**BACKGROUND**

Horsetails (*Equisetum* species) are a family of weeds not to be confused with Mare’s tail, (*Hippurus vulgaris*), which is an aquatic plant of an entirely different species. *E. Arvense*, (Common Horsetail or Field Horsetail) is the most widely seen but there is also Marsh Horsetail, (*E. palustre*) and Wood Horsetail, (*E. sylvaticum*) The Horsetail family consists of a single genus of a lower order of plants which has survived since the Carboniferous age when the coal measures were laid down and can be seen fossilised in ancient rocks!

It is a perennial with creeping, rhizomatous stems, which can penetrate 2 metres into the soil. Much of the spread of the plant is vegetative by these rhizomes, but a sexual fruiting stem carrying a sporulating fruiting body emerges in the spring to about 25 cm in height. It is brownish white and hollow terminating in a cone-like structure bearing sporangia on their scales. The spores are ripe in April when the sporangia burst, liberating their spores before dying down. Barren, pale green, jointed stems then emerge to 30 - 60 cm in height and bare slender, simple branches in place of leaves in whorls of up to 12. It is these stems which are increasingly seen as a problem in waste ground, non-cropped areas and gardens.

The stems contain large amounts of silica, it has also been called Scouring rush and was said to be used by milkmaids to clean milk pails! Most species of *Equisetum* are poisonous to livestock by virtue of alkaloids and the enzyme Thiaminase, which destroys Vitamin B1 and causes animals to suffer from Vitamin B1 deficiency. Horsetails are usually avoided by grazing livestock, but should never be fed to livestock in hay or silage.

**CONTROL METHODS**

Drainage in wet areas, liming where necessary and repeated cutting of the vegetative shoots can all contribute to controlling the weed. In practice frequent cutting would take years to exhaust the rhizomes. Cutting of the spore-bearing shoots before sporulation also helps minimise new plants. Mechanical cultivation will make the infestation worse with new plants regenerating from pieces of rhizome as small as 1 cm. MCPA and 2,4,D give control of aerial shoots but re-growth from rhizomes occurs the following year. The contact herbicide glufosinate ammonium gives some control. Sowing intervals need to be carefully observed with these herbicides.
CONTROL WITH ROUNDUP PROBIO

Thick layers of silica and wax make the cuticle very difficult to penetrate with herbicides and the needle-like 'leaves' present a very small area for interception of spray. This physical barrier, combined with a large area of underground storage organs, mean this weed is usually classed as resistant or only moderately susceptible to glyphosate.

To maximise control in areas where an alternative residual weed control is not possible or where re-cropping of the area is planned it may be necessary to use a non-residual, environmentally acceptable herbicide and the following will optimise control with Roundup:

**Foliar Spray**

Use Roundup ProBio with its superior wetters and consider adding up to a 2% Mixture B NF or alternative approved wetter. Wait until the vegetative shoots have reached maximum height (60cm), usually in July. Bruise the stems lightly immediately before treatment. This will break the waxy layer and allow much better penetration of the glyphosate. To achieve this small areas can be brushed with a stiff broom, field areas are best with a Cambridge roller. The bruising must not be severe enough to break off the stems. Apply the highest rate of Roundup ProBio recommended - i.e. 10 l/ha in 100-200 L water with a droplet size on the finer side of medium. In a knapsack this rate is 50ml per litre of water sprayed to just before run-off.

**Weed Wiper**

A weed wiper with 1 part Roundup ProBio to 2 parts water could also be used and the effect of wiping itself can help the bruising process. On small areas or where the weed is encroaching amongst other desirable plants the use of a weed wiping glove can also prove a very successful method of bruising and application at the same time.

**Stem Injection**

Where the infestation is in a position where spraying is not practical or to eliminate the last few stems after previous spray treatments a stem injection method can be adopted. Although it is labour intensive there may be situations where it is justified. It is legal under the general chemical thinning recommendation on the forestry approval to inject up to 2mls into each hollow stem using an injection tool, or alternatively the stem could be cut at the first segment above the crown and the herbicide introduced using a spot gun or a medical syringe with no needle. As 2ml is a small amount it is advisable to make a 20% solution and inject 10mls per stem. Cut stems should be removed from grazing areas before stock are returned.

**RATES AND WATER VOLUMES**

**Foliar Spray Knapsack** - 5 l/ha in 200 litres of water per hectare + Mixture B NF @ 2% spray volume

**Conventional CDA** - 5 l/ha in a minimum of 10 litres of water or carrier oil (200-300 micron VMD)

**Hand Held Weed-Wiper** - 1 part Roundup ProBio to 2 parts water or paintbrush

**Mankar** - Neat product up to 5 l/ha

**JK Injection Gun** - 2ml per stem use of 10ml of a 20% solution

*The Microwipe, hand held weed-wiper is available from Billericay Farm Services, Telephone (01268) 710237** The Mankar ULV applicator is available from ALS Ltd, (01952) 641949*** The JK injection tool is available from Cityscape Design & engineering Ltd, (0845) 643 1162