation in Australia. But its invasive ability in climatically similar habitats of New Zealand suggests that *A. scandens* could seriously impact on Australia's biodiversity if not controlled.

Bioclimatic modelling indicates that *A. scandens* may spread north in coastal areas of central and southern QLD and expand across coastal regions of NSW, SA, TAS, VIC and south-west WA (Scott and Batchelor 2006).

Habitat in Australia

Asparagus scandens generally occurs in sub-tropical to temperate, high rainfall regions. It invades shaded woodland, heathland, sclerophyll forest, cool temperate rainforest, riparian and coastal habitats, and disturbed areas. Generally it is found in shady areas, but plants can also establish under moderate light. Plants appear to need moisture all year round and favour riparian habitats, but they can tolerate a range of conditions, from open sites to deep shade and damp to dry forest. *Asparagus scandens* is tolerant of fire and drought and may tolerate frosts. On Flinders Island (TAS) in Bass Strait, it has invaded native riparian habitats. In south-west WA, around Denmark and Albany, infestations occur in *Agonis* and *Banksia* woodlands and riparian areas.



Current distribution of Asparagus scandens

Environmental impacts

Asparagus scandens is a serious environmental weed threat to southern Australia. It is shade tolerant and competes with native plants for water, nutrients and space. The tuberous root system can form dense mats that impede native seedling germination, and the twining stems strangle or smother small seedlings and shrubs.

In New Zealand (NZ), it is the most damaging and widespread of all asparagus weeds. It can strangle or smother soft-barked plants and prevent the regeneration of native plants. On the North Island of NZ, *A. scandens* invades extensive areas of lowland broad-leaved and secondary forests. Following control of large infestations, the large amount of dead root biomass appears to impede the growth of other plants until the root mass decomposes (Timmins and Reid 2000).

In Australia, there is speculation that *A. scandens* may cause impacts on biodiversity similar to those caused by common bridal creeper (Lawrie 2004).

Biology and threat

Movement by humans is a major cause of spread. As a result, infestations are commonly found near towns. However, because *A. scandens* is both shade-tolerant and bird-dispersed, it can invade intact as well as disturbed native forest. Thus seedlings can be hard to find and areas need to be thoroughly searched to enable control (Timmins and Reid 2000). It can also grow as an epiphyte on tree ferns and in tree branch crooks.

Biology and ecology

Asparagus scandens is a creeping or climbing vine with thornless, wiry stems. Plants are perennial, and generally retain above ground foliage year round. The green, delicately-branching stems, that give the plant a fern-like appearance, arise from a crown at the base of stems. The dark green cladodes (leaves) are linear and often slightly curved (sickle-shaped). They occur in groups of three along fine branchlets.

Fibrous underground roots form small thin tubers that are predominantly for water storage. The root system can constitute up to 87–92% of mature plant biomass, allowing the plant to be extremely fire, drought and shade tolerant (Timmins and Reid 2000).

The fruit is a glossy, globe-shaped berry that ripens to orange-red when mature and usually contains one seed. Fruit appear in late spring and can remain on the plant until the following flowering season in wet years. An average of 64 fruit has been found on 1 m lengths of fruiting stems (Timmins and Reid 2000).

Denmark Weed Action Group

Invasion of Asparagus scandens

Shauna Potter

Asparagus scandens fruits and foliage

Reproductive maturity can occur after 12 months. Seedlings germinate from spring through to summer. The seeds are dispersed by birds and are likely dispersed by foxes and rabbits. *Asparagus scandens* is also spread by water and earth moving machinery, mud caught on vehicles and shoes, rhizomes in garden refuse and plant exchange through gardeners.

