

protective cover for bugs, but grass, clover, and weeds may be alternate hosts and a source of reinfection.

(b) **Scraping trunks** of pear trees so that all excess bark is removed from older trees is particularly useful in removing overwintering sites and also allows more effective spray coverage. This suggestion may be rejected on grounds of cost of the operation and possible damage, but it would undoubtedly assist control.

(c) **Clean pruning:** By this is meant the removal of all old, spent, or dead fruiting spurs, and twigs and water sprouts from inside the pear leaders. These parts provide ample shelter for mealy bugs and if present are nearly always infested.

#### \*Chemical

Recent experiments carried out in Hawke's Bay orchards show that with the large range of insecticides available only the organo-phosphate materials are effective. In particular two materials, parathion and diazinon, have given good control. However, fairly high rates of application at frequent intervals and with good coverage are essential.

Of the two, parathion appears a little more effective than diazinon, but is extremely dangerous to operators, who must wear the recommended protective clothing. Diazinon is safer to the operator, but is more expensive (almost double the price of parathion when used at a strength to give equal control).

#### Trial on Pears

A brief description of last season's trial on 1 acre of Winter Cole pears at Havelock North is given below.

Treatments were as follows:

	Per 100 gallons
Parathion (31 per cent) ..	10 oz
Parathion (31 per cent) ..	15 oz
Diazinon (20 per cent emulsion) ..	½ pint
Diazinon (20 per cent emulsion) ..	1 pint
"Phosdrin" (25 per cent emulsion) ..	½ pint
"Phosdrin" (25 per cent emulsion) ..	1 pint

Preceding these treatments was an overall combined application during the dormant season of winter oil 1 in 20 + lime sulphur 1 in 15. There was a heavy carry-over of mealy bugs (eggs and adults) from the previous season and infestation was considered to be uniform throughout the pear block.

\* Permissible residues on food at time of sale of some of the materials mentioned are specified in Amendment No. 12 to the Food and Drug Regulations 1946 as follows: Parathion, not greater than 1 part per million; "Phosdrin", nil. The Systemic Pesticides Notice 1959 prohibits application of "Phosdrin" to pip and stone fruits within one week of harvesting and of "Rogor 40" within two weeks of harvesting.

Treatments were in single rows of eight trees each separated by guard rows. Spraying was done with the grower's air blast machine, about 6 gallons per tree being applied, and was carried out in a system to eliminate drift to adjacent trees as far as possible. The trial block received four applications.

The first was applied on 12 November when a heavy infestation of all stages from crawlers to adults was collecting, mainly round the bases of young lateral growth, particularly in centres and tops of trees. To obtain the greatest possible kill, spraying was delayed a few days from when first emergence was noted. Bugs appear to feed at the base of young growth for a week or two before moving out to leaves and fruit spurs.

Before the second application all trees were summer pruned (all surplus lateral growth was pulled out (not cut) from the centres of the trees, and as far as one could reach along the fruiting arms). This was done to allow better penetration of sprays and to reduce protection for the bugs. Many bugs adhering to the bases of the laterals were removed on the growth pulled out.

The second application with all treatments was made on 6 December. Spraying was done at a time when it was considered there was a predominance of young crawlers round laterals and spurs from a recent second hatching.

It was obvious from this stage onward that there was an overlapping in stages between eggs and adult bugs. This was probably due to the fact that bugs emerge from wintering places both as young crawlers and as adults. As a result of the first two applications very few had managed to reach the calyx in the most effective treatments.

On 17 January a third application was made as for the earlier treatments except that "Phosdrin" ½ pint, which was giving poor control, was replaced by parathion.

On 17 February the fourth and final sprays were applied, being similar to those of the third application. Before this final spray it was evident that re-infestation from a late hatching had occurred during early February from eggs laid within the actual spur, crawlers having only a short distance to travel to infest fruit. They quickly collected at the point of contact between pears in the bunch and some moved into the calyx to become firmly embedded under the calyx leaves.

Harvesting of the trial block was carried out between 11 and 14 March, fruit being picked into bulk trailers. Samples of five cases of pears from each treatment were examined for presence of bugs in the calyx. Percentages of infested fruit from each treatment at harvest were as follows:

## Control Recommendations

1 From first or second week in November and at three-weekly intervals until 14 days before harvesting apply:

	Per 100 gallons
Parathion (31 per cent)	15 oz
or	
Parathion (25 per cent)	18½ oz
or	
Diazinon (20 per cent) .....	1 pint

Ensure best possible coverage to reach bugs in sheltered places on the tree and include a wetting agent in the spray. An autumn application as soon as possible after harvest will reduce carry-over to the next season. (The above strengths could be reduced with closer-interval spraying.)

2 Remove all surplus lateral growth from the insides of leaders and fruiting arms during early summer. At this period before growth has hardened laterals can be pulled out by hand and this is preferable to cutting, which leaves stubs that provide additional shelter for bugs.

3 To reduce migration of crawlers from weeds and grasses under trees maintain a clean zone round butts during spring and summer.

4 On old pear trees the removal of "sprags" (old gnarled and knobby growths on leaders and fruiting arms) and scraping off of loose bark from trunks and leaders will greatly reduce the main sheltering places for mealy bugs and assist control.

Growers are strongly recommended to take appropriate action where mealy bug is either well established or beginning to appear. There is no point in applying contact insecticides where bugs are not to be seen, but once they appear in a block, infestation is rapid if control is neglected. Eradication is then a far more difficult and costly business.

	Per cent
Diazinon: ½ pint .. ..	61.9
1 pint .. ..	19.9
Parathion: 10 oz .. ..	26.2
15 oz .. ..	14.5
"Phosdrin": ½ pint (2 sprays) followed by parathion 15 oz	
(2 sprays) .. ..	76.2
1 pint .. ..	75.5