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best practice management guide

2

BEST PRACTICE MANAGEMENT GUIDE FOR ENVIRONMENTAL WEEDS

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Broom, *Cytisus scoparius*

Taxonomy and status

Botanical name: *Cytisus scoparius* (L.) Link subspecies. *scoparius* (synonym: *Sarothamnus scoparius* (L.) Wimmer) - Family Fabaceae.

Standard common name: broom. Other common names applied to this plant in Australia include Scotch broom, English broom, common broom and Spanish broom.

Relationship to other species in Australia: There are no indigenous Australian species closely related to broom although two other species within the *Cytisus* group are also naturalised in Australia: tagasaste or tree lucerne (*Chamaecytisus palmensis*), promoted as a fodder plant in WA, and white Spanish broom (*Cytisus multiflorus*). Other less closely related environmental weeds naturalised in Australia include Montpellier broom (*Genista monspessulana*), flax-leaved broom (*Genista linifolia*), Madeira broom (*Genista stenopetala*) and Spanish broom (*Spartium junceum*). An Australian native that resembles broom is native broom (*Viminaria juncea*).

Legislation: Broom is declared noxious throughout SA and WA and in parts of NSW, Vic and Tas. Keep up to date with the latest legislation through local and State/Territory government weed agencies or on the web at www.weeds.org.au

Description

Habit/lifeform: large shrub that loses leaves over winter or in dry conditions.

Description: Broom is a non-spiny leguminous shrub, having several erect or spreading then erect stems which later collapse to become prostrate. Plants grow to 4 m high, and often form dense thickets in cooler areas. Branches are green, five-angled and mostly hairless. Leaves are usually three-foliolate (like clover), but one-foliolate on young growth. Leaflets are 5–20 mm long and 1.5–8 mm wide, with scattered hairs on the upper surface and numerous short hairs on the lower surface. Flowers are on a stalk and solitary or in pairs. Petals are golden

yellow, 15–25 mm long. Fully developed pods are 2.5–7 cm long and 8–13 mm wide, oblong, strongly compressed, with brown or white hairs on the margin, otherwise hairless, initially green (Figure 1), black at maturity; they open explosively. Many ornamental hybrids have been derived from crosses between broom and other *Cytisus* and *Genista* species. Red- and yellow-flowered hybrids (Figure 2), similar to cultivars 'Andreasus' and 'Andreasus Aureus', have become naturalised in NSW, Victoria and Tasmania.



Close-up of broom.
Photo: J.R. Hosking



Broom infestation near Scone, NSW.
Photo: J.R. Hosking.



Broom flowers.
Photo: K. Blood.



Figure 1. Flowers and pods of *Cytisus scoparius*, note that pods of this species have hairs only along the pod margin. Photo: J.R. Hosking.



Figure 2. Flowers of *Cytisus scoparius*, both the yellow flowered species and red and yellow hybrid. Photo: J.R. Hosking.

Montpellier broom is frequently confused with broom but can readily be distinguished as it has ridged (but not five-sided) stems, flowers 0.8–1.3 cm long and densely hairy pods mainly 1.5–2.5 cm long (Figure 3).



Figure 3. Flowers and pods of *Genista monspessulana*, note that this species has densely hairy pods.
Photo: J.R. Hosking.

Origin and distribution

Origin: Broom is native to much of Europe.

Introduction: The exact date of the initial introduction of broom from Europe into Australia is unclear. It apparently took place about 1800 after Governor King requested broom seeds to be grown as a substitute for hops. Later introductions were made for ornamental purposes. Several cultivars and hybrids can still be purchased from garden centres and nurseries.

Distribution: Broom has spread to many regions in south eastern Australia (Figure 4) including the Barrington Tops National Park in NSW, Australian Alps national parks and western Tasmania, where it poses a serious threat. It has also been recorded around Perth in WA. The total area infested in Australia is estimated currently to be over 200 000 hectares but it is still spreading. Broom is a major weed in New Zealand and western USA.



Figure 4. Distribution of *Cytisus scoparius* in Australia (Based on Parsons and Cuthbertson 1992).

Ecosystems invaded: Broom invades natural ecosystems where it competes with indigenous plants and changes fauna habitat. Broom is found in grassland and woodland/open-forest (Figure 5), including a wide range of disturbed as well as undisturbed communities in cool, moist regions. Broom

invades and persists in treeless vegetation such as subalpine grassland and cleared pastureland, but will not grow in heavily shaded or swampy places. On pastureland, broom forms thickets that prevent grazing and restrict access to water.

Successful seedling establishment occurs away from broom shading, usually after soil or vegetation disturbance, including cultivation, fire, slashing, herbicide treatment, road-making and pig-digging. Broom can, however, also readily invade vegetation without major disturbance, with seedlings being found in open microsites such as along animal tracks and beside fallen timber.



Figure 5. *Cytisus scoparius* invading indigenous native forest.
Photo: J.R. Hosking.

