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THE CHEMICAL CONTROL OF WILD GARLIC

Wild garlic (Allium vineale L.) is of limited distribution in Victoria but has potential of becoming an important weed. Trials have shown that eradication in pasture is possible without severe damage to grasses. Legumes however are killed by the chemicals used.

Experimental work was carried out in 1962 and 1963 on wild garlic on red-brown earth near Geelong in Victoria, on a pasture consisting mainly of perennial ryegrass, cocksfoot, and some lucerne and phalaris. The infestation of wild garlic was dense over the whole experimental site. The experimental area was fenced off 1 year before the commencement of the trials to prevent grazing stock removing the aerial growth of wild garlic plants.

The experiments were carried out in randomized block design and four replications were used. Counting of wild garlic is a difficult task and in the 1962 trial a method of semi-fixed-point quadrats was adopted and 200 points on each plot were counted. Counts were made before the spraying and repeated 12 months later.

The treatments were carried out in July when the plants were in the early growth stage. All the normal bulbs and most of the hard-shelled bulbs had germinated, although some were in the very early growth stage.

The results showed that very little reduction was obtained with 2,4-D (2,4-dichlorophenoxyacetic acid) ester, even at 4 lb per acre. The use of diesel distillate as carrier did not improve the result. It is of note that 2,4-D has been recommended overseas for the control of this weed.

The benzoic acid weedicides proved very successful for the control of wild garlic. 2,3,6-TBA (2,3,6-trichlorobenzoic acid), as well as dicamba (2-methoxy-3,6-dichlorobenzoic acid), at 4 and 8 lb per acre produced 100% control of wild garlic without serious damage to grasses, which became dominant on the plots 12 months after treatment. Lucerne and other legumes were removed however.

Amitrole (3-amino-1,2,4-triazole) at 4 lb per acre slightly checked the vigour of the wild garlic plants, but they eventually recovered. At 8 lb per acre amitrole stunted the plants more severely, but they recovered. The grasses were badly reduced, and the plots treated with amitrole became infested with Lythrum flexuosum. Amitrole plus ammonium thiocyanate at 8 lb per acre gave a reasonable control of wild garlic. The average percentage control of top growth over the four replicates was 77.5%. While this reduction appeared substantial, most of the

bulbs were alive and numerous young shoots appeared. All the grasses were eliminated and the plots were dominated by Juncus and Lythrum spp. Amitrole and ammonium thiocyanate at 4 lb per acre produced less reduction of wild garlic, the pasture was badly damaged, and it became weed-dominant.

Diquat (9,10-dihydro-8a,10a-diazoniaphenanthrene cation) and paraquat (1,1′-dimethyl-4,4′-bipyridylium cation) at 4 and 2 lb per acre temporarily removed all the vegetation except wild garlic. Diquat at 4 lb per acre stunted wild garlic, but the plants remained vigourous. Paraquat at 4 lb per acre had practically no effect on wild garlic apart from initial desiccation.

MCPA (2-methyl-4-chlorophenoxyacetic acid) appeared to reduce the vigour of wild garlic somewhat, but the result was not satisfactory. 2,2-DPA (2,2-dichloropropionic acid) at high rates reduced wild garlic plants substantially. At 20 lb per acre, an average kill of 94% was obtained and the grasses were severely reduced; at 40 lb per acre the percentage kill was increased, but the grasses were completely removed.

It was quite evident that 2,3,6-TBA and dicamba produced most satisfactory results, and at 4 lb per acre it could be a practical proposition. 2,3,6-TBA and dicamba not only killed the parent plants but, owing to residual effect, no germination of the hard-shelled bulbs or of aerial bulbils occurred in the following year. It is quite likely that less than 4 lb of 2,3,6-TBA or dicamba would be capable of achieving good control without much damage to grasses.

In 1963 further work was conducted on wild garlic, which involved the reduced rates of 2,3,6-TBA and dicamba as well as picloram (4-amino-3,5,6-trichloropicolinic acid) and picloram/2,4-D mixture. The results appear to be outstanding with all of these weedicides.

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A LEGUME-SAFE HERBICIDE FOR WEED CONTROL WORK IN PASTURES

Prometryne (2-methylmercapto-4,6-bis (isopropylamino)-s-triazine) applied as an early post-emergence spray to weedy pastures at rates of 4-8 oz a.i./ac. has given excellent control of broad-leaved weeds such as Emex australis, Cryptostemma calendula, Geranium molle, Echium plantagineum, Fumaria spp., and Erodium spp., as well as giving some control of Vulpia spp. and Hordeum leporinum.

At these rates, prometryne appears to be selective towards Trifolium subterraneum, Medicago denticulata, Medicago tribuloides,

and Medicago sativa seedlings with two or more trifoliate leaves. Prometryne at 8 oz and 16 oz a.i./ac. has proved selective towards Lolium spp., Festuca arundinacea, and Dactylis glomerata seedlings with three or more leaves.

One of the chief problems in the establishment of improved pastures is to obtain and maintain freedom from weed competition during the critical early development stage of the sown grasses and legumes. The availability of a satisfactory selective herbicide should allow choice of the optimum sowing time for establishment, regardless of potential weed competition.

Several chloro-triazine herbicides, notably simazine (2-chloro-4,6-bis (ethylamino)-s-triazine) and propazine (2-chloro-4,6-bis (isopropylamino)-s-triazine), have been reported to exhibit a satisfactory degree of selectivity towards clovers and medics, and the author demonstrated, in 1958, that this applied to Trifolium subterraneum seedlings in a logarithmic trial at Pleasant Hills.

From 1960 onwards, in a series of 17 replicated observation trials, a number of chloro- and methylthio-triazines (including prometryne) were tested for their weed-killing properties and phytotoxicity to small-seed legumes and pasture grasses growing in southern Australia.

In addition, prometryne was tested in four replicated lucerne trials and about 50 replicated cereal trials, all of which added to information on weed control.

In the pasture and lucerne trials, treatments were replicated two, three, or four times, while six of the trials were designed to make use of exponential dosage rates applied with a logarithmic sprayer, a Chesterford Mini-Log Sprayer, or a Boysie Day type of machine being used. In all other trials constant-pressure knapsack sprayers with a boom were used.

Assessments were made visually at varying intervals after treatment, using a 1 to 10 scale for weed control and pasture response. In a few trials weed counts were made.

Except initially, no suppression of legume species was recorded below the following rates of prometryne a.i./ac.: Medicago sativa (established) 2 lb, (seedling) 1 lb; Trifolium subterraneum, Medicago denticulata, and Medicago tribuloides (seedlings) 8 oz. In most trials, the elimination of weed competition resulted in the legumes present becoming dominant and more luxuriant than in the untreated controls.

Emex australis occurred in 13 experiments and kill varied according to the growth stage, but in addition appeared to be related to rainfall or soil moisture conditions prior to treatment. After very dry conditions, prometryne even at 8 oz a.i./ac. gave a kill of 20% or less; while following moist soft-growth conditions, 4 oz a.i. or less gave 90-100% kill of four- to five-