

Weeding out Field Horsetail

YOUR GUIDE TO MANAGING FIELD HORSETAIL

agresearch

Rangitikei **Horsetail***Group*

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REGIONAL COUNCIL



Background

Field horsetail (Equisetum arvense) is a very difficult to control perennial weed appearing after winter from an extensive underground root system.

This root system comprises actively growing rhizomes that can penetrate to greater than 2m in depth, from which green fern-like fronds grow each year. Attached to the deeper rhizomes are small tubers which remain dormant while the rhizome stays alive. Upon the death/decay of the rhizome, or when it becomes detached due to cultivation or other means, the tubers initiate growth to produce new plants.

Field horsetail is native to Europe, Asia and North America and has naturalised in Madagascar, South Africa, South America, Australia and New Zealand. Fossils show the plant has remained unchanged for over 300 million years.



Isolated infestations of field horsetail have been found at Kawhia (Waikato), Havelock North (Hawkes Bay), New Plymouth and Wellington, but it has become well established and widespread in the Manawatū/ Rangitīkei – particularly on the floodplains of the lower Rangitīkei River. From the river it has been spread along roads, walking tracks and to building sites via river gravel used for construction.

There are no reports of stock poisoning caused by field horsetail in New Zealand. In the northern hemisphere there are reports of fresh plant material poisoning horses, and fatal if large amounts are consumed. When field horsetail infested pasture is used to produce hay it is reported to cause the hay to rot making it unsuitable as stock food.



General management



Consistence and diligence are key to weed management.

General management

Field horsetail has proved a very difficult weed to control. As with many pernicious weeds, all available management options involve a consistent and time consuming approach. This must be taken into consideration when planning and costing work involving the management of field horsetail. To be successful you need to be consistent and diligent, treating all the infestation multiple times.

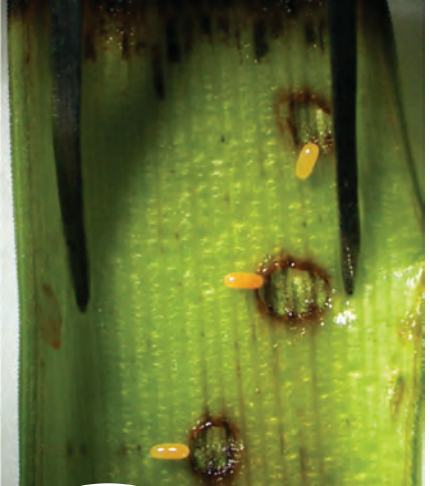
Field horsetail favours light and sandy soils where its root system can penetrate to depths greater than 2m, with the majority of tubers occurring at the lower depths. It is very difficult to control these underground plant parts as few herbicides will travel that distance and none are capable of killing the tubers.



The challenge is destroying field horsetail's complex root system and it is important to persist.

Similarly with soil acting herbicides, it is very difficult to get the active ingredient to the depths required to kill the deeper rhizomes and tubers. Hence effective strategies are based on repeat attacks on those plant parts that are accessible, with the aim of depleting reserves to the point where the plant dies. But, as noted earlier, killing the plant will only release the tubers to grow and start the cycle again. Complete control of field horsetail can only be achieved with a programme that takes several years to accomplish.

Activated amitrole (available as various trade names) is an important tool in many field horsetail management programmes. However, this herbicide has only been evaluated at very high rates and more trial work is required to evaluate lower rates in different use situations.





This is the first time the weevil has been used as a biocontrol agent globally. The weevil only attacks horsetail species.

Field horsetail weevil
- Grypus equiseti



An option for the long term reduction of field horsetail infestations is the field horsetail weevil. Establishment of local populations of this weevil was confirmed in 2021 after an 8 year development project by the Rangitīkei Horsetail Group.

The weevils feed on the field horsetail, often causing the fronds to die, and lay their eggs in the stems of the weed. The larvae then feed on the stem while the adults head down the weed for the winter, where they consume and break up the roots, reducing the ability of the plant to produce new fronds in spring.

Weevils disperse slowly moving only a few kilometres per year. If you would like further information on the weevil see the Community Pest Control page under Plant and Animal Pests at horizons.govt.nz



Farming



As with many difficult to manage weeds, the best approach is a systematic programme of pasture renewal.

Farming

PASTORAL

There are no selective herbicides available that will be effective in the management of field horsetail in pasture and not harm either the grass or clover content of a permanent pasture.

Several options are listed in Table 1 but even the least damaging to pasture, will severely affect clover with the required repeat applications. In some pastures where clover is not important e.g. an annual ryegrass crop, triclopyr may be used for a longer lasting result.

Although largely untested, the recommended option is to have at least one, but preferably two, summers out of pasture and growing a strongly competitive crop in which field horsetail can be selectively controlled.



Crops such as maize, annual ryegrass or forage cereals are likely to be the best candidates. After one or two years of cropping, re-establish a strong pasture sward and, if required, use a herbicide such as MCPA to reduce any newly appearing field horsetail infestations.

