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The Effect of Dimecron® on Zeuzera pyrina L.*

(Lepidoptera)

by

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The leopard moth, *Zeuzera pyrina* L. is a serious pest of pome fruits in the Eastern Mediterranean countries. The damage caused by the larvae of this moth cannot be accurately estimated due to the fact that even one larva can cause the breaking of a limb under the weight of a heavy load of fruit, or the breaking of the trunk of the tree under the effect of wind or load or both. The loss of a limb is irreparable and its detrimental effect is felt by the fruit grower for a number of years.

The leopard moth does not limit its attacks to the weak trees, although the weak ones are generally more subject to its attack, as has been repeatedly observed by the writer in Lebanon and Syria.

In middle altitudes (700–1000 m.), this pest has only one generation per year. The adults appear mostly in July and August, and the first symptoms of attack are usually not noticed before late in September or in October. There are two general forms of infestation : (1) mass infestation of the current year's shoots and (2) individual infestation. The most obvious symptom of the first form is the fine excreta ejected from very narrow holes anterior to the buds in the leaf axils. It is not rare at all to see holes drilled in ten or more successive bud axils. In such cases the attacked shoots wilt and die, and the larvae die also. