Insect pest - new insecticides and fruit fly control

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NEW INSECTICIDES AND FRUIT FLY CONTROL

Despite the increasing number of new insecticides and techniques which are being developed, the Mediterranean fruit fly (Ceratitis capitata) continues to be one of the most serious pests of the fruit industry in this State.

Community baiting schemes have been inaugurated in several districts and have shown their worth in keeping this pest to a minimum. Nevertheless fruit fly still abounds in the West Coastal and Hills fruit-growing districts. It has been felt that one or more of the new developments should be applicable to fruit fly control, and may overcome some of the limitations of the strict hygiene and sodium fluosilicate foliage baiting which has been made a compulsory measure to combat the pest.

Parathion, H.E.T.P., DDT, BHC, aldrin, dieldrin and chlordane have been used in baits and DDT, BHC, aldrin, dieldrin and chlordane as ground dressings in laboratory and field tests but no means of control superior to the present recommendation has yet been achieved. An earlier report (Ryan, 1950) has dealt with trials concluded during or before 1950.

BAITING TRIALS

Poisoned sugar syrup splashed onto the foliage has been the basis of the method recommended for controlling fruit flies in W.A. for a number of years. Sodium fluosilicate was early shown to be an efficient poison and has proved satisfactory when properly used in conjunction with practices such as early picking of fruit, regular picking up of fallen fruit and the proper destruction of any fruit suspected of being infested. This bait (1 oz. of sodium fluosilicate plus 2½ lb. sugar in 4 gallons of water) has been used as the standard with which to compare other baits. Sugar concentrations in all baits have been left constant.

BHC showed immediate promise but after a number of trials it became apparent that results from cage baiting trials were being marred by a high mortality due to the fumigatory action of the BHC.

Fig. 1.—Adult female of the Mediterranean fruit fly (greatly enlarged).
This effect would be greater in confined spaces, such as are necessary in laboratory trials, than would occur in the field and hence an endeavour was made to ascertain the proportion killed by fumigation. Two cages were baited with a BHC bait which was available to the flies; two were treated with the same material but with the bait covered by a wire gauze to prevent contact or feeding; two cages were kept as controls with no insecticide present. The time taken for 50% of the flies to die was—

- Open bait: 17 hours
- Covered bait: 32 hours
- Control: 96 hours

A small-scale field trial in which BHC was compared with sodium fluosilicate showed, by the number of flies dead under the trees, that the rapid killing action of a BHC bait was not confined to the laboratory.

In an experiment carried out on Valencia oranges, in which BHC was compared with sodium fluosilicate, the efficiency of both insecticides in a bait and the superiority of sodium fluosilicate over BHC were demonstrated. Lindane, the pure gamma isomer of BHC, was used in later trials in conjunction with the more recent insecticides.

**DDT, Parathion and H.E.T.P.** were shown to be less effective than BHC in early trials and were discarded in favour of more extensive tests with this insecticide.

**Chlordane, Aldrin and Dieldrin** were the subject of more recent exploratory cage baiting trials. As in trials using other insecticides, the bait was smeared onto a glass plate which was introduced into the test cage.

Indications from the trials were that these materials were no more effective and no more rapid in action than the standard bait when used at comparable concentrations. Aldrin, at higher concentrations, killed the flies more rapidly. This, as in the case of BHC, was probably due to a fumigatory action.

**SOIL DRESSINGS**

Soil dressings have been investigated because it has been felt that a susceptible stage in the life of the fruit fly is the time when the larva leaves the fruit to pupate in the soil.
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Although in some cases quite good results have been achieved, no treatment appeared obviously superior to the foliage baiting when efficiency and cost were both considered.

BHC again showed promise and has been used in a number of laboratory experiments. In this also the fumigatory action in the laboratory has made results difficult to interpret.

At the rate of 19 lb. of 10% BHC per acre, only a few flies emerged and none of these survived for more than one hour. Most larvae dropping onto treated soil either died before pupation or formed distorted pupae which failed to develop. Others perished at or soon after emergence of the adult fly. Toxicity was shown to remain for at least a period of 4-5 months.

To simulate field conditions, an experiment was carried out on a small plot of land on which fly wire cages were placed over areas of treated soil. Reasonable control seems to have been obtained from a concentration of 1½ lb. of gamma isomer BHC per acre.

DDT soon proved to be inferior to BHC and hence was discarded in its favour.

Chlordane, Aldrin and Dieldrin were tested against BHC in the laboratory. Chlordane gave disappointing results. Aldrin and dieldrin had comparable effects on the larval stage. Aldrin caused a higher mortality of emerging flies, but was still inferior to BHC in total kill. Concentrations used were approximately 4 lb. of active ingredient per acre applied in an emulsion to wet the soil in the test tray.

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REFERENCES


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