

# English broom

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## Common names

English broom, Scotch broom, broom

## Botanical name

*Cytisus scoparius* (L.) Link Family Fabaceae

## Status

English broom is a Regionally Controlled Weed in the Wimmera, Corangamite, Port Phillip East, Goulburn, North East, West Gippsland and East Gippsland Catchment and Land Protection Regions. Landholders in these areas must take all reasonable steps to control English broom and prevent its spread on their land and the roadsides which adjoin their land.

## Origin and distribution

English broom is native to most of Europe. It is an important weed in the Pacific coast states of the USA, Hawaii, New Zealand, and in parts of Asia and its native range. It was first brought to Australia in about 1800. In Victoria, English broom was naturalised by 1887 and was first declared noxious in 1901. By 1980 it occupied an estimated 150,000 ha. Infestations occur in higher rainfall areas, mainly on roadsides, in dry sclerophyll forests and woodlands, wasteland and grazing lands in southern, central and north-eastern regions. The most important infestations are in the central highlands and the Alpine National Park.

## Description

English broom is an upright evergreen shrub up to 4 m, but more commonly 1 to 2 m high. It reproduces by seed which germinates mainly in spring and autumn. Young plants usually do not flower until their third year. Plants live for up to 27 years, although 10-15 years is more usual. After about 20 years they collapse and grow prostrate for the remainder of their life.

**Stems** - Numerous, erect, woody, green to brownish green, prominently ridged, five angled. Young stems remain green for about three years and actively photosynthesise.

**Leaves** - Singly or in clusters, shortly stalked, scattered hairs above and softly hairy beneath, bright green, composed of three leaflets, except on the growing tips where they can be single. Each leaflet ovate to lance-shaped, 1.5 to 8 mm wide. The central leaflet is largest, up

to 20 mm long. New leaves, produced in spring, are often lost during dry periods in summer or other periods of stress, and plants may be leafless for most of the year.



Figure 1. *English broom*.

**Flowers** - Pea-like, bright yellow, sometimes with red markings in the centre, shortly stalked, 15 to 25 mm long, occurring singly or in pairs in the leaf axils. October to December is the peak flowering time but flowers may appear sporadically throughout the year.

**Fruits** - Flat, brown or black pod (green when immature), hairy on the margins, mostly 25 to 60 mm long and 8 to 10 mm wide; ripening during summer and bursting open to eject the seed. Some pods curl up after seed is ejected.

**Seeds** - Green to yellowish-brown, shiny, rounded and flattened, 3 to 4 mm long and 2 mm wide, 6 to 22 (usually less than 15) per pod.

**Roots** - Taproot, often branched, with shallow laterals.

## Other broom species

*Cytisus multiflorus* (L'Her.) Sweet, white Spanish broom, is also naturalised in Victoria in the Creswick area and near Castlemaine. It has white flowers less than 15 mm long with pink markings in the centre and pods that are

hairy all over and less than 7 mm wide. It is considered an environmental weed in Victoria.

A yellow and brown flowered variety of English broom known as var. *andreas* found in France in 1844 was crossed with Portuguese broom at Kew Gardens. The hybrid was called *dallimorei*. The many forms of English broom sold in Australia are mainly descended either from var. *andreas* or cultivar *dallimorei*. Variety *andreas*, and *andreas aureus* or related cultivars are naturalised on the Central and Southern Tablelands of NSW, in Tasmania and around Mt Hotham.

English broom may be confused with Cape broom, *Genista monspessulana* (L.) L. Johnson, a widespread noxious weed which has ridged but not five-sided stems, densely hairy pods and much smaller flowers (8 to 13 mm long).



*Figure 2. Mature pods of English broom.*



*Figure 3. Seeds of English broom.*

## Properties

English broom is a legume and has root nodules that fix nitrogen. It is found mainly in cool temperate areas and grows most successfully on moist, fertile soils. It is common at altitudes of 300 to 800 metres and is a problem weed at higher altitudes in the Alpine National Park. Seedlings establish readily on sites where the soil has been disturbed or after fire, and can survive in shade. Successful establishment does not occur in existing dense broom stands. Seedlings require protection from drought and grazing. English broom can also invade areas subject to minimal disturbance, including eucalypt forest and woodland, alpine grassland and pasture. It spreads rapidly down creeks and rivers, and along roads and tracks.

