

Primary Industries, Water, and Environment

Service Sheet

PRODUCED BY THE DEPARTMENT OF PRIMARY INDUSTRIES, WATER, AND ENVIRONMENT

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Horehound (*Marrubium vulgare* L.)

Identification and Characteristics

Horehound is a branching, perennial plant with stems that are square in cross-section, growing to a height of about 800 mm. The stems and lower surface of the leaves have a covering of white woolly hairs that give it the silvery appearance from which the name "horehound" is derived. The leaves are round or ovate in shape with deep-set veins, giving them a "crinkly" appearance. The leaf margins have rounded teeth.

The leaves are set in pairs at each node or joint of the stem. Branching occurs from the axils of the lower leaves but as the stem elongates, flower clusters appear in the upper leaf axils. The clusters of whorls are densely packed, forming balls of flowers that surround the stem at each node. Each individual flower is enclosed by a calyx of joined sepals that has ten narrow teeth, each ending in a hook. The flower itself is white, about 12 mm long, tubular at the base and ending in two unequal lips. Each fertile flower produces four seeds.

Distribution

Horehound is a plant that belongs to the mint family. Originally native to Europe, Central and Western Asia and North Africa, it has become naturalised in many parts of the world including temperate Australia.

In Tasmania it was introduced in the early days of settlement. The plant has medicinal properties and was used by early settlers to treat several complaints including ear and eye problems, worms, coughs, catarrh, sore throats and as a laxative and sedative as

well as a cure for poisoning. It was often taken as horehound tea or horehound beer and is still used in herbal medicines.

Infestations of horehound are commonly found on roadsides, waste areas, stockyards, dry banks, near farm buildings and on the site of old homesteads.

Dispersal

Seeds provide the only means of spread. They are primarily dispersed by stock, as the fruit or burr readily attaches to wool, fur, clothing and similar materials. Water is also an effective dispersal agent and horses are known to pass the seeds after ingestion, in a viable condition.

Life Cycle

Most seeds germinate after autumn rains but some germination also occurs through winter into spring. Young seedlings are not very competitive but, once established, they make rapid growth. Plants may or may not flower in their first year, this largely depending on soil fertility. Established plants flower over several months during summer and autumn and new growth is produced each year in autumn and spring.

Economic Significance

Horehound is a weed of crops and especially pastures in southern Australia which have poor soils and low rainfall.

Horehound is of low palatability and the productivity of pastures carrying heavy infestations is considerably reduced. Sheep will graze horehound when alternative feed is not available but the meat of these animals may become strongly tainted by the plant. It takes about 7 days on clean pasture for animals to lose this taint.

The main detrimental effect of horehound in pastures is the contamination of sheep and goat fleeces by its dry fruits. The hooked calyx on the fruit is adapted for attachment to fleeces, leading to significant losses in their value due to matting.

Horehound tolerates dry soil conditions very well and may be the only plant present on stony, exposed north-facing slopes after prolonged dry periods. In this situation the plant has some value in protecting the soil from erosion.

As well as being an agricultural weed of pastures horehound has become an important environmental weed because of its ability to invade disturbed native vegetation.

Status under the *Weed Management Act 1999*

Horehound is a declared weed in Tasmania, largely due to its impacts on agricultural productivity. As such, its importation, sale and distribution are prohibited. The legal responsibilities of landholders and other stakeholders for this declared weed are specified in a statutory weed management plan available from the DPIWE.

Control

Control by cultivation and cropping:

When horehound is densely established, the area should be burnt to stimulate most seeds to germinate and then ploughed in order to bury the plants, or to remove them completely because partially buried plants continue to grow. Summer cultivation is preferred because the disturbed plants are readily killed by the heat of the sun. Repeat cultivations are necessary when new growth appears and must be followed by the sowing of a crop or pasture suitable to the area to give maximum competition to seedlings. Spotspray any surviving plants in the new pasture.

Ideally, the pasture should not be grazed in its first year in order to give maximum competition to any horehound seedlings. For the same reason, rabbits should be controlled on the treated areas.

Mechanical control:

Grubbing is the most effective means of controlling small infestations.

Control by grazing:

In pasture, horehound populations show a marked response to seasonal conditions, pasture insect infestations and grazing pressure. Heavy grazing with sheep (block grazing) can eliminate seedlings but other less intense stock management systems may favour the weed by allowing stock to graze desirable species and avoid the less palatable horehound.

Control by competition:

Infested areas cultivated for pasture should be sown down with a strongly competitive grass/clover mixture. In areas subject to drought or severe attack by pasture insects, either phalaris or cocksfoot should be included.

