Landcare Notes

Spear Thistle

Department of Primary Industries

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Common and scientific names

Spear thistle, black thistle, bull thistle; often wrongly called Scotch thistle. The true Scotch thistle, *Onopordum acanthium*, is also a noxious weed in Victoria.

Cirsium vulgare (Savi) Ten.

Status

Spear thistle is a Regionally Controlled Weed in the Glenelg-Hopkins, Corangamite, Port Phillip East and North East, West and East Gippsland CaLP Regions. Land owners in areas where Spear thistle is a Regionally Controlled must take all reasonable steps to control it and prevent its spread on their land and the roadsides which adjoin their land.

Origin and distribution

Spear thistle originated in Europe, western Asia and North Africa. In Victoria, it occurs in a range of environments, particularly annual pastures and neglected areas.

Description

An erect, deep rooted annual or biennial herb, commonly 1 to 1.5 m high, reproducing by seed. Although seed can germinate at any time of the year, there are two main germination times, late summer to autumn and late winter to spring. This results in infestations consisting of plants of different size and ages. Seedlings develop into rosettes, but require a cold period before they can grow a flowering stem in their first spring-summer. Plants resulting from summer to autumn germination behave as annuals, flowering the following summer, while plants resulting from winter to spring germinations behave as biennials, growing as rosettes through summer, autumn and winter and flowering the following summer. Plants die after flowering and dead plants can remain standing for 1 or 2 years.

Stems - Erect, winged, spiny, usually very leafy and covered with fine stout hairs. Sometimes a single stem but more commonly several multi-branched stems coming from the base.

Leaves - Dark green, coarse and prickly on the upper surface and lighter beneath due to a covering of whitish hairs; deeply cut into equally spaced, spiny lobes, ending in a stout yellowish spine. Rosette leaves are spiny and up to 35 cm long. Stem leaves are alternate, with bases extending along the stem as wings.

Flowers - Purple or reddish, in heads 3 to 5 cm diameter surrounded by spiny bracts. Produced singly or in groups of 2 or 3 at the end of branches. Flowers appear in December to February, later in higher rainfall areas.

Seeds - Grey or light-brown, oblong, somewhat flattened, smooth, 3 to 4 mm long, attached to a soft, feathery pappus (parachute) of numerous fine hairs 2 to 2.5 cm long. Up to 200 flower heads and 8000 seeds are produced per plant.

Roots - Branched taproot.

Figure 1. Young rosette of spear thistle.

The problem

A competitive weed in pastures where it favours heavier, fertile soils and a high levels of soil nitrogen. Spear thistle is avoided by stock because of its spines, thus is encouraged by heavy grazing in pastures. If eaten the spines can cause damage to stock, particularly around the mouth. The spines and dead leaves contribute to vegetable fault in wool.

Dispersal

Seed is the only means of dispersal. Seeds have a large pappus (parachute) of fine bristles which aids dispersal by wind. The majority of seed detach from the parachute close to the mother plant, but some can be carried long distances. Seed can also be spread in contaminated hay because plants are normally flowering when hay is cut.

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Management program

Priorities for controlling different infestations must be worked out when planning a spear thistle management program. An important element of a good strategy is to keep clean areas free of the weed and manage them to prevent infestation.

In intensively managed pastures, a combination of autumn treatment with a herbicide selective for broadleaf weeds, spring grazing, and pasture renovation after the following autumn break is the best approach. Extensive infestations on grazing land are best quarantined and tackled progressively as part of pasture improvement programs. In general, a management plan should involve the integration of a number of control techniques coupled with good pasture management to give the best long-term results. After resown pastures establish, appropriate grazing management, fertiliser regimes and weed control maintenance programs are vital to keep them free of the weed. In more extensive, lower productivity grazing systems, grazing management, with biological control and spray grazing during winter is the best strategic approach. All management programs in pastures should integrate control techniques with complementary changes to overall management that ensure the maintenance of a competitive cover of desirable pasture species.

The use of residual or non-selective herbicides is a major factor contributing to vigorous regrowth of the weed in following seasons. Often all that grows in areas treated this way is Spear thistle, and it flourishes owing to the lack of competition. The lack of competing vegetation has a huge influence on the growth of the weed.

The most important aims of a control program are to:

- Target the rosette stage with a selective broadleaf herbicide.
- Ensure there is competition from other plants that can replace the weed.
- Follow-up your work and be persistent in implementing a long-term management plan.

Prevention

The aim of prevention activities is to avoid the deposition of Spear thistle seed in areas free of the weed. Preventative management is a good investment because it requires few resources and minimises the chances that large expenses will later be required for control works.

