INDICATIONS OF RESISTANCE TO DDT BY THE IMPORTED CABBAGEWORM IN THE OKANAGAN VALLEY[1]

R. H. HANDFORD AND IMANTS BERGIS[2]

Reports of dissatisfaction with DDT as used against the imported cabbageworm, *Pieris rapae* (L.), in the Okanagan Valley in 1960, suggested that experimental tests were advisable. Accordingly, an experiment was set up in June, 1961, in a field of Pennstate Ballhead cabbages on the farm of S. and J. Low near Kelowna, B.C. There were five treatments arranged in four randomized blocks. Each plot measured 16.5 ft. x 16.5 ft. and contained 80 to 100 plants.

The cabbage plants were set out on June 25 and the plots were staked on June 27. The insecticide for each plot was measured separately into two quarts of water and applied with a knapsack sprayer. Spraying was done on June 28, July 7, 18, 28, August 9 and 21. Dibrom was substituted for DDT on August 21 to avoid illegal residues at harvest. Otherwise the treatments on each date were as follows:

1. DDT, 50% wettable powder, 4 lb. per acre.
2. Thuricide, 30 billion viable spores per gram, 1 lb. per acre.
3. Phosdrin E.C., 1.54 lb. actual per 20 fl. oz., 8 fl. oz. per acre.
4. Dibrom E.C., 9.6 lb. actual per U.S. gal., 16 fl. oz. per acre.
5. Untreated check.

The effectiveness of the treatment was determined by counting the larvae on 12 plants selected at random in each plot on July 6, 11, 27, August 9 and 21, before treatment in each instance. The diameter of the cabbage heads was measured at the end of the experiment.

[1] Contribution from the Entomology Laboratory, Canada Department of Agriculture, Research Branch, Kamloops, B.C.

[2] Officer in Charge and Greenhouseman, respectively.

The total number of larvae on 48 plants per treatment, counted on the five dates indicated, was divided by the number of replicates (four) to give the following means:

Phosdrin	7.8
Thuricide	11.3
Dibrom	13.8
DDT	27.0
Check	51.3

Difference necessary for significance at the 5% point was 3.95.

Difference necessary for significance at the 1% point was 5.54.

The difference in amount of damage to the leaves and heads was considerably greater than indicated by the differences in numbers of caterpillars. Mortality in plots treated with Phosdrin and Dibrom was very high immediately following treatment, and the worms found in these and the Thuricide plots just before treatment were very small as compared to those in the check plots and in those treated with DDT.

The average sizes in inches of heads in plots receiving the different treatments were as follows:

Dibrom	5.36
Phosdrin	5.30
Thuricide	5.02
DDT	4.69
Check	4.41

Difference necessary for significance at the 5% point was 0.22.

Difference necessary for significance at the 1% point was 0.31.

Again, as in the comparison of the number of larvae, the differences in damage, and probably in marketable heads, was much greater than the differences in size, but in the same direction.

It was obvious, from both criteria, that DDT, although used at double the strength recommended in previous control charts, did not give satisfactory control.

Although no counts were made of aphid populations, it was observed that they were numerous enough to cause considerable injury to plants in the check plots and to those treated with Thuricide. They increased less rapidly on plants receiving DDT, and were not observed on those treated with Dibrom or Phosdrin. This may have accounted in part, at least, for the larger heads produced in the plots treated with Dibrom or Phosdrin.

We should like to express our thanks to Mr. E. M. King, Horticulturist (Vegetables), B.C. Department of Agriculture, Kelowna, for indicating the need for the experiment and for arranging for a suitable experimental site.

EFFECT OF TWO SPRAY PROGRAMS ON LEAFHOPPERS IN CHERRY ORCHARDS IN THE KOOTENAY VALLEY OF BRITISH COLUMBIA[1]

W. H. A. WILDE[2]

Introduction

The purpose of this paper is to present results of an experiment to assess the value of dieldrin ground sprays as compared to DDT and Sulphenone tree sprays for control of leafhoppers in sweet cherry orchards. Assessments of spray programs were made by comparing the numbers of leafhoppers caught on sticky boards in the tree canopies (2). Spraying tree canopies with DDT and Sulphenone was a procedure used by some Kootenay Valley growers for controlling leafhoppers and mites. Dieldrin was selected for use as a ground spray because of its reported residual action against earwigs, spittle bugs, and thrips, pests prevalent in Kootenay Valley cherry orchard cover crops, and because it was considered possible that such an insecticide would provide economic control against leafhopper populations. Most of the leafhoppers recorded in this test work are known to spend part of their life-cycle in cover crops.

Materials and Methods

Three plots were used, each consisting of a block of 24 sweet cherry trees, almost all of the Lambert variety, 10 to 16 years old. Each plot was bordered by a buffer row of trees on all sides. The two treated plots were in one orchard and the check plot was in another. The two orchards immediately adjoined each other and were separated by a fence somewhat overgrown with native shrubs including *Symphoricarpus* sp., *Ribes* sp., *Crataegus* sp., and *Rosa* sp. The check plot, which simulated conditions in many Kootenay Valley cherry orchards, was not irrigated, mowed, pruned, or sprayed for eight years, including the year of the experiment; the ground cover was tall couch grass. The check trees were vigorous but growth was not so succulent as that in the treated plots.

The sprays were applied by a high volume sprayer. Fogging in the tree canopy applications held spray runoff to a minimum. The ground sprays of 20 per cent emulsible dieldrin[3] at the rate of 0.75 gallon per 100 gallons of water were applied on May 15 and August 12. The tree spray was 50 per cent DDT wettable powder at 3 pounds per 100 gallons with 40 per cent Sulphenone wettable powder at 2.5 pounds per 100 gallons applied on May 15 and August 12. A single spray

[1] Contribution No. 59, Research Station, Research Branch, Canada Department of Agriculture, Summerland, British Columbia.
[2] Entomologist.
[3] Hexachloro-epoxy-octahydro-dimethanonaphthalene, Shell Oil Company of Canada, Limited.