Non-arable areas, such as stony ridges or sheep camps may be hand sown or sown through a fertiliser spreader after herbicide application. The planting of trees is another option that can be pursued in areas where it is difficult to establish pasture.

Biological control:

A program is under-way to introduce natural enemies of horehound from Europe to Australia. The first of these, the horehound plume moth, *Wheeleria spilodactylus* (Curtis), was first released in southern mainland states during the summer of 1993/94.

The successful establishment and spread of the moth at mainland release sites resulted in the Tasmanian Institute of Agricultural Research initiating a mass rearing/release program for horehound plume moth in Tasmania. Between October, 1997 and December 2000 the moth was released on 40 Tasmanian properties and is now well established at many sites.

None of the other service sheets have this much detail on the lifecycle. For additional information refer to TIAR Weed Biological Control Pamphlet for Horehound.

Preliminary studies in Victoria indicate that the agent can significantly reduce seed outputs. It must be stressed that biological control does not involve the eradication of a pest species and is not expected to provide the complete answer to the horehound problem. It is intended that the moth will be eventually used in conjunction with control methods as part of an integrated management program.

Chemical control:

To be most effective herbicides need to be applied when the plants are actively growing. Poor results will result if horehound plants are suffering from moisture stress at the time of application. Autumn and spring are thus the normal seasons for undertaking chemical control. In addition spring spraying will reduce the formation of flowers and seed, reducing the soil seed bank and fleece contamination. In any weed management program the first priority is to stop plants setting seed.

The size of the horehound infestation will determine the spray technique required. Patches or scattered plants can be controlled by spot application using a knapsack or spray gun while large patches may require boom equipment for economical control. Complete foliage wetting has to be obtained for satisfactory control and any boom sprayer used on mature horehound should be fitted with nozzles capable of delivering an output of at least 300 L/Ha. Horehound develops herbicide symptoms relatively slowly and it can take between 6 and 20 weeks for maximum development of symptoms.

For inaccessible areas, aerial application for horehound control may be the most appropriate method.

The most effective registered herbicides for the control of horehound in pasture are MCPA, dicamba, 2,4-D and triclopyr. For control in non crop situations bromacil can be used to provide residual control.

MCPA, dicamba, triclopyr and 2,4-D are suitable for use as boom applied sprays in pasture and to treat isolated plants and small infestations. All herbicides require the addition of a surfactant as the very hairy leaf of the plant is difficult to wet.

Trials conducted by the Department of Primary Industries, Water and Environment (DPIWE) suggest that triclopyr is slow acting but very effective when applied at the rates recommended. Complete coverage of the plant is required to maximise the result.

Trials undertaken by New South Wales Agriculture in 1989 suggested that MCPA and 2,4-D were effective in controlling mature horehound and were cheaper and less damaging to pastures than other products registered for horehound control. These trials also supported DPIWE data that the best results are achieved when spraying in autumn or spring.

The woody weed herbicide Grazon[®] (triclopyr/picloram) has recently been registered for horehound control and high volume spraying is recommended. Thorough coverage of foliage to the point of run-off is essential and a spray volume of 3 to 4L / 10m² of infested area should be used. However, picloram, one of the active constituents in this product can remain active in the soil for extended periods and effect susceptible following crops.

MCPA, dicamba, triclopyr and 2,4-D retard clover (MCPA and 2,4-D are much softer on most clovers than dicamba and triclopyr) so where sub-clover is the main legume present in the pasture, delaying treatment until after the clover has set seed will minimise long term damage. However, delaying treatment in a dry season will reduce the effectiveness of the herbicide on the horehound.

Crash-grazing will usually eliminate horehound seedlings in young pasture and MCPA will suppress seedlings when applied at 0.5L/Ha of a 500g/L formulation.

The general use of herbicides containing 2,4-D during the period 15 September to 15 April is prohibited. Application during this period can only be made under a permit issued by the Registrar of Chemical Products, DPIWE. Generally few permits are issued during this time.

Non-crop, roadsides and waste areas

Spot or boom sprays can be used as recommended for established pasture. Bromacil can also be used when residual control is desired.



Bee Careful !

Some herbicides are toxic to bees. As a general rule, avoid applying herbicides when and where bees are foraging. Always read the label.

Note:

These herbicide recommendations are made subject to the product being registered for that purpose under relevant legislation. It is the user's responsibility to check that registration or an off-label permit covers the proposed use. Always read the herbicide label. If in doubt, check with the Registrar of Chemical Products, Department of Primary Industries, Water and Environment. Statewide Freecall 1300 368 550.