Broom forms dense thickets that alter microclimate and exclude most other vegetation. Dense infestations in eucalypt forest prevent regeneration of understorey species and trees. Thickets provide harbour for rabbits, foxes and feral pigs which can modify the disturbance regime to favour the persistence of broom. English broom is highly flammable and burns intensely. Thickets increase fire fuel-loads in native vegetation and agricultural areas. Infestations can impede access along watercourses.

The seeds of English broom are considered toxic to stock if eaten excessively, and the foliage has been known to cause digestive troubles in horses. Sparteine and other quinolizidine alkaloids and the glycoside scoparin are the toxic principles. They are present in very small quantities although concentrated in the flowers and seeds. Ingestion of these plant parts could cause lack of coordination, nervous system depression, convulsions and respiratory failure, however it is very unlikely that animals would consume the large amounts necessary to cause poisoning. In practice, the toxicity of English broom is not considered to be a problem in Australia.

The hard seed coat can delay germination for months or years. Seed stored dry can remain viable for more than 80 years and more than 80% of buried seed can remain dormant and viable after 45 months. As a result large soil seed banks can develop under mature plants. Seed banks exceeding 65,000 seeds per square metre have been found beneath mature broom infestations in NSW. The seed coat needs to be ruptured before seed will germinate. Fire can stimulate seed germination resulting in dense infestations of seedlings.

English broom has been used in herbal medicine and has various culinary uses. The stems were once utilised to make brooms and to thatch rooves. Cultivars are widely sold for ornamental planting.

## Dispersal

English broom is spread solely by seed which are ejected from the pods when they open during the hotter months, mostly from December to early March. Most seed falls within 1 m of the parent plant but some may occasionally be flung out several metres. The seeds are not buoyant in water but are carried in the bed load of rivers and streams, resulting in long distance dispersal. Scouring in the stream bed damages the seed coat and the seed is ready for germination when it washes up on the bank. Seeds may also be locally dispersed by ants.

Dry pods containing seeds can be blown short distances by wind. Long distance seed movement can occur in mud and soil carried on road graders and earth moving equipment, farm machinery, vehicles and footwear, and in sand and gravel from quarrying operations. Seed can also be carried within the digestive tracts of horses and other animals. Contaminated agricultural produce probably results in some spread.

## Control

Long term management programs must be initiated to effectively control English broom. In planning these



programs integrated management strategies will achieve the best results. Early treatment of new infestations should be a priority. New infestations should be treated prior to plants reaching the flowering stage. Once plants begin seeding, control becomes more difficult and expensive. The persistent soil seed bank usually leads to rapid regeneration after initial treatment with herbicides, mechanical means or fire.

In native vegetation, avoidance of ground disturbance, particularly by pigs, vehicles and earth moving equipment, should reduce the rate of invasion of English broom. To minimise soil disturbance feral animals such as pigs should be controlled. Treated areas should be marked and regularly checked for regeneration, particularly after fire.

The presence of English broom plants in remote areas should be reported to a NRE or Parks Victoria office.

### **Limiting dispersal**

Walkers, horse riders and vehicles should keep to designated routes to minimise the amount of seed picked up on footwear, hooves and tyres. Broom growing along access tracks must be controlled to limit the potential for such spread. Equipment, vehicles and animals should be thoroughly checked and cleaned when leaving infested areas to ensure seed is not being carried. Do not remove gravel and sand from infested quarries and streams.

### **Manual control**

Small plants can be hand pulled or grubbed in spring when the ground is soft. Larger shrubs should be cut close to ground level and the stumps painted with herbicide.

### **Slashing**

Cutting seedlings when they are 5 to 10 cm high can provide effective control of regenerating plants. Thickets can be slashed with a brush cutter and any regrowth sprayed with herbicide.

### **Cultivation**

On agricultural land cultivation can destroy small plants but produces conditions suitable for seedling establishment, so must be followed up by further cultivation, heavy grazing or use of herbicides. Some dense infestations have been destroyed by bulldozing and repeated cultivation over two years. However the soil disturbance will move seed from the surface and distribute it through the soil profile, and may make long term management more difficult.

### **Grazing**

Sheep and goats, but not cattle, graze English broom, particularly younger seedlings and flowers, and may suppress development of infestations and reduce seed production. Larger plants may need to be cut or slashed to allow better grazing access.

### **Fire**

Fire may be a useful technique to reduce the soil seed bank. Most adult plants are killed by fire, while younger plants may re-sprout, depending on the fire intensity. The mass germination of the seed is stimulated by high soil

heating and fire can deplete seed banks by up to 90%. If infestations are burned in the spring the seedling regrowth will be subject to drought stress which will reduce seedling survival. Post-fire regeneration can be treated with herbicide or by hand weeding.



