Image by Greg Jordan

Discaria pubescens

spiky anchorplant

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Scientific name: ***Discaria pubescens*** (Brongn.) Druce, *Bot. Soc. Exch. Club Brit. Isles* 1916: 620 (1917)

Common Name: spiky anchorplant (Wapstra *et al.* 2005)

Group: vascular plant, dicotyledon, family **Rhamnaceae**

Status: *Threatened Species Protection Act 1995*: **endangered**
Environment Protection and Biodiversity Conservation Act 1999: **Not listed**

Distribution: Endemic status: **Not endemic to Tasmania**
Tasmanian NRM Region: **North, South**

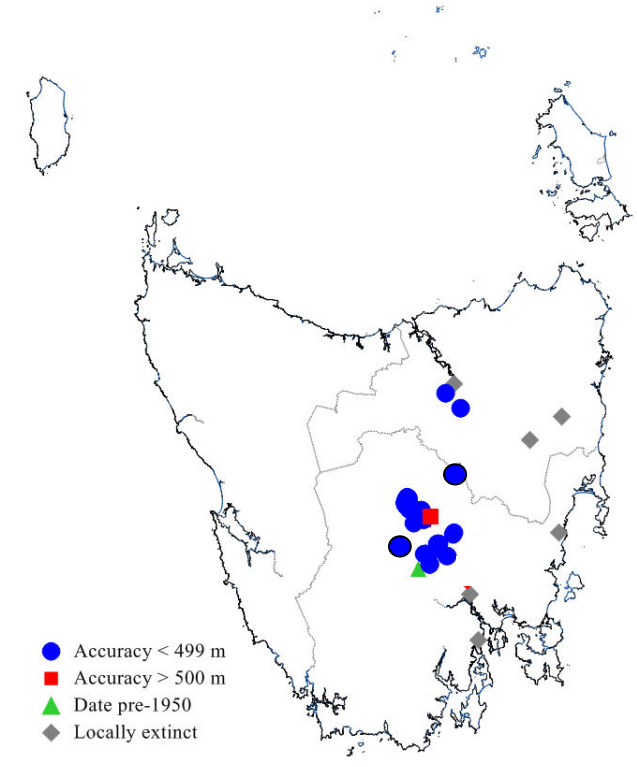

Figure 1. The distribution of *Discaria pubescens* in Tasmania, showing NRM regions

Plate 1. Growth habit of *Discaria pubescens* showing the disc-like receptacles (image by Greg Jordan)

SUMMARY: *Discaria pubescens* (spiky anchorplant) is a shrub which, in Tasmania, has become restricted to the central highlands (its stronghold), the southern Midlands and the Launceston/Perth area. Much of its grassland and woodland habitat has long been converted for agriculture, with plants now mostly restricted to riparian areas protected by inaccessibility and rockiness. Only 1,000 to 2,000 plants remain, sometimes scattered in low numbers over large areas. Despite the ferocious spines of the species when mature, seedlings are highly palatable to native and introduced animals, stock and insects, resulting in small over mature subpopulations. Because of this, the species is subject to ongoing decline and is also at risk from agricultural, irrigation and power generation developments, roadside maintenance, chance events due to low numbers and fragmentation, and impacts of climate change. Small occurrences would benefit from periodic browsing protection to provide opportunities for the recruitment of seedlings.

IDENTIFICATION AND ECOLOGY

Discaria pubescens often occurs as scattered individuals but can also occur in dense colonies under ideal conditions. Recruitment appears to be solely from seed. As the seed exhibits some dormancy mechanisms, with germination maximised in trials by cold stratification (Hall & Parsons 1987, Coates 1991), this species is likely to form a soil-stored seed bank, the longevity of which is unknown. The thickened rootstock produces and replaces new shoots regularly and plants often produce horizontal underground stems that can emerge up to 40 cm away. However, these stems always remain attached to and dependant on the parent plant (Hall & Parsons 1987). The suggestion that the species can regenerate vegetatively by suckering (Coates 1991) may be erroneous as excavations revealed that most plants thought to be suckers were in fact seedlings (Hall & Parsons 1987).