Seasonal patterns for *Asparagus scandens*

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering						■	■	■	■	■	■	
Fruiting	■	■	■	■	■	■	■	■	■	■	■	■
Germination	■	■	■							■	■	■
Foliage present	■	■	■	■	■	■	■	■	■	■	■	■

■ Generally present

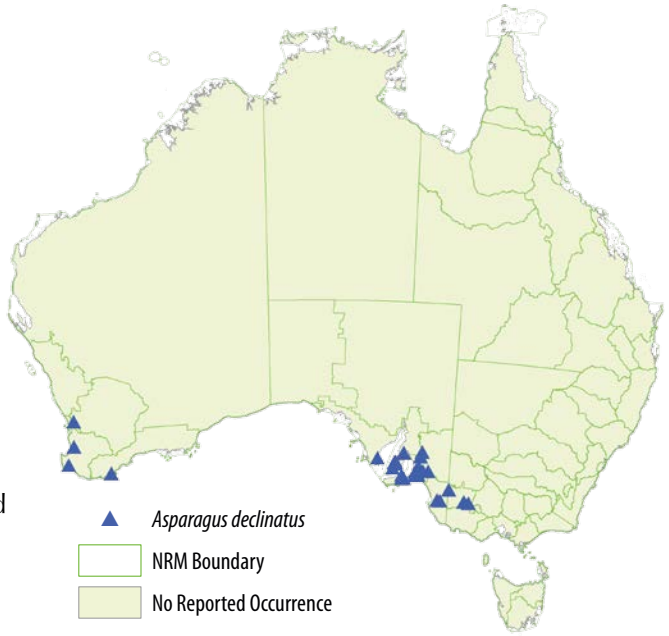
■ Present in suitable conditions

Asparagus declinatus

Asparagus declinatus is most commonly known as bridal veil, but is also referred to as asparagus fern. Previous scientific names include *A. crispus* Lam. and *Myrsiphyllum declinatum* (L.) Oberm.

Origin and distribution

Asparagus declinatus is native to the Western Cape region of South Africa. It has been present as an ornamental garden plant in Australia since 1870 (Pheloung and Scott 1996). Naturalised populations were first recorded on Kangaroo Island South Australia in 1954 (Weidenbach 1994). It has since become a highly invasive and aggressive environmental weed and has naturalised in coastal and inland regions of temperate SA (with severe infestations on Kangaroo Island) and to a very limited extent in south-west WA and VIC.



Current distribution of Asparagus declinatus

Bioclimatic modelling indicates that it has potential to invade across south-west WA and coastal regions SA, VIC and TAS (Scott and Batchelor 2006). Further work is needed to determine the full potential threat of *A. declinatus* as it may have similar invasive ability to bridal creeper.

Habitat in Australia

Asparagus declinatus grows in a wide variety of environments, including exposed rocky outcrops and pine forests to woodlands and coastal habitats. It grows well in shade and open sun and may occur in a variety of soil types, including sandy soils. It has a wide climate range and can tolerate cold winters and frosts, but does not persist in agricultural landscapes because it is grazed by stock.

Environmental impact

Asparagus declinatus biomass can dominate both the ground and shrub layer, leading to the displacement of native vegetation. Infestations can reduce recruitment of over-storey native species and lead to a decline in native groundcover. The dense, underground root mass can reduce regeneration of native species. The long-range dispersal capability of *A. declinatus* contributes to its invasive spread. For example, large frugivorous birds have been found to fly up to 10 km before regurgitating viable seeds, which potentially allows the weed to establish in undisturbed vegetation (Lawrie 2006).

In Australia, there is speculation that A. declinatus may cause impacts on biodiversity similar to those caused by common bridal creeper, as these two species are similar in their morphological and ecological characteristics (Lawrie 2004).

Biology and ecology

Asparagus declinatus is a scrambler, or weak climber, that shoots annually from an extensive rhizomatous, perennial root system. It shares a similar lifecycle and habit to the highly invasive bridal creeper.

Stems are smooth, wiry and twine. Shoots appear in autumn and dense foliage develops in winter. The leaves are densely arranged in whorls of 3 on short, fine branchlets that have a zig-zag pattern. Above ground plant material generally dies back

Biology and threat

Colin Wilson; Hilary Cherry (inset)

Asparagus declinatus fruits and foliage (inset: fruit and seeds)

Tim Parkinson

Invasion of Asparagus declinatus, Newland Hill, South Australia

during the summer and reappears with autumn rains, but in cool and wet areas fruit can stay on the plant through summer. There is little knowledge about its growth rate but it may be similar to bridal creeper.

Underground rhizomes radiate from the base of stems and run throughout the underground root system (see page 5 for root description). These underground rhizomes bear large, bulb-like, ridged tubers. The root mass generally occupies the top 15 cm of soil, though it has been found up to 1 m below the surface in sandy soil. The root mass in mature plants can account for 85% of the total plant mass (Leah 2001).