*Figure 4. English broom infestation at Kinglake West, Victoria*

### **Chemical control**

**Under Victorian legislation there are controls on various aspects of the uses of agricultural chemicals. Some particular uses are prohibited and some require permits. Users of certain agricultural chemicals are required to obtain an Agricultural Chemical User Permit (ACUP) or work under the direct supervision of an ACUP holder. Additional restrictions on the use of some herbicides apply to particular geographic areas known as Chemical Control Areas (CCA).**

**It is the responsibility of chemical users to familiarise themselves with these controls. See Agriculture Note: Agricultural chemical user permits (ACUP) and chemical control areas (CCA) for further information.**

**An ACUP is required for the use of prescribed chemicals containing the active constituents marked with an asterisk (\*) in the following list. Records of the use of these chemicals must be made by the user and these records must be kept for 2 years. Restrictions on use in CCAs apply to the chemicals marked with a hatch (#).**

**Contact the Regional Chemical Standards Officer of the Department of Natural Resources and Environment if further advice is required.**

**You should read the product label and follow all label instructions carefully before using any herbicide.**

Use a product containing the following active constituents that is registered for use in Victoria to control English broom in the particular situation in which you need to use chemical control, eg. in non-crop areas. Consult the product label for detailed information.

- 2,4-D TRI ISO PROPANOLAMINE SALT# + PICLORAM TRI ISO PROPANOLAMINE SALT#
- TRICLOPYR BUTOXYETHYL ESTER\*#

- TRICLOPYR BUTOXYETHYL ESTER\*# + PICLORAM HEXYL OXY PROPYLAMINE SALT#

This list of chemicals is based on information supplied to the Department of Natural Resources and Environment by the National Registration Authority for Agricultural and Veterinary Chemicals (NRA). The State of Victoria through the Department of Natural Resources and Environment has not assessed or checked the accuracy of the information supplied to it from the NRA as that responsibility rests with the NRA.

Herbicide can be used to prevent flowering and seed production. Spraying should be undertaken when plants are in full leaf. Control with a single application cannot be expected. Cut stump treatment may be permitted - see label directions.

Products containing triclopyr and triclopyr + picloram are registered for spot spraying of English broom in forests. Products containing triclopyr, triclopyr + picloram and 2,4-D amine + picloram are registered for commercial and industrial areas, rights of way and pastures. Picloram is a residual herbicide which is very persistent in soil. Pasture legumes are sensitive to picloram and may take more than 12 months to re-establish on treated areas. Triclopyr ester will also kill pasture legumes but does not affect grasses.

### Biological control

An international program involving Australia, New Zealand and the USA has been underway since 1990 to introduce a number of natural enemies to control English broom. These agents can be released only after rigorous testing has demonstrated they are specific to English broom and pose no danger to native plants or plants of economic importance.

The twig mining moth, *Leucoptera spartifoliella* (Hubner), was first released in NSW in 1993 and has been released at numerous sites in Victoria, mainly in the Alpine National Park. The larvae tunnel in the stems where they feed on photosynthetic tissue. Heavily infested branches are killed. It is still too early to determine the level of damage which this insect is likely to cause.

The broom seed-feeding beetle, *Bruchidius villosus* (Fabricius), lays eggs on developing seed pods and the larvae mine into the pods and destroy the seed. It was first released in Victoria in autumn 1998.

The broom bud psyllid, *Arytainilla spartiophila* (Forster), sucks the sap of young buds and stunts the growth of plants. It was first released in Australia in 1994 and has been released in NSW and Tasmania.

A seed-feeding weevil *Exapion fuscirostre* (Fabricius) which has significantly reduced seed production in broom infestations in the western USA is expected to be the next agent released in Australia. Several other potential agents are under investigation



*Figure 5. Broom seed-feeding beetles (left) are about 2 mm long. Adult broom twig mining moths (right) are about 4 mm long*

Large populations of the seed feeders are expected to reduce seed production, and slow down the spread of broom. The other insects are expected to stress the plants, reduce their vigour and decrease the density of infestations. Biological control will take many years because there is likely to be a large bank of seeds already in the soil. Biological control is a long-term program which is best used on large, chronic infestations with a low priority for control by other methods.

For more detailed biological control information refer to Landcare Notes LC0149: *English broom suppression with the broom twig-mining moth* and LC0164: *English broom suppression with the broom seed feeding beetle*, or contact the Keith Turnbull Research Institute on (03) 9785 0111.

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