The development of flower buds begins in June until bud burst is initiated from October to mid November, with the main flowering period from October to December (Coates 1991, Walsh 1999). Plants can flower prolifically, although Coates (1991) noted that less than 40% of plants produced flowers. Flowers are thought to be highly fragrant and very attractive to native bees, the likely pollinators. Fruit develops in late spring and is mature by mid February, with maximum seed release in mid March. Seed is often produced in abundance (Coates 1991). When the capsules dry, seed is released by explosively expelling seed 1 to 2 m away (see Coates 1991).

The longevity of rootstocks has been estimated to be at least 30 years though the individual shoots may be no more than 6 years old (Hall & Parsons 1987). Many Tasmanian subpopulations of *Discaria pubescens* appear to comprise only mature individuals with little or no evidence of recruitment, suggesting that conditions conducive to the establishment of seedlings are infrequent, perhaps being due to the palatability of seedlings prior to the development of its protective spines. While the species can resprout after damage, the species is usually found in places where the frequency and severity of fires has been reduced, suggesting that *Discaria pubescens* may be relatively intolerant of fire.

Survey techniques

Surveys can be conducted at any time of the year for this highly distinctive shrub.

Description

Discaria pubescens is a rigid, much-branched spreading shrub that is typically 30 to 90 cm tall and wide and occasionally up to 2.5 m tall. Some occurrences on mainland Australia are comprised of prostrate shrubs. The mature stems are hairless, dark green and smooth, the surface being almost waxy. They have the appearance and flexibility of stiff plastic. The tiny leaves are soon deciduous, giving the plant a leafless appearance, although they may persist on new growth. They are more or less oblong to 10 mm long and 3 mm wide, with minutely toothed margins and an obtuse or mucronate apex within an apical notch. The surfaces are glabrous or occasionally with a few hairs near the tip. The stipules are dark reddish-brown,

about 1 mm long, often shallowly joined around the node, and pubescent on the inner face. The plant is dominated by stout spreading spines. They are usually between 1.5 and 4 cm long, sometimes to 7 cm long, and are positioned on opposite sides of the stems at regular intervals. The white to cream flowers are solitary or occur in few-flowered clusters in the axils of small leaves at the base and on the underside of the spiny branches. The pedicels are 2 to 3 mm long. The sepals are somewhat spreading, and 1 to 1.5 mm long, and the petals are about 1 mm long. The stamens are sub equal to and weakly hooded by the petals. The style is minute. The disc-like receptacle supporting the flower parts is prominent, and obscurely 5-angled. The fruit is a capsule that is prominently 3-lobed and 4 to 5 mm in diameter, with the valves separating incompletely at maturity and splitting dorsally and medially. Each pod contains 1 to 3 ovoid, leathery, black-brown seed.

[description from Curtis & Morris 1975, Walsh 1999]

Confusing species

There are no confusing species, although, from a distance, shrubs of *Discaria pubescens* can look superficially similar to *Melicytus dentatus* (spiky violetbush) and *Bursaria spinosa* (prickly box), two species that co-occur at a few sites.