Flowering occurs from winter to mid-spring. The ovoid fruit is relatively large and begins green but ripens to pale, translucent or bluish-white. Fruits are present from late winter through to midsummer and are most prevalent on low growing (<0.5 m) plants. Fruit production ranges from 100–800 fruits per m^2 (Lawrie 2006) with each fruit usually containing 5–8 (but up to 14) black, round seeds. Under favourable conditions, it can produce up to 4800 seeds per m^2. Research indicates that higher rainfall regions have larger fruit with more seeds than lower rainfall areas (Lawrie 2006).

Dispersal distances may be greater than bridal creeper, as the larger fruit size attracts larger birds that can disperse seeds over a greater distance (i.e. distances up to 10 km). The grey currawong, Australian raven, magpie, red wattlebird and brush wattlebird have been identified as the most important bird dispersers (Bass and Lawrie 2003, Lawrie 2006). Other potential dispersers include brush-tail and ringtail possums, foxes, small rodents and lizards. Dispersal is also aided by water and humans. Humans can spread rhizomes with machinery, through soil disturbance and in dumped garden waste.

Seasonal patterns for *Asparagus declinatus*

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering								■	■	■	■	
Fruiting	▒	▒							■	■	■	■
Germination				■	■	■	■	■	■			
Foliage present	▒	▒	▒	■	■	■	■	■	■	■	■	▒

■ Generally present

▒ Present in suitable conditions

The two forms of bridal creeper (*Asparagus asparagoides*)

Common bridal creeper is widely distributed across southern Australia. Another form has also been recorded in South Australia and south-west Victoria. Both forms originate from South Africa.
In 2003, amateur botanist Kath Alcock of Naracoorte, SA, described and illustrated the Western Cape form of bridal creeper that was first discovered in the south-east of SA (Coles and Willing 2006). Further investigations revealed that this was a Western Cape form of bridal creeper, a form that is highly aggressive and apparently resistant to the bridal creeper rust fungus (*Puccinia myrsiphyllii*), a biological control agent that was introduced to help control the common form of bridal creeper. Western Cape bridal creeper could potentially reinfest vegetation where common bridal creeper has been suppressed by either the rust fungus or other control measures. It is suspected that Western Cape bridal creeper is a different species to common bridal creeper, but the scientific name *A. asparagoides* is currently used for both. Both forms are described below.

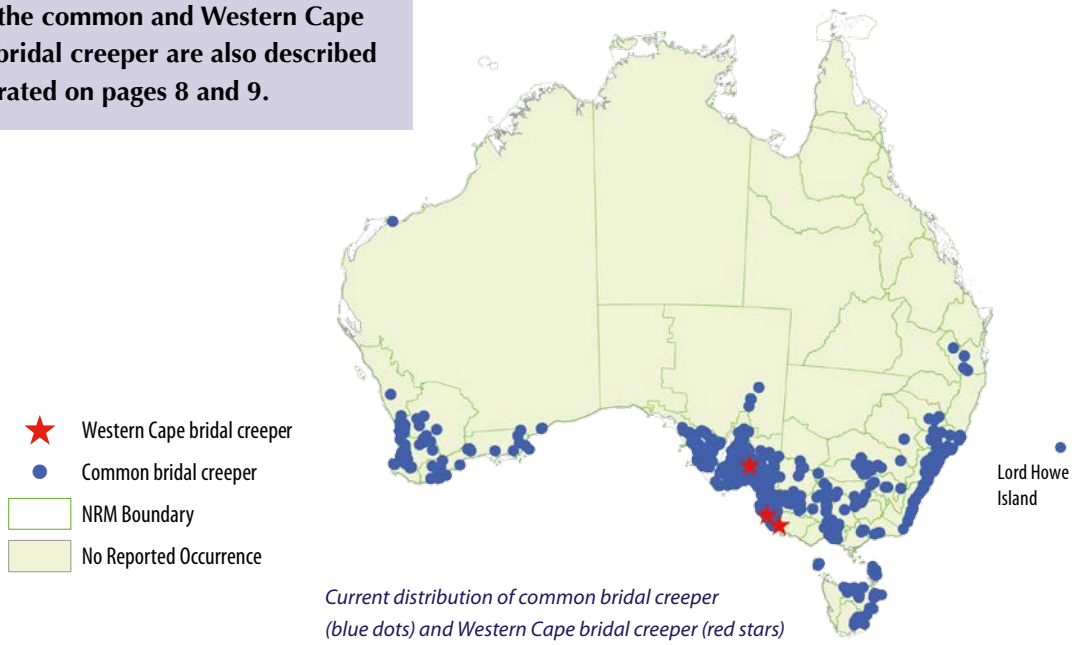
Please note: Distinguishing features between the common and Western Cape forms of bridal creeper are also described and illustrated on pages 8 and 9.