Another option currently being evaluated is for pasture renewal after a summer fallow. In this programme, field horsetail is sprayed out with amitrole. The ground is then cultivated and any surviving plants that appear over summer should be immediately killed with glyphosate. The new pasture should be established in the autumn using no-till sowing methods.

It has been suggested that regular mowing over a period of years may eliminate horsetail from grassed areas.



Table 1: Herbicide options for control of field horsetail in pasture and during pasture renewal.

Herbicide	Rate/10L Knapsack	Rate/100L Handgun	Rate/Ha Water/Ha	Adjuvant
Activated Amitrole [1]	250ml	9L	30L 300L	LI700 100ml/100L
Glyphosate 510	70ml	700ml	7L 150L	Organo-silicone 100ml/100L
Triclopyr [2] (Grazon, Triclop)	60ml -120ml	300ml	10L 300L	Organo-silicone 100ml/100L
Triclopyr, Picloram (Tordon Brushkiller, Trichloram Brushkiller)	60ml	300ml	10L 300L	Organo-silicone 100ml/100L
MCPA			3L 300L	Organo-silicone 100ml/100L

[1] Use activated amitrole only for pasture renewal. Apply in spring when field horsetail is actively growing. Leave area fallow over summer, spot spraying any field horsetail which appears with glyphosate or similar chemical to burn it off. Spray entire area with glyphosate prior to autumn sowing of new pasture.

[2] When spot spraying or broadcast spraying non-grazed areas the higher rate is more effective.



Management of field horsetail in arable farming situations involves appropriate crop selection so there are options for chemical control.

ARABLE

Management of field horsetail in arable farming situations involves appropriate crop selection so there are options for chemical control. To discuss all possible crops is beyond the scope of this booklet, but there are many online resources available with advice on managing field horsetail in various crops.

Crops from within the Poaceae family such as maize and cereals offer the best opportunities for field horsetail control. For example, a post-emergence application of nicosulfuron plus dicamba (which gave 85% control of this weed in maize) and chlorsulfuron have been successfully used to manage it in cereal crops. Field horsetail is not very competitive in tall crops. The lack of functional leaves may make it intolerant of shading. It does not respond as quickly as cereals to increased soil fertility.



Outside the crop area activated amitrole is probably the best herbicide for controlling this weed, but note that amitrole can only be used in drains that will remain dry for at least one month post application.

Successful management of field horsetail within the crop will also require management of the source of the infestation i.e. fence lines and drains. Activated amitrole is probably the best herbicide for controlling this weed in both these situations, but note that amitrole can only be used in dry drains that will remain dry for one month post application.

Other management options include soil drainage, liming, deep cultivation, improvements in soil texture and persistant cutting of vegetative and spore bearing shoots.



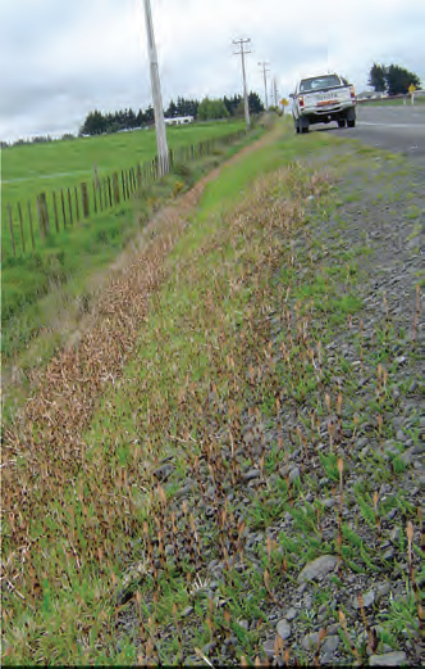
Table 2: Herbicide options for control of field horsetail in cropping.

Herbicide	Rate (prod/ha)	Adjuvant	Application method
Dicamba [1] (e.g. Banvel®)	1.5L/ha	None	Apply with boom sprayer in 200L water/ha
Nicosulfuron (e.g. Neeko™)	1.3L/ha	Nicovate at 500mL/100L water	Apply with boom sprayer in 200L water/ha
Chlorsulfuron (e.g. Glean®)	20g/ha	Non-ionic surfactant at recommended rates	A variety of application options, refer to label

[1] Dicamba can also be combined with MCPA according to label instructions.



Roadsides



Field horsetail is known to occupy low lying drains and culverts.

Roadsides

The most likely places this weed will occupy are low lying drains and culverts; the very places residual herbicides should not be used due to potential contamination of water sources.

However, there are two short-term residual herbicides that show good potential for controlling field horsetail on the roadside. These are activated amitrole and metsulfuron-methyl, both of which provide 80% or greater control for about three months.

Metsulfuron-methyl, in combination with glysophate, has the potential to severely suppress field horsetail. However, in a roadside situation its efficacy and persistence is likely to be compromised by the large quantities of water running off the road into the drains. Repeat applications of triclopyr may be used in areas where it is important to maintain some



groundcover. As this herbicide is selective to grasses, a grass canopy can be maintained. This may assist in managing other weeds, particularly annual ones.

Table 3: Herbicide options for control of field horsetail on roadsides.

