SOIL RESIDUES OF HERBICIDES AFTER REPEATED USE

P.W. Weiss
Geigy Australia Pty Ltd, Kemps Creek, New South Wales

Soil residues of some commonly used substituted triazines and ureas were studied after their repeated use in some perennial and annual crops. Herbicides are likely to be used a greater number of times in a perennial crop than in an annual one but residues in the former have usually only to be considered in relation to that crop. In annual crops, soil residues are usually more important to intervening crops

Some herbicides were dropped from long-term studies because of their excessive soil penetration, particularly in citrus grown in Murray Sands under overhead irrigation. These herbicides included monuron, atratone, and prometone.

The following were used in vines (sultanas and currants), with side furrow irrigation, and in citrus, with overhead irrigation, in the Sunraysia area of Victoria: simazine, atrazine, and diuron. A total of up to 9.6 lb a.i. per acre (10.8 kg per hectare) was used either in three applications over two years (vines and citrus) or in five applications over three years (vines).

In soil samples taken 8 months after the last application, the most herbicide that could be detected by bioassay was 0.4 ppm. In the case of simazine and atrazine, this was concentrated in the surface 2 in. of soil. Diuron was also concentrated at this depth in vines, and at a depth of 2-4 in. in citrus. (5.08 - 10.16 cm).

Simazine was also used in two other longer-term vineyard experiments in the Sunraysia area, on a loam and on a sand. Applications were made either once or twice each year from 1963 to 1969 on the sand and from 1963 to 1967 on the loam. At the end, some rows had received a total of 24.8 lb per acre (27.8 kg per hectare)at both sites.

Soil samples were taken in June of each year (8 months after the last application) and the concentration of simazine determined by bioassay. No detectable simazine (<0.05 ppm) was present below 2 in. in the soil at any of the sampling times. The most simazine that could be detected in the surface 2 in. (5.08 cm) was 0.3 ppm. There were no significant differences in residues of simazine between any year, indicating no build-up in residues.

This was also confirmed by the effect on the vines and on the weed flora. Thus, there were no significant reductions in yields of sultanas, compared with cultivated controls, in any

year of the experiments. Some rows, treated each year previously, were left untreated in the final year. Inadequate weed control, particularly of *Setaria verticillata* and *Digitaria sanguinalis*, then resulted.

The repeated use of atrazine in maize, grown on an alluvial loam, was also investigated. Atrazine was applied at 3.0 lb a.i. per acre (3.4 kg per hectare) to the same plots for three consecutive maize crops. Oats were grown in a field bioassay after harvest of the maize each year. No damage to the oats occurred in any year and maize yields were unaffected.

There was a change in the weed flora from a mixed grass and broadleaf situation to a predominantly grass one during the period between maize crops, indicating that the small amount of residue remaining after the maize harvest may have been sufficient for broadleaf but not grass control.

PICLORAM PERSISTENCE AND ITS EFFECT ON WHEAT CROPS

N.S. Welsh
Department of Agriculture, Victoria

Persistence of herbicides is often a useful property, but it can also limit a product's widespread usage. This is particularly so with picloram in cereal areas when it is used for perennial weed control and where soil residues may affect subsequent cereal crops.

A number of trials have been carried out to assess picloram's persistence in relation to sowing cereal crops at intervals after spraying. An area of Wimmera ryegrass-subterranean clover pasture free of any major perennial weed species was chosen. Picloram (as Tordon 50-D) was boom-sprayed in 40 gal. per acre of water (449.2 litre per hectare) at the following rates:

(1) Unsprayed control
(2) 2 oz a.i. per acre (0.15 kg per hectare)
(3) 4 oz a.i. per acre (0.3 kg per hectare)
(4) 8 oz a.i. per acre (0.6 kg per hectare)
(5) 16 oz a.i. per acre (1.2 kg per hectare).

Sprayings were made at approximately 4-monthly intervals and the wheat crop was sown at the usual time for the district. The yields are presented in Table 1.

From the Table it can be seen that significant yield reductions occurred at Numurkah with 16 oz applied up to 8 months before