Western Cape bridal creeper (*Asparagus asparagoides* Western Cape form)

Origin and distribution

While little is known about the history of Western Cape bridal creeper it is suspected that it was introduced along with the common bridal creeper as an ornamental. The distribution of the Western Cape form in its native range of South Africa is restricted to the areas of 'winter rainfall' (where <20% of the annual average rainfall occurs between the months of December to February) and summer rainfall regions. Its distribution in southern Australia is climatically similar to its native distribution. In Australia, it currently exists in the 650 mm to 800 mm annual average rainfall regions in the south-east of SA and south-western VIC.

Predictive distribution models based on climatic data from its native range in South Africa indicate that Western Cape bridal creeper can grow along all Australian coastlines with a Mediterranean climate and may reach a similar distribution to the common form (Scott and Batchelor 2006).



Current distribution of common bridal creeper (blue dots) and Western Cape bridal creeper (red stars)

Biology and threat

Incursions of Western Cape bridal creeper in south-west Victoria and south-east South Australia are being contained, and local efforts are underway to eradicate a smaller infestation in the Adelaide Hills.

Habitat in Australia

Western Cape bridal creeper appears to favour higher rainfall regions and coastal areas. It is known to invade native bush corridors, roadsides, nature reserves and pine plantations, and infestations can be found growing among common bridal creeper. New infestations occur under bird perching areas such as tall trees and fence lines. Large numbers of seeds can germinate beneath the climbing plants.

Environmental impacts

Western Cape bridal creeper grows rapidly during autumn and winter and forms dense curtains of foliage that smother other plants. Although infestations are currently not extensive, it has the potential to spread further into most areas where common bridal creeper occurs throughout southern Australia. It can invade undisturbed habitats and is a major threat to most low shrubs and ground plants in mallee, dry sclerophyll forest and heath vegetation. Western Cape bridal creeper has a prolonged survival period over summer after common bridal creeper has died back, thereby demonstrating its vigorous nature compared to the common form.

Biology and ecology

The growth habit of Western Cape bridal creeper is similar to the common form, but more robust. Western Cape bridal creeper is a climbing perennial plant (with annual foliage) that forms multiple twisting stems that climb to 3 m high on supporting vegetation and grow up to 6 m long. Its system of roots, rhizomes and tubers form a thick mat just below the soil surface. The tubers

Shauna Potter

Western Cape bridal creeper (left) growing among common bridal creeper (note rust fungus on common bridal creeper leaves giving them a yellowish appearance)

are different to those of common bridal creeper and are a distinguishing characteristic. They are large (40–75 mm long) and thick, and usually end in a fine root. They are arranged in a tight rosette around the short rhizomes that grow close to the ground surface.

The leaf-like flattened cladodes (leaves) are broad at the base and pointed at the tips. They are a dark blue-green, and leathery with a waxy feel and are thicker and larger than those of common bridal creeper.

When the common form is growing in ideal conditions, seedlings and leaves can appear similar, so it is important to look underground at the tubers to confirm identification.

Tracey Hardwicke

The underground tubers are the best defining characteristic of Western Cape bridal creeper; they grow to 7.5 cm long and form tight rosettes that grow close to the ground surface

Tracey Hardwicke

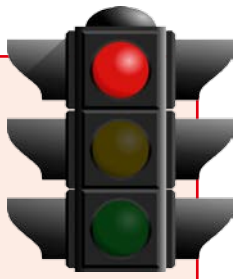
The leaves of Western Cape bridal creeper are generally larger, thicker and darker than the common form

Shoots appear after the first rains in early autumn. Germination appears to occur in the second winter after seed set, in contrast to common bridal creeper where seeds generally germinate in the first season.

