DIELDRIN RESIDUE ON BARLEY GRAIN CROP

W. F. LEONARD

Department of Agriculture, Christchurch

Summary

Three rates of dieldrin emulsion were applied to a standing barley crop at intervals prior to harvest. Results indicate that, after application at the early greenhead stage, the residue levels drop sharply over the first sixteen days but persist in considerable amounts up to harvest.

INTRODUCTION

UNDER THE Agricultural Chemicals (Insecticides) Regulations 1962, dieldrin used on a grain crop must be applied at least nine weeks before harvest if the straw is to be fed to stock. This rules out the use of dieldrin in dealing with attacks of armyworm (*Pseudaletia separata* and *Persectania aversa*) occurring within a few weeks of harvest.

Preliminary results presented here are from an investigation into the residues persisting on barley straw and grain following the application of dieldrin at various intervals before harvest.

EXPERIMENTAL

Dieldrin emulsion at the rate of 2 oz, 4 oz and 8 oz (all rates given in active ingredient per acre) was applied in twenty gallons of water per acre to a crop of Carlsberg barley near Christchurch. Applications were made 1, 16, 31, and 46 days before harvest.

Plots were 7 ft wide but to minimize the risk of contamination by drift only the central 3 ft 6 in. strip of each plot was sprayed. Treatments were replicated three times.

The crop was cut with a sickle bar mower and the material from each plot divided into two samples. One group of samples was threshed and both grain and straw stored under cover. The other samples were spread out to weather for a further 21 days to simulate cereal straw which might remain unbaled for a period after harvesting of grain.

STAGE OF GROWTH

At the first application (46 days before harvest) the barley heads had just emerged and flowers were open only at the tips. Some heads were still erect 15 days later, but most had turned 90° to 120° from the vertical position. At the third time of application (16 days before harvest) heads were just beginning to change colour, while the last application was made just 1 day before harvesting began.

RAINFALL

No rain fell between the last application and harvest. In the 16 days prior to harvest, 1.97 in. fell, 3.82 in. during the 31 days before harvest and 3.89 in. over the 46 days between the first application and harvest.

The interval between application and a substantial fall of rain was little more than a day for the treatments applied 16 days before harvest, 0.80 in. falling over the second and third days.

Following the application 31 days before harvest, 1.80 in. of rain fell on the third and fourth days whereas the weather after the application 46 days before harvest was comparatively dry, only 0.07 in. being recorded over the next 19 days.

In the 21-day period after harvest, 0.43 in. of rain was recorded.

RESULTS

The only results available (July, 1963) are from the straw samples collected at harvest. These are set out in Table 1.

TABLE 1: RESIDUES OF DIELDRIN IN STRAW SAMPLES
(PPM, DRY MATTER BASIS)

<i>Days before Harvest</i>	<i>Application Rates</i>		
	<i>2 oz</i>	<i>4 oz</i>	<i>8 oz</i>
1	2.0	4.0	5.8
16	0.58	0.87	0.91
31	0.38	0.55	1.05
46	1.16	1.03	No result

The mean level recorded in untreated samples was 0.24 ppm. [Because of initial confusion in relating plot numbers to treatments, control samples were not isolated when first received by the analyst. Some contamination of untreated samples before analysis could thus have occurred, for which the writer accepts full responsibility.]

DISCUSSION

Under the conditions prevailing during the course of the experiment, dieldrin residue on barley straw declined sharply over the first 16 days but altered little during the next 30 days. The results are, however, from one trial in one season and require confirmation before a conclusion can be reached.

ACKNOWLEDGEMENTS

D. L. Harrison, Wallaceville Animal Research Station, carried out residue determinations and T. J. Smallridge assisted with field work.