

Repeat applications of paraquat (0.25-0.5 lb per acre) (0.25-0.5 kg per hectare) produce a clover-dominant sward which, owing to its open nature, is only partially effective in reducing the re-establishment of barley grass. The other method is the use of sterilants such as simazine which give season-long control resulting in bare ground.

The dominant factor preventing a major overall reduction in barley grass is the lack of desirable pasture species or lack of knowledge of their management to produce tight competitive swards. Cocksfoot (*Dactylis glomerata*) is quite tolerant to the combination rates of 2,2-DPA and TCA but is difficult to establish. The use of yarrow (*Achillea millefolium*), a dense, low-growing species which is tolerant to grass herbicides, is a possibility. To be successful, an introduced species must have the ability to establish rapidly from a spring sowing, be reasonably drought hardy, and withstand close grazing.

To summarize, herbicides are available to adequately control resident barley grass populations, but desirable species and methods to satisfactorily recolonize nucleus infestation areas are yet to be found.

CONTROL OF DICOTYLEDONOUS WEEDS IN SEEDLING LUCERNE

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A large number of dicotyledonous weeds are problems in the establishment of lucerne stands. *Emex australis* is considered particularly troublesome not only because of its competition but also because it can be responsible for sharp fruit in lucerne hay. 2,4-DB is the standard treatment for control of dicotyledonous weeds in seedling lucerne, but a number of the more common species occurring in this crop, such as *E. australis*, *Lamium amplexicaule*, *Stachys arvensis*, and *Capsella bursa-pastoris* are comparatively resistant to this herbicide.

A number of herbicides were compared with 2,4-DB and, of these, prometryne and bromoxynil were selected for further work in a series of trials over three years in the Hunter Valley of New South Wales.

In general, 0.50 lb a.i. per acre (0.56 kg per hectare) of prometryne and bromoxynil gave satisfactory weed control. However, prometryne did not adequately control *Cotula australis*, *Silybum marianum*, and *Brassica* spp., while bromoxynil did not control *Stellaria media*, *S. arvensis*, and *L. amplexicaule*. No treatment gave satisfactory pre-emergence weed control but large germinations of weeds subsequent to spraying were common.

Dry matter yields of lucerne and individual weeds were taken 2 months after treatment. As expected, large increases in yield of lucerne were obtained after satisfactory control of a high density of weeds. Thus, where weight of weeds to lucerne was 15:1 in untreated plots, prometryne increased lucerne yield by 554% and bromoxynil increased it by 367%. These increases fell to 49% and 23% respectively where the ratio of weeds to lucerne in untreated plots was 1.3:1.0. In the latter case, it is doubtful if yield increase alone could justify spraying. However, if a troublesome species, such as *E. australis*, were present, its control could be an overriding factor.

In 1969, mean dry matter yield increases of lucerne after application of prometryne, bromoxynil, and 2,4-DB were 185%, 212%, and 145% respectively.

Prometryne was tested in more detail with regard to stage of plant growth and climatic conditions. It was more selective on lucerne at the two trifoliolate leaf stage than earlier, selectively being maintained at later stages. However, largest yield increases were obtained at the two leaf stage because weed control was then more satisfactory than later and because competition was probably more critical early in the life of the lucerne.

Some lessening of selectivity was apparent where climatic conditions were unusually warm at application. However, largest yield increases were generally obtained after autumn and spring applications when the lucerne was growing most actively.

A lessening of the herbicidal effect on weeds occurred when heavy rain fell within 8 hours of applying prometryne.

No increase in phytotoxicity to lucerne was observed where prometryne was mixed with 2,4-DB or bromoxynil and it is suggested these mixtures are worthy of further trial to obtain an increased spectrum of weed control.