Table 1. Population summary for *Discaria pubescens*

	Subpopulation	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied	Number of individuals
1	**Fingal district**	unknown	North	Fingal	1931	presumed extinct	
2	**Avoca** (South Esk River)	unknown	North	Hanleth	1891	presumed extinct	
3	**Cataract Gorge** (First Basin)	Launceston City Council	North	Launceston	early 1900s	presumed extinct	
4	**South Esk River** (opposite Hadspen)	private property	North	Prospect	2003 (pre 1858?)	unknown	1
5	**South Esk River** (S of Perth)	private property	North	Longford	2001 (pre 1900?)	unknown	2
6	**River Ouse** (W side just N of Waddamana)	private property	South	Waddamana	1979	unknown	unknown
7	**Waddamana powerline**	private property	South	Waddamana	2009 (2006)	0.1 ha	6
8	**Bashan Ledge** (near Waddamana)	private property	South	Waddamana	2007	1 ha	12
9	**Bashan Ledge** (south)	private property	South	Waddamana	2008	scattered over 60 ha	36
10	**Bashan Ledge (**Mushroom Hill)	private property	South	Waddamana	2009 (2005)	scattered over 50 ha	46
11	**Bashan Plains Rivulet**	private property	South	Waddamana	2009	unknown	46
12	**River Ouse**	private property	South	Waddamana	2005 (1981)	unknown	8+
13	**Bashan Road**	roadside*/private property	South	Echo/ Waddamana	2009 (1989)	along 6 km	120+ 100-1000
14	**Waddamana Road** (W of Synnots Sugarloaf)	roadside*/private property	South	Hermitage	2003 (1989)	unknown	15-20

	Subpopulation	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied	Number of individuals
15	**River Ouse** (W of Carrot Hill)	private property	South	Hermitage	1996?	unknown	unknown
16	**Lake Highway** (W of The Bitters)	roadside*	South	Hermitage	2008	unknown	1?
17	**Shannon River** (downstream of Hermitage)	private property	South	Hermitage	1998 (1971)	0.001 ha	7
18	**River Ouse** (junction with No Tea Creek)	private property	South	Cluny	1991	unknown	unknown
19	**Fordell Creek**	private property	South	Dennistoun	2012	0.0015 ha	12
20	**Falls of Clyde**	private property	South	Cawood	2007 (1990)	unknown	unknown
21	**Grass Hut Rivulet**	private property	South	Cawood	1991	unknown	unknown
22	**West of Wrigleys Flat**	private property	South	Strickland	1991	0.0001ha	1
23	**Langdons Creek**	private property	South	Montacute	2006	along 1 km	130
24	**Langdons Creek** (upper)	private property	South	Montacute	2006	0.5 km	11
25	**Abyssinia Creek** (Sag Hill)	private property	South	Kempton	2008	0.01 ha	14
26	**Dew Rivulet** (Boomer Tier)	private property	South	Montacute	2006	unknown	unknown
27	**Hamilton**	unknown	South	Hamilton	pre-1930	unknown	unknown
28	**Brighton to Bagdad**	private property	South	Broadmarsh	pre-1900	presumed extinct	
29	**Derwent River**	unknown	South	unknown	pre 1810	presumed extinct	
30	**Browns River**	unknown	South	unknown	pre 1858	presumed extinct	
31	**Swanport or Swansea area?**	unknown	South	unknown	late 1800s	presumed extinct	

NRM region = Natural Resource Management region
* managed by Department of Infrastructure, Energy and Resources, Tasmania

DISTRIBUTION AND HABITAT

Discaria pubescens occurs in Tasmania, Victoria, New South Wales, A.C.T. and southern Queensland. In Tasmania (Table 1, Figure 1), the species is extant along a limited number of major river systems (South Esk, Clyde, Ouse, Derwent) in both lowland sites in the southern Midlands and the Launceston/Perth area, and highland sites in the Waddamana to Lake Echo area.

Herbarium specimens support an historical presence along the middle and lower reaches of the South Esk River at Avoca, Fingal and Cataract Gorge, and additional sites in the southern Midlands. While Coates (1991) noted that a dubious first record is from South Bruny Island in 1802, may have been confused with *Bursaria spinosa*, Hooker (1858) and Rodway (1903) both cite locations such as Bagdad, Brighton, Swanport, Browns River and Perth, only some of which are supported by herbarium specimens.

In Tasmania, *Discaria pubescens* is most strongly associated with native grasslands and grassy woodlands, often occurring on banks, roadside batters, sandy and gravelly soil on basalt talus slopes, and amongst fractured dolerite outcrops and flood channels (Plates 2 & 3). An atypical

site occurs on substrates derived from mudstone. The apparent preference for riparian areas may be an artefact of historical clearing (Coates 1991). Occurrences on mainland Australia are often associated with streams in cool elevated areas on various substrates (Walsh 1999).