Herbicide	Rate/10L Knapsack	Rate/100L Handgun	Rate/Ha Water/Ha	Adjuvant
Activated Amitrole	250ml		30L 300L	LI700 100ml/100L
Metsulfuron-methyl (Meturon, Escort)	5gm	50gm	170gm 300L	Organo-silicone 100ml/100L
Glyphosate 510	150ml	1.5L	9L 100L	Organo-silicone 100ml/100L
Triclopyr (Grazon, Triclop)	120ml	1.2L	10L 300L	Organo-silicone 100ml/100L
Triclopyr, Picloram (Tordon Brushkiller, Trichloram Brushkiller)	120ml	1.2L	10L 300L	Organo-silicone 100ml/100L
Terminate/Tag Residual	300ml	2.5L 1-2ml active per	20L 300L	Non-ionic Wetter penetrant 25ml/100L



Footpaths, garden strips and reserves



The best solution for managing field horsetail in footpaths is to lay down a layer of dichlobenil herbicide prior to laying the ashphalt or pavers.

Footpaths, Garden Strips & Reserves

If the soil/sand under the pavement is dry, dichlobenil will need to be both incorporated into the top few centimetres then watered to activate. If the footpath is already laid then the dichlobenil prills will need to be placed in pavement cracks and gaps. Pavement stones will need to be lifted and re-laid as new pavement. The section of pavement should be isolated from traffic until the prills have dissipated.

For permanent garden beds that contain sensitive desirable plants, glyphosate is probably the only option. To achieve longer control, or where there are no sensitive plants, metsulfuron may be used. However, with both these herbicides, the aim should be for regular and consistent repeat applications whenever new growth of field horsetail is observed.



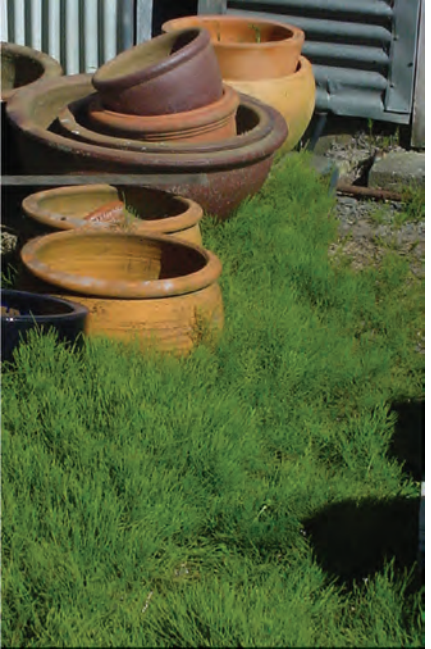
As with all other plants, field horsetail requires photosynthesis to remain alive and re-supply its root mass with nutrients. Regular defoliation will achieve this, providing the top growth is removed before the roots are re-supplied.

Table 4: Herbicide options for control of field horsetail in paving and permanent garden beds.

Herbicide	Rate/10L Knapsack	Adjuvant
Dichlobenil (Prefix®-D)	38 g/m²	None
Metsulfuron-methyl (Meturon, Escort)	5gm	Organo-silicone 10ml/10L
Glyphosate 510	200ml	Organo-silicone 10ml/10L
Triclopyr (Grazon, Triclop)	120ml	Organo-silicone 10ml/10L
Terminate/Tag Residual	300ml	Non-ionic Wetter penetrant 25ml/100L



Home gardens



The home gardener has two tools for dealing with field horsetail – hand weeding and glyphosate.

Home Gardens

If the weed is not yet in garden beds but can be found adjacent to them, preventative measures should be taken. The best option is to drive corrugated iron at least 50cm into the ground around the bed to exclude the weed.

Care should be taken when hand weeding to avoid shaking off the tubers. Repeat defoliation is the best option for control. It does not matter if this defoliation is by weeding using a push hoe or by herbicide. In fact, it may be best to combine both methods dependent on the garden.

Field horsetail is difficult to control by cultivation alone as new stems regenerate from rhizome fragments and tubers. Black plastic sheeting has been found to kill or suppress rhizomes in the upper layers of the soil however, emerging horsetail stems can



penetrate some types of weedmat with its piercing and vigorous growth.

Horsetail can survive periods of flooding and burning, but may be sensitive to water stress in drought conditions especially in competition with other plants.

Table 5: Herbicide options for control of field horsetail in home gardens.

Herbicide	Rate/10L Knapsack	Adjuvant	Note
Glyphosate 510	200ml	Organo-silicone 10ml/10L	Non-ionic Wetter penetrant 25ml/100L
Glufosinate 100 (Buster)	100ml	Non-ionic Wetter penetrant 25ml/100L	Contact herbicide, slightly systemic effect. Wet plant to just before runoff.

For more information...

about field horsetail and control options in your area, contact Horizons Regional Council.

Images and chemical recommendations supplied by AgResearch, Horizons Regional Council and AgPro NZ

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REGIONAL COUNCIL

horizons.govt.nz

24 hour freephone 0508 800 800
fax 06 952 2929 | **email** help@horizons.govt.nz
Private Bag 11025, Manawatu Mail Centre, Palmerston North 4442

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