Western Cape bridal creeper flowers two to three years after germination. Initial growth is rapid with white flowers first appearing in winter and fruit first appearing in late September. Berries are red and globe-shaped with three distinct lobes. With berry ripening, leaves yellow and fall, and stems begin to dry out and die back in late spring to early summer, but can survive throughout summer in areas with sufficient summer rainfall and shade. Plants produce thousands of black seeds (about 3.5 mm wide) each year and while viability is not confirmed up to 90% is suspected.

Like common bridal creeper, its main dispersal vectors are birds. Silvereyes, currawongs, black birds, wattle birds and emus readily consume fruits.

It also spreads vegetatively through rhizomes in dumped garden waste onto roadsides and into remnant bushland.



Correct identification is critical. Land managers should be on the lookout for Western Cape bridal creeper and report suspected infestations to local weed authorities.

Vigilance is required from all land managers to ensure that this form of bridal creeper is not growing on their property. Any findings must be reported to your local noxious weed management authority. An eradication program is currently underway in the Adelaide and Mount Lofty Ranges region of SA (see case study on page 95).

Seasonal patterns for Western Cape bridal creeper

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering							■	■	■	■		
Fruiting	■									■	■	■
Germination				■	■	■	■	■	■			
Foliage present	■	■	■	■	■	■	■	■	■	■	■	■

■ Generally present

■ Present in suitable conditions

Biology and threat

Common bridal creeper (*Asparagus asparagoides*)

Asparagus asparagoides is commonly known as bridal creeper. It was previously known as *Myrsiphyllum asparagoides* (L.) Willd., *A. medeoloides* (L.f.) Thunb., *Dracaena medeoloides* L.f., *Medeola asparagoides* L., *Elachanthera sewelliae* F.Muell. and *Luzariaga sewelliae* (F.Muell.) K.Krause. Other common names include bridal veil creeper, florist's smilax, baby smilax and false smilax, but it should not be confused with native plants in the genus *Smilax*.

Biosecurity SA

Infestation of common bridal creeper

Origin and distribution

Bridal creeper comes from a range of climatic regions in southern Africa, including areas with winter, summer and evenly distributed rainfall. It was first recorded in Australia in 1857 in a nursery catalogue and by the 1870s it was a common garden plant. Within 50 years after introduction, bridal creeper had become naturalised and widely distributed throughout southern WA, SA and VIC, with localised infestations in parts of NSW, QLD, Lord Howe Island and TAS. It is also a weed in New Zealand and South America.

Climate modelling indicates that the full extent of its range has not yet been reached. There is a risk of invasion in areas of rainfall greater than 350 mm, including central-northern and far south-eastern coasts of WA, far south-western coast and northern agricultural districts of SA, northern and south-western VIC, central and southern NSW, south-east QLD and northern and eastern TAS (Scott and Batchelor 2006).

Habitat in Australia

Bridal creeper invades a wide range of habitats throughout Australia, including coastal vegetation, wet and dry sclerophyll forests, heathlands, mallee shrublands and river banks. It prefers shaded or part-shaded situations, is found on most soil types and can tolerate a wide range of pH and climatic conditions. It thrives in nutrient-enhanced soils such as along drainage lines. It does not persist in pastures or most cropping situations due to grazing and cultivation.

Environmental impacts

Bridal creeper is very competitive. Its shoots form a dense canopy that shades out native shrubs, herbs and seedlings. The tuberous root mat forms a thick barrier just below the soil surface, which can limit the establishment of native seedlings by restricting access to soil moisture, nutrients, available space and light. This in turn can affect animals that depend on native plants.

Bridal creeper can cause significant economic losses by smothering trees and seedlings in forestry and plantation citrus orchards (Kwong 2006). It further reduces the productivity of orchards by shading trees (e.g. citrus and avocado trees) and interferes with fruit picking.

Bridal creeper is ranked as SA's most damaging environmental weed (Bass and Lawrie 2003).

Biology and ecology

Bridal creeper is a climbing plant with twisting stems that grow up to 3 m long and branch extensively. Plants have soft and shiny, broadly ovate, green leaf-like cladodes (leaves) that are 4–30 mm wide and 10–70 mm long. Leaves

occur alternately along the length of wiry green stems.

Annual shoots emerge in autumn from a perennial root system that consists of extensively branched rhizomes and numerous tubers. These rhizomes and tubers form thick root mats extending 10–20 cm below ground. Tubers range in size from 25 to 40 mm long and 8 to 20 mm wide. The perennial root mats make up at least 87% of the plant biomass and allow the weed to persist year round, withstand disturbance and outcompete native species (Raymond 1996).

Flowers are white and scented. They appear in late winter to early spring. Green pea-sized berries turn pink, then red or burgundy in late spring to early summer, and blacken upon maturity. Berries contain between 1 and 9 seeds. With berry ripening, leaves yellow and fall and stems begin to dry out and die back in late spring or early summer. However, stems can survive year round in areas with sufficient summer rainfall.

Seeds germinate readily under a wide range of environmental conditions (Willis *et al*. 2003). Vegetative reproduction commonly occurs from small sections of below-ground rhizomes. There have been no reports of regeneration from tubers alone but, as the tubers are attached to a rhizome that runs extensively underground, care must be taken to ensure rhizomes are completely removed, if manually removing this plant from the soil. The plant is able to persist mainly by way of the 'bud bank', with numerous shoot buds located along the rhizomes. Over 1000 berries per square metre may be produced. Viable seeds readily germinate from

Hillary Cherry

Common bridal creeper leaves

Biosecurity SA

Common bridal creeper root system

a depth of up to 10 cm and dry seeds can remain viable for at least three years (CRC 2004a).

Bridal creeper is capable of invading undisturbed sites, primarily through fruit-feeding birds (both introduced and native) that eat berries and excrete seeds a long distance away. Common bird dispersers include silvereyes, blackbirds, red wattlebirds, singing honeyeaters, common starlings, little crows, ringneck parrots and emus. Rabbits and foxes also eat fruit and disperse seeds, and berries may be carried by water along watercourses. Other methods of spread include dumping of garden rubbish and machines such as graders along road verges moving soil contaminated by seed or root mass.

Seasonal patterns for common bridal creeper

	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Flowering									■	■		
Fruiting											■	■
Germination				■	■	■	■	■	■			
Foliage present	▒	▒	▒	■	■	■	■	■	■	■	■	▒

■ Generally present
▒ Present in suitable conditions

New and emerging asparagus weeds

Species	*Asparagus falcatus* (sicklethorn)	*Asparagus retrofractus* (Ming asparagus fern)
Other names	*Protasparagus falcatus* (L.) Oberm.	*A. macowanii* Baker (pom pom asparagus or zig-zag asparagus)
Origin	Eastern and southern Africa	Southern Africa
Habit	Robust climber up to 6 m; capable of attaining large crown size (>300 mm diameter)  Sheldon Navie	Shrubby plant growing 1–2 m and occasionally 3 m tall  Sheldon Navie
Cladodes (leaves) and stems	Year round foliage; sickle-shape, shiny, dark green, elongated cladodes 30–60 mm long, 3–5 mm wide; stems with thorns that become woody with age  Sheldon Navie	Year round foliage; needle-like cladodes 7–45 mm long and produced in clusters of 20–30 along the stems; older stems are light grey and bear small spines  Sheldon Navie
Flowers	Small white flower clusters on elongated stalks  Sheldon Navie	Small, white or cream; dense clusters produced in large numbers on short stalks  Sheldon Navie
Fruits	Red rounded berry  Matt Sheehan	Rounded berries, initially green turning purple to pinkish-red or with bluish bloom to black as they mature  Matt Sheehan
Roots	Form swollen tubers	Form fleshy, tuberous roots  Glen Sanders
Current known distribution	Recorded in Sydney and Wyong region at Lake Cathie, Sancrox and Port Macquarie in NSW; growing in Littoral Rainforest, Wet Sclerophyll, Swamp Oak and Subtropical Rainforest ecological community types	Recorded in the Moreton and Wide Bay districts in south-eastern QLD, Coochiemudlo Island, Greenslopes and St Lucia in Brisbane and on the margins of a dry rainforest near Gympie; also observed growing in bushland at Ashgrove, Rochedale, Riverhills and Mount Coot-tha
Status and spread	Emerging environmental weed in south-eastern QLD and NSW coastal areas; spread by birds and other animals that eat its fruit	Emerging threat in south-eastern QLD in urban bushland and along waterways; often cultivated as a garden ornamental and spread by birds and other animals that eat its fruit
Habitat	Prefers moist, semi-shaded growing conditions; common in riparian areas near human habitation; can germinate in conditions from full sun to rainforest with >80% canopy closure	Potential weed of riparian vegetation, forest margins, open woodlands, urban bushland, coastal environs, roadsides and disturbed sites; most commonly found in the understorey of drier forests