In many sites, the species occurs in areas virtually devoid of native species. Reconstruction of pre-clearing native vegetation would suggest the preferred habitat of the species included open grassy woodlands with a canopy cover of species such as *Eucalyptus pauciflora*, *Eucalyptus viminalis /dalrympleana*, and *Eucalyptus rodwayi*, and an understorey of low shrubs and various tussock-forming grass species.

Plate 2. Flood-prone rocky creek through open grassland – typical habitat of *Discaria pubescens* (image by Mark Wapstra)

Plate 3. Growth habit of *Discaria pubescens* in a rock crevice (image by Mark Wapstra)

POPULATION PARAMETERS

The distribution of *Discaria pubescens* in Tasmania has been presented in Table 1 as 31 separate subpopulations, although some may be better combined into larger occurrences in localities that now represent the stronghold of the species, including in and around the Waddamana, Bashan Ledge and River Ouse areas, and the Hamilton to Bothwell area. The extent of occurrence of all observations is about 6,450 km^2, and linear extent about 205 km, reducing to 2,650 km^2 and 118 km respectively when considering extant sites only (Figure 1).

Plants have not been observed at many sites for several decades or since the 1800s. Coates (1991) suggested that historical records from locations where the species has not been recorded in recent years represent a significant range contraction, primarily due to agricultural clearing. While there is limited information on the numbers of mature individuals and area of occupancy (Table 1, Figure 1), the available data is perhaps suggestive of a continuing contraction from lowland areas to the stronghold of the species in the central highlands. *Discaria pubescens* may never have been common, with Hooker reporting in 1858 that the species was not common, despite occurring in widely separated areas. Subpopulations are generally small, with the total population here estimated in the order of 1,000 to 2,000 mature individuals. The species may occupy around 250 ha, though the area of occupancy is difficult to define for species like *Discaria pubescens* that are sometimes scattered over large areas or along creeks or roads and may not well inform the assessment of extinction risk.

The widespread and disjunct distribution of *Discaria pubescens* suggests that the species may be detected at further sites, although these are likely to be within the range predicted by extant subpopulations. Discovery of new sites is likely to be serendipitous or the result of targeted surveys for threatened flora for development proposals such as instream dams, particularly on private land. Ongoing river rehabilitation activities along the South Esk suggest only a slight possibility of re-discovering

subpopulations now presumed extinct in the Fingal and Avoca areas, and Cataract Gorge near Launceston.

RESERVATION STATUS

Discaria pubescens is not recorded from any formal reserve. The presumed extinct site in Cataract Gorge (First Basin) is on land managed, in part, for its conservation values by Launceston City Council.

CONSERVATION ASSESSMENT

Discaria pubescens was listed as endangered on the Tasmanian *Threatened Species Protect Act 1995* when the Act came into being. It meets criterion C as the total population is estimated to number fewer than 2,500 mature individuals and there is an estimated continuing decline of at least 20% within the next two generations.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

The primary threats to *Discaria pubescens* have been, and continue to be, clearing of habitat for agriculture, irrigation and hydropower production, and more recently from wind power production, plantation establishment and instream dams. Lack of knowledge on the distribution of the species is also a concern because many potentially suitable sites are likely to be subject to ongoing or new intensive primary production activities. Browsing by native and exotic pest animals and stock grazing (cattle and sheep), combined with agricultural practices such as cultivation are probably responsible for the contraction of the species to naturally protected sites. The apparent contraction of the species to its highland stronghold also suggests that the species may be susceptible to the direct or indirect impacts of climate change, particularly as recruitment events appear to be a significant limiting factor for the species.

Land clearing: In Tasmania, threats to *Discaria pubescens* have historically been extensive land clearing of low-lying ground for the development of pasture and cropping lands, which included substantial modifications to many areas of riparian habitat that may have supported the species. This may partially explain the disjunct contemporary distribution of the species.

Impoundments: Large instream dams (e.g. Trevallyn Dam) have probably resulted in the loss of several sites for *Discaria pubescens*. Loss and modification of known sites and potential habitat continues through small- and large-scale agricultural and irrigation activities.

Agriculture and browsing: Despite its stout spines, young plants may be browsed, which may explain the lack of seedlings at many sites. Coates (1991) suggested that the significant range reduction is due to agricultural clearing, noting that in many places the species has contracted to protected sites amongst heavily grazed areas such as rocky outcrops, slopes, cliffs and river banks. Hooker in 1858 had already reported that the species was much browsed by cattle and sheep. Browsing appears to be predominantly from native animals such as wallabies, possums and wombats (Coates 1991) and presumably from introduces species such as rabbit and deer, the numbers of which may be enhanced in response to agricultural production. Repeated ploughing has probably eliminated the species from some areas, as evidenced by the apparent locally high abundance in raised rocky sites that have escaped cultivation. Management may require a restriction on stock grazing for a few years to allow seedlings to establish. In addition to mammal browsing, Coates (1991) reported significant insect damage affecting the development of new shoots, leaves, flowers and fruit.

Inappropriate fire regime: Most sites supporting the species have been burnt (Coates 1991), especially on farmland where fire is used to reduce the cover of *Lomandra longifolia*. Fire in itself may not be a direct threat as the species appears to be able to resprout after fire (Coates 1991). However, the species tends to occur in patches where the frequency and intensity of fires is reduced (Coates 1991, 1992), suggesting that the impact to the species may be exacerbated by other factors such as increased exposure to frost, browsing and insect attack.

Lack of recruitment: Coates (1991) noted that many subpopulations are ageing and show little to no sign of recruitment.

Roadside maintenance: Many individuals of *Discaria pubescens* are restricted to the grassy verge between public roads and fenced pastures, and underneath cleared powerline easements. The degree of roadside and powerline maintenance including slashing and herbicide spraying, that the species can tolerate is not known.

Climate change: A warmer climate and longer periods of drought may deleteriously impact on the habitat of *Discaria pubescens*, through effects such as drying out of low-lying areas, competition with weeds and fewer opportunities for successful recruitment. This may be exacerbated by impacts of native or introduced mammal browsing at some sites, and insect damage from climate change induced outbreaks.

Stochastic risk: The often highly localised distribution of some subpopulations of *Discaria pubescens*, combined with a usually low abundance, makes them subject to chance events.

MANAGEMENT STRATEGY

Management objectives

The main objectives for the recovery of *Discaria pubescens* are to prevent the loss or degradation of known subpopulations, increase the information and data available on the location, size and condition of known subpopulations, gain a better understanding of the ecological requirements of the species, and increase the number of known subpopulations through survey.

What has been done?

Research: Coates (1991) undertook extensive ecological research on five species of threatened species of Rhamnaceae, including *Discaria pubescens*.

What is needed?

Agencies, groups or individuals may assist with some or all of the following recovery actions. Coordinated efforts may achieve the best and most efficient results.

- provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies, development proponents and the local community on the locality, significance and management of the known subpopulations and potential habitat;
- undertake surveys of poorly known subpopulations, and historical sites to determine the full extent of subpopulations and identify relevant management issues;
- monitor selected subpopulations for health, recruitment and response to disturbance;
- provide periodic protection from browsing, for small isolated subpopulations to encourage recruitment;
- encourage private landowners to consider protection and management of the habitat of the species through either perpetual covenants or vegetation management agreements under the Tasmanian *Nature Conservation Act 2002*.

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View:
www.dpipwe.tas.gov.au/threatenedspecieslists

Contact details: Threatened Species Section, Department of Primary Industries, Parks, Water and Environment, GPO Box 44, Hobart, Tasmania, Australia, 7001. Ph (03) 6233 6556; fax (03) 6233 3477.

Permit: It is an offence to collect, disturb, damage or destroy this species unless under permit.