



# Weeding out Field Horsetail

YOUR GUIDE TO MANAGING FIELD HORSETAIL

## Background

**Field horsetail (*Equisetum arvense*) is a very difficult to control perennial weed that regrows each spring/summer from an extensive underground root system.**

This root system comprises actively growing rhizomes that can penetrate to greater than 1m 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.





## Background

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 Manawatu/ Rangitikei – particularly on the floodplains of the lower Rangitikei 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 toxicity of field horsetail in New Zealand, but overseas the plant is widely reported as being poisonous to sheep, cattle and horses in both its green state and when dried in hay.





**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 as lack of consistence and diligence will only lead to disappointing results.

Field horsetail favours light and sandy soils where its root system can penetrate to depths greater than 1m, 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.



## General management

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.



**Farming**



## 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, MCPA, 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.

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





## Pastoral

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. 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.



## Pastoral

**Table 1:**

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

Herbicide	Rate (prod/ha)	Adjuvant	Application method
<b>MCPA</b> (dimethylamine salt e.g. Agritone® 750)	3.0 L/ha	None	Apply with boom sprayer in 300 L water/ha.
<b>Activated amitrole</b> <sup>1</sup> (e.g. Amitrole 4L)	30 L/ha	LI 700 @ 100 mL/100 L	Apply with boom sprayer in 300 L water/ha.
<b>Glyphosate</b> (Roundup Transorb® is recommended)	7.0 L/ha	Pulse @ 100 mL/100 L	Apply with boom sprayer in 100 L water/ha.
<b>Triclopyr</b> (e.g. Grazon®)	10 L/ha	Pulse @ 100 mL/100 L	Apply with boom sprayer in 300 L water/ha.

<sup>1</sup> 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.



*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.



## Arable

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 persistent cutting of vegetative and spore bearing shoots.



## Arable

**Table 2:**

Herbicide options for control of field horsetail in cropping.

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

<sup>1</sup> 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 glyphosate, 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.



## Roadsides

**Table 3:**

Herbicide options for control of field horsetail on roadsides.

Herbicide	Rate (prod/ha)	Adjuvant	Application method
<b>Activated amitrole</b> (e.g. Amitrole 4L)	9.0 L/100 L or 30 L/ha <sup>1</sup>	LI 700 @ 100 mL/100 L	Apply until the foliage is visibly wet and some run-off occurs.
<b>Metsulfuron-methyl</b> (e.g. Escort®)	50 g/100 L or 170 g/ha <sup>1</sup>	Pulse @ 100 mL/100 L	Apply until the foliage is visibly wet and some run-off occurs.
<b>Glyphosate</b> (Roundup Transorb® is recommended)	1.5 L/100 L or 9.0 L/ha <sup>2</sup>	Pulse @ 100 mL/100 L	Apply until the foliage is visibly wet but try to avoid run-off.
<b>Triclopyr</b> (e.g. Grazon®)	1.2 L/100 L or 10 L/ha <sup>1</sup>	Pulse @ 100 mL/100 L	Apply until the foliage is visibly wet and some run-off occurs.

<sup>1</sup> Apply with boom sprayer in 300 L water/ha.

<sup>2</sup> Apply with boom sprayer in 100 L water/ha.





**Footpaths, Garden Strips & Reserves**



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



## Footpaths, Garden Strips & Reserves

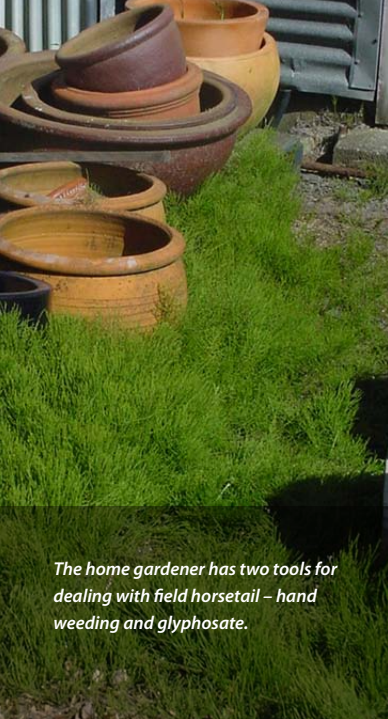
**Table 4:**

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

Herbicide	Rate (prod/ha)	Adjuvant	Application method
<b>Dichlobenil</b> (Prefix®-D)	38 g/m <sup>2</sup>	None	Spread prills evenly and mix into top few cm under pavement. Water in if dry.
<b>Glyphosate</b> (Roundup Transorb® is recommended)	200-300 mL/15 L	Pulse or similar organosilicone (30 ml/15 L)	Knapsack or pump-up garden sprayer. Keep pressure low to avoid drift and overspray onto desirable plants. Apply until fronds are wet but not so that water is running onto the ground.
<b>Metsulfuron-methyl</b> (e.g. Escort®)	7.5 g/15 L	Pulse or similar organosilicone (30 ml/15 L)	Knapsack or pump-up garden sprayer. Keep pressure low to avoid drift and overspray onto desirable plants. Apply until fronds are wet and allow some water to run onto the ground.



**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 penetrative stems can penetrate some woven polypropylene mulches.



## Home Gardens

**Table 5:**

Herbicide options for control of field horsetail in home gardens

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

Herbicide	Rate (prod/ha)	Adjuvant	Application method
<b>Glyphosate</b> (Roundup Transorb® is recommended)	200-300 mL/15 L	Pulse or similar organosilicone (30 ml/15 L)	Knapsack or pump-up garden sprayer. Keep pressure low to avoid drift and overspray onto desirable plants. Apply until fronds are wet but not so that water is running onto the ground.



**Local Authorities**



**The best management option for local authorities is containment**

## Local Authorities

With current control options severely limited, the best management option for local authorities is containment, i.e. to stop this weed from spreading further afield.

As the principal means of spread are vegetative e.g. by rhizome fragments, the movement of material and equipment from within infested areas to weed free areas should be either restricted or include an acceptable decontamination procedure. This is likely to impact many farming and construction practices.





## For more information...

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

Images supplied by Horizons and T James, AgResearch



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