THE EFFECT OF SOIL RESIDUES OF PICLORAM ON WHEAT CROPS AND UNDERSOWN LEGUMES

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Picloram is probably the most effective herbicide for controlling skeleton weed in the Victorian Mallee. Its main use is for eradicating small patches of the weed, but fallow applications at low rates have given good skeleton weed control for short periods prior to cropping. Unfortunately, picloram is very persistent in the soil and, before it can be recommended for extensive use on arable land, it is essential that its residual effect on crops and pastures be thoroughly investigated.

Experiments were commenced in 1965 to study the effect of picloram applied during the fallow in the growth and yield of the subsequent wheat crop and on undersown medic pasture. In a second series of experiments, commenced in 1967, picloram was applied at different growth stages of the wheat crop and its residual effect on medic pasture in the following year was also measured.

WHEAT

In both 1966 and 1967, wheat yields were increased after picloram treatment [up to 4 oz per acre (0.28 kg per hectare) in the previous winter] compared with those on cultivated fallows; this yield increase being the result of higher soil nitrogen and soil moisture at sowing. In 1969 there were no significant differences in yield between the cultivated and picloram fallows.

Picloram residues in 1968 were toxic to the wheat, causing prostrate growth of the crop during tillering. The drought conditions during the fallow period were probably responsible for the toxic residues.

MEDICS

In the cropping year following fallow applications of picloram, a mixture of lucerne and strand medic was sown in a strip 18 ft (6 m.) wide across one end of all treatments; two observers visually scored growth in the spring. In the stubble-sown experiments, lucerne and either strand or barrel medic were sown separately in a split-plot design and plant populations were counted in the spring.

The comparison between lucerne and the annual medics at four

sites showed no differences in susceptibility to picloram residues, so the following comments refer to all three medic species.

Picloram residues from applications the previous year affected medic growth in all experiments, but were most severe in 1968 following the drought. Generally, 2-4 oz per acre (0.14-0.28 kg per hectare) applied in the winter killed all medic the following year, but after application in the drought year, even 0.14 oz per acre (0.01 kg per hectare) reduced the medic population by 68%. In dry years, spring-summer applications of picloram had less effect on subsequent medic growth than winter applications, suggesting photodecomposition of the herbicide.

CONCLUSIONS

At the rates tested, soil residues of picloram from fallow application reduced subsequent wheat yields in only one year out of four (1968), while undersown medic was affected every year, particularly in 1968. It is concluded that seasonal conditions determined the extent of picloram residues through microbial break-down and photodecomposition, and possibly also through leaching.

In view of the advantages of establishing medic pastures on skeletonweed land, the use of picloram on broad acres is inadvisable.

HAZARDS ASSOCIATED WITH THE USE OF PICLORAM FOR SKELETON WEED CONTROL IN THE MURRAY MALLEE

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The Murray Mallee is bordered by the River Murray to the west and north, the Victorian border on the east, and on the south it is approximately separated from the Upper South-east by the road from Tailem Bend to Pinnaroo. Annual rainfall varies from nearly 15 in. (380 mm) in the south to about 10 in. (254 mm) near Loxton. Soils vary from infertile sandy rises to more fertile loamy flats. Skeleton weed is now widespread through the less fertile sandy areas, where pasture growth is generally poor.