1. Boom Spray Application

Situation	Herbicide (Active ingredient)	Commercial Product (Content of active ingredient)	Application Rate of Commercial Product per Ha	With holding Period	Comments
New Pasture	MCPA dimethylamine salt	(500g/L formulations)	500mL	7 days	Apply to seedlings.
Established Pasture	MCPA dimethylamine salt	(500g/L formulations)	700mL to 4L	7 days	Apply to established pasture. Legume damage may result. Lower rate for seedlings, the higher rate for established plants.
	2, 4-D ester	(400g/L formulations)	700mL to 1.4L	7 days	Pasture containing legumes. Apply to seedlings.
			2.8L to 5.6L	7 days	Pastures - without legumes. Apply to seedlings.
	MCPA + Dicamba	Banvel M [®] (340g/L + 80g/L)	4 to 7L	7 days	Use higher rate on larger weeds. When necessary a second treatment may be made after 4 weeks.
	Dicamba	Banvel 200 [®] (200g/L)	700mL to 2.8L	7 days	Lower rate for seedlings. Higher rate for young mature plants. Use 110 to 280L of mixture per hectare.
Triclopyr	Garlon 600 [®] (600g/L)	1.6L	Nil	Apply as a thorough foliage spray.	
Non-crop	MCPA dimethylamine salt	(500g/L formulations)	700mL to 4L	-	Lower rate for seedlings, the higher rate for established plants.
	2, 4-D ester	(400g/L formulations)	2.8L to 5.6L	-	Apply to seedlings.
	MCPA + Dicamba	Banvel M [®] (340g/L + 80g/L)	4 to 7L	-	Use higher rate on larger weeds. When necessary a second treatment may be made after 4 weeks.
	Triclopyr	Garlon 600 [®] (600g/L)	1.6L	-	Apply as a thorough foliage spray.
	Dicamba	Banvel 200 [®] (200g/L)	700mL to 2.8L	-	Lower rate for seedlings. Higher rate for young mature plants. Use 110 to 280L of mixture per hectare.
	Bromacil	Hyvar X [®] (800g/kg)	8kg to 13kg	-	Use low rate in areas of low rainfall - <250mm.

2. Spot Spray Application

Situation	Herbicide (Active ingredient)	Commercial Product (Content of active ingredient)	Application Rate of Commercial Product per Litre	With holding Period after Application	Comments
Pasture	MCPA dimethylamine salt	(500g/L formulations)	1 to 4mL	7 days	Lower rate for seedlings, the higher rate for established plants.
	2, 4-D ester	(400g/L formulations)	5mL	7 days	Apply to seedlings.
	MCPA + Dicamba	Banvel M [®] (340g/L + 80g/L)	6mL	7 days	When necessary a second treatment may be made after 4 weeks.
	Dicamba	Banvel 200 [®] (200g/L)	2 to 4mL	7 days	Lower rate for seedlings. Higher rate for young mature plants.
	Triclopyr	Garlon 600 [®] (600g/L)	2mL	Nil	Thorough foliage spray required.
Non crop	MCPA dimethylamine salt	(500g/L formulations)	1 to 4mL		Lower rate for seedlings, the higher rate for established plants.
	2, 4-D ester	(400g/L formulations)	5mL		Apply to seedlings.
	MCPA + Dicamba	Banvel M [®] (340g/L + 80g/L)	6mL		A second treatment may be required after 4 weeks.
	Dicamba	Banvel 200 [®] (200g/L)	2 to 4mL		Lower rate for seedlings. Higher rate for young mature plants.
	Triclopyr	Garlon 600 [®] (600g/L)	2mL		Thorough foliage spray required.
	Bromacil	Hyvar X [®] (800g/kg)	6 to 8g		Low rate in areas of low rainfall (250mm or less).

3. High Volume Spraying

Agricultural non-crop areas, Commercial and Industrial Areas, Forests, Pastures and Rights-of-Way			
Herbicide (Active ingredient)	Commercial Product (Content of active ingredient)	Application Rate of Commercial Product per Litre	Comments
Triclopyr + Picloram	Grazon DS [®] (300g/L + 100g/L)	3.5 mL	Apply pre-flowering as a thorough foliage spray with spray volume of 30 to 40L / 100m ² .

- For maximum effect all the products above will require the addition of a wetting agent. Carefully consult each product's label for specific directions.
- Triclopyr is slow acting and it can take up to 3 months for treated plants to show any effect.



A. Seedling B. Young regrowth from perennial rootstock C. Flower branch D. Flower E. Calyx showing hooked sepals. Flowers white