Impacts

Species and ecosystems at risk: A number of plant and animal species listed as rare or threatened are found only in broom-infested areas. These include *Ozothamnus* sp. (undescribed) and a number of orchid species at Barrington Tops. Most groundcover plants and eucalypt seedlings are shaded out by dense broom stands. Broom also provides shelter for pest animals, such as pigs and horses, that affect the neighbouring flora and fauna.

Economic impact: Broom is mostly an environmental weed in Australia although it is also a problem in pastures grazed by cattle and in forestry in Tasmania. Broom affects natural ecosystems, pastures and forestry in New Zealand and the USA.

Dispersal and establishment

Reproductive techniques: Plants spread by seed. Plants flower prolifically but only a small proportion of flowers develop into fruits. The average number of seeds per pod varies from five to eight. Pods ripen over summer. Seeds are released explosively on sunny days as the pods dry out.

Vectors and dispersal mechanisms: Most seed falls within 1 m of parent plants, although exceptionally explosive release can fling them 4.5 m. Some secondary local dispersal may be achieved by ants. Longer-distance dispersal may occur by movement of seed in mud attached to vehicles, machinery, footwear and animals; by watercourses in flood; and probably internally by animals such as horses and pigs. Humans further assist its spread by deliberate planting for beautification and through soil movement for roadworks in infested areas.



Persistence: Like many legumes broom is hard seeded and only a small proportion of seeds germinate at any time. Seed longevity contributes to large soil seed banks below broom infestations. There can be up to 50 000 seeds per square metre in the soil under mature broom infestations.

Tolerances: Frosts appear to have no impact on plants and mature plants tolerate summer droughts.

Properties

Health risks and other undesirable traits: Seeds are poisonous if eaten in quantity whilst foliage may cause digestive problems in horses. These problems are minor compared with broom's ability to displace indigenous vegetation and compete in cattle grazing and forestry situations.

Cultural uses: Broom and its hybrids are still sold widely as ornamentals in Australia. Branches have been made into brooms - hence its common name. Broom has also been used as a substitute for hops, capers and coffee, for tanning, as a source of yellow dye and for medicinal purposes such as treatment of cardiac arrhythmia, as a diuretic, emetic and purgative, as a cure for dropsy and respiratory problems, and to induce abortions.

Biology and ecology

Biology and ecological notes: Fire encourages germination of broom seeds. There are many potential biological control agents for broom in Europe, three of which have been released in Australia (see below).

Growth calendar: Germination occurs throughout the warmer months, but the rate varies from year to year. In drier areas, spring seedlings rarely survive the summer unless protected by surrounding vegetation.

Broom plants generally flower first in their third year. While flowers can be found on plants at any time of the year in warmer climates, most flowering occurs from October to December in Australia and New Zealand. Seeds are mostly shed from January to early March. Plants may live for up to 25 years or more in Australia.

Management

Prevention: It is important to keep uninfested areas clear of broom. Identify and address existing or potential sources of this plant before it invades natural ecosystems. Are there plants in local gardens? Is the plant still being sold in local garden centres and nurseries or promoted in magazines? Encouraging gardeners to use more appropriate garden plants and dispose of garden waste responsibly will reduce broom sources.

Once an infestation is established, preventing its spread into surrounding areas should be a priority. This may include the quarantining of an area to stop movement of seeds in mud on vehicles. Ensure the removal of mud containing seed before moving vehicles, machinery, footwear and animals to uninfested areas.

Movement of vehicles should be avoided close to seeding broom stands in summer to prevent seeds being thrown through open windows or into roof gutters, onto truck trays and then transported to uninfested areas. Raising awareness amongst vehicle users (both recreational and management) is advisable. Removal of broom from roadsides and along watercourses will also slow rate of spread.

Spread of broom can also be reduced by minimising ground disturbance around existing broom stands. Control of pigs and closing vehicle access through broom-infested areas will help to reduce disturbance.

Integrated management: When treating broom in a natural ecosystem, it is essential to consider its management in light of other management issues so that they can be integrated to get the best results. When using these guidelines, it is essential to realise their limitations and modify them based on experience and local knowledge. Each situation should be considered individually. Weeds need to be treated as a symptom of larger land and water management issues.

If broom occurs in small isolated infestations, removal to prevent expansion is advisable. Larger infestations require planning to efficiently reduce the population to an acceptable level. That level will be determined by the management objectives of the area and the resources available to tackle the problem. There are a number of different treatment techniques that can be used but it is often better to combine a number of techniques for the best results.

Isolated plants or small infestations: Ensure you have correctly identified the plant before removal. Isolated plants can be physically removed, preferably before they have seeded. Small to large infestations can be treated with herbicide applied by spot-spraying or other suitable application methods. As infestations become larger, a strategically staged approach for removal is advisable to ensure that treated areas are not reinfested.

Larger infestations: Fire effectively kills plants and encourages germination of seed. The resulting seedlings can then be treated. In areas with a dry summer it has been suggested that prescribed burning of broom stands could greatly decrease the number of seeds on and in the soil. These fires should be carried out under conditions that maximise soil heating (ie. when the soil itself is dry) to promote a flush of germination prior to onset of summer drought. Follow-up chemical treatment after fire is likely to be needed. However, the ideal conditions for burning broom may make it a difficult exercise to justify in light of public safety and the resources required. Large soil seedbanks, the varied depths at which seeds are located in the soil and the difficulties in safely burning areas of normally damp vegetation all seem likely to make burning an unworkable strategy in many infested areas in Australia.

Infestations of many hectares in environmental areas or native forest will probably have to rely on biological control, as there is no economic alternative for management of these areas at present. Three agents have been released and have established in Australia: a twig-mining moth, a sap sucking psyllid and a seed-feeding beetle. These insects are still multiplying in the field but it is too early to determine their likely impact.

Grazing with goats or sheep is suitable for pastureland.

Herbicide information: When using chemicals always read the label and follow instructions carefully. Consult a specialist for advice on registered chemicals in your particular State or Territory. Herbicides information is available at the National Registration Authority web site at www.affa.gov.au/nra/pubcris.html

Herbicides used for broom treatment include products containing 2,4-D amine + picloram, triclopyr and triclopyr + picloram. Glyphosate is permitted for cut-stump treatment in NSW.



Disposal: If broom is being removed from gardens, dispose of waste through local government collection services or tip facilities. As seeds are difficult to destroy it is advisable to dispose of plants when they are not carrying pods with mature seed. Cover trailers and ensure local tip facilities are following Australian standards for composting and transfer station or tip management best practice guidelines. Encourage gardeners to avoid dumping garden waste over back fences or in bushland areas.

In natural ecosystems, isolated non-seeding broom plants should be pulled out and left where found with roots up-turned, as they are unlikely to re-root. If weed material cannot be accommodated on the site (ie mulched, dried on platforms, hung in trees, solarised etc), remove to tip facilities.

Community Awareness: There is considerable awareness of the broom problem in the Barrington Tops area of NSW as a result of the Barrington Tops Broom Council and publicity on the extent of the problem and management carried out to limit broom's impact in that region. The community of Waratah on Tasmania's West Coast has an understanding of the broom problem in their area because of the extent of the broom infestation in and around the town. Consider running activities as part of national Weedbuster Week in October each year to increase local community awareness of the problem. See the web site at www.weedbusterweek.info.au for more information.

Follow-up: Once an area of broom has been treated it will be necessary to monitor the treated area for many years and new plants destroyed. As plants generally seed three years after they germinate, monitoring and removal of plants should be carried out every second year.

Management calendar: Herbicides are generally more effective when applied to actively growing broom plants between late spring and the end of flowering. The best time to find new and map infestations is when the plant is flowering in spring to early summer (depending on the location). Checking large areas may be done by helicopter with follow-up ground checks as necessary.

Replacement plants: In gardens, broom can be replaced with indigenous species such as native broom, *Viminaria juncea*. This species flowers in spring, has yellow to orange flowers and looks similar to broom. It is best to seek the advice of local flora and revegetation experts for suitable indigenous plants of local provenance for revegetation.

WeedWatch: Legislation prevents sale of broom in a number of areas. If it is being sold in such areas then the garden centre or nursery and local weed management authority should be informed. Let garden centre staff know how weedy it is and the damage it is doing locally. Encourage them to provide safer alternatives.

Plants are unlikely to be a problem in gardens in large cities as seed rarely moves long distances from existing plants. However, gardeners often share seeds and seedlings with friends and relatives so removal of broom from gardens is advisable.

Where plants are found in the bush they should be reported to those managing the area so that infestations can be treated where feasible.

If you are uncertain about identification, send a specimen to the State or Territory Herbarium with details on where and when it was found and the contact details of the person who sent the specimen (see the *White Pages* or the *Weed Navigator* for address details of herbaria).

Further reading

Fallavollita, E. and Norris, K. (1992) The occurrence of broom, *Cytisus scoparius*, in the Australian Alps national parks. Australian Alps Liaison Committee Report.

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Parsons, W.T. and Cuthbertson, E.G. (1992) *Noxious weeds of Australia*. Inkata Press, Melbourne.

Waterhouse, B.M. (1988) Broom (*Cytisus scoparius*) at Barrington Tops, New South Wales. *Australian Geographical Studies* **26**: 239-248.

There are a number of management guides on different weeds being published by the Weeds CRC (see contact details below). Other CRC publications include the *Weed Navigator* (lists many weed publications, information resources and contacts in Australia and New Zealand), workshop proceedings, field and management guides, brochures and posters.

Further contacts: Many people interested in environmental weeds communicate regularly through the *Enviroweeds* email discussion group established in Australia. If you would like to join this group free of charge, send this message <subscribe> to the following email address: enviroweeds@majordomo.nre.vic.gov.au

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