Species	*Asparagus officinalis* (garden asparagus)	*Asparagus virgatus*
Other names	(edible asparagus)	*Protoasparagus virgatus* Baker (Oberm.)
Origin	Native to northern Africa, Europe, western Asia and Mongolia	Native to eastern and southern Africa and the Arabian Peninsula
Habit	Erect or scrambling multi-branched perennial herb to 1.5 m high  Rob Richardson	Erect herb, climber or shrub 0.4–0.8 m high; can attain very large and continuous infestations  Sheldon Navie
Cladodes (leaves) and stems	Foliage dies back annually; cladodes are fine and cylindrical, 5–30 mm long and 0.5–1 mm wide with a few in each axil  Rob Richardson	Year round foliage; cladodes and branches spirally arranged with 3–6 cladodes in each axil; each cladode 6–20 mm long and 0.5–1 mm wide, slightly tapering and hairless  Sheldon Navie
Flowers	Greenish-white and solitary in axils; spring to summer flowering  Rob Richardson	Greenish-white and solitary in axils; spring flowering  Sheldon Navie
Fruits	Globular berries to 10 mm diameter, red when mature; contain 1–9 seeds  Rob Richardson	Egg shaped berries, 4–6 mm diameter, bright orange when mature; contain 1 seed  Sheldon Navie
Roots	Form dense mat of rhizomes that arise from crowns	Fibrous forms an extensive rhizomatous root mass  Peter Michael
Current known distribution	Occasionally naturalised in southern and eastern Australia (i.e. in south-eastern QLD, eastern NSW, ACT, VIC, TAS, south-eastern SA and south-western WA); problematic in riparian areas	Naturalised in some parts of coastal and sub-coastal districts of south-eastern QLD and less common in the coastal districts of central NSW
Status and spread	Commonly grown vegetable plant that escapes cultivation and is an emerging weed of disturbed sites, wetlands and watercourses; an environmental weed in VIC and a potential environmental weed in WA, NSW, ACT, TAS and SA; spread by birds and rhizomes	Regarded as a minor environmental weed in eastern QLD and as a sleeper weed or potential weed in other parts of Australia (e.g. in north-eastern NSW); spread by birds and other animals that eat its fruit
Habitat	Occurs in disturbed areas and on roadsides and riverbanks and other wet areas; widely cultivated	Mainly found in riparian areas and near forest margins, or in disturbed sites near human habitation; can germinate in conditions from full sun to rainforest with >80% canopy closure

Other non-native *Asparagus* species to look out for and eradicate

The *Asparagus* species outlined in the previous table are emerging weeds in Australia. They are all naturalised in limited areas of Australia but have the potential to spread much further and negatively impact on a range of environments. If detected, these species should be immediately targeted for control, thereby reducing their chance of becoming major weeds in future.

We do not currently know the full distribution of these new and emerging asparagus weeds. If you see any of these species, they should be reported and targeted for eradication, if possible.

Emerging asparagus weed species *A. falcatus* and *A. virgatus*

Asparagus falcatus (sicklethorn) and *A. virgatus* are two emerging asparagus species in Australia that could become widespread weeds if they are not detected and controlled immediately. Both species can germinate in conditions from full sun to more than 80% canopy closure and can infest a range of coastal environments. Port Macquarie-Hastings Council in New South Wales is currently managing infestations of these weeds (see case study on page 106).

Sheldon Navie

Asparagus falcatus flowering

Peter Michael

Asparagus falcatus

Sheldon Navie

Asparagus retrofractus invasion

Sheldon Navie

Asparagus virgatus invasion

Peter Michael

Asparagus virgatus