- Ensure hay and other fodder is free of seed and that seed for planting is not contaminated. Obtain verification from fodder and seed suppliers that their products are grown in clean areas and are free of contamination. If contaminated fodder is used, it should be fed out only in areas that are already infested, or in a defined area that is regularly monitored and can be readily treated should an outbreak occur.
- Apply the same standards to soil, sand and gravel as are applied to fodder. Work towards an infested area when earthworks are undertaken, not away from it.
- Seed can be carried in the coats and digestive tracts of livestock. Sheep that have recently been shorn are less likely to have contaminated fleeces. Sheep require 3 days to void internally-carried seed. Stock that have grazed in infested areas should be quarantined for several days to minimise the risk of the introduction of seed. The quarantine area should be regularly inspected and any plants which appear should be removed before they flower.
- Use only vehicles, machinery and equipment, including those of contractors, which have been thoroughly cleaned after being used in infested areas.
- Where a property already has infested areas, internal quarantine measures should be practised. Produce from infested areas should be separated from that grown in clean areas. Weed-free buffer zones should be maintained between infested and uninfested land.
- Contractors, roadside maintenance staff, etc. should be trained to identify and report infestations and to manage them in a way that will prevent spread.

Cultivation

Ploughing is effective in killing plants and can be used as a preliminary to establishing competitive pastures.

Manual control

Isolated plants and small patches can be grubbed, but for effective control most of the root system must be removed.

Slashing or Mowing

These methods are not effective before flowers are produced because the plants will reshoot. Viable seeds may have already been produced if flowers are present when cutting occurs.

Pasture management

Strong, competitive, well-managed pastures are effective in shading thistle seedlings, reducing establishment of the weed during the main germination periods. Careful grazing management is necessary to minimise bare ground which assists thistle seedling establishment. Contact your local DPI Catchment and Agricultural Services staff for pasture management advice.

All land managers have a responsibility to control weeds on their property.

Grazing

Spray-grazing can be used at the rosette stage using low rates of herbicide to make the rosettes more erect. Heavy grazing, preferably with sheep, using 5 to 7 times the normal stocking rate until the weed is eaten reduces the plants' vigour. Goats can be used at the flowering stage to reduce seed production of thistles. Fencing must be adequate to restrict the animals to the chosen control area. Keep in mind that browsing animals eat a range of vegetation and may destroy desirable plants as well as thistles.

Chemical Control

Registrations of products can change from time to time, and it is therefore important for chemical users to ensure they refer to current information about chemical use patterns and legislative obligations. An Agricultural Chemical User Permit (ACUP) is required for use of 'restricted use' chemicals in Victoria, and there are restrictions on certain chemical uses in Agricultural Chemical Control Areas.

Since 24 July 2007, records of chemical use MUST be made and kept for all agricultural chemical use, not only for 'restricted use' chemicals as was required previously. Chemical users must make within 48 hours of use, and keep for a period of 2 years, records of use specified in the Agriculture Note AG1212; "Keeping Chemical Use Records (Give me one good reason!)"

For further information on chemical use patterns and/or legislative obligations in relation to chemical use in Victoria call the DPI Customer Service Centre on 136186, or visit the Chemical Standards Branch website: www.dpi.vic.gov.au/chemicalstandards

Biological control

A program is under way to introduce a number of natural enemies of thistles from Europe after testing to ensure they are specific to particular thistles and present no danger to native plants or plants of economic importance.

Two insects which reduce seed production are being released. The spear thistle gall fly, *Urophora stylata*, was imported to Australia from western France. The larvae feed on the developing seed tissues of spear thistle and the plant reacts by forming a woody gall within the flowering head, which diverts energy from the developing seed into growth of gall tissue. A strain of the thistle receptacle weevil, *Rhinocyllus conicus*, adapted to spear thistle has also been introduced from western France. Larval weevils feed in the flower head and can prevent the development of seed. Adult weevils cause minor damage to bracts around the flower head.

Large populations of these agents are expected to reduce seed production and in turn slow down the spread of spear thistle and decrease the density of infestations. This process will take many years because there is likely to be a large bank of seeds already in the soil. These seeds will continue to germinate. Biological control is a long-term program which is best used on large, chronic infestations with a low priority for control.

Another biological control agent is *Trichosirocalus horridus.* It is a rosette and tap root feeding weevil that has been released by CSIRO on nodding thistle in NSW. It has been listed on our list of agents for spear thistle by El Bruzzese

For more detailed biological control information refer to Landcare Notes: LC0147 *Spear thistle suppression with the spear thistle gall fly;* and LC0148 *Spear, variegated and nodding thistle suppression with the thistle receptacle weevil*.

Further advice

- Contact your local landcare or friends group for further assistance and advice.
- Call the DPI/DSE Customer Service Centre on 136 186.
- Contact your local DPI Pest Management Officer for advice on local programs.
- Visit the DPI website at: http//www.dpi.vic.gov.au and the Weeds Australia website at: http//www.weeds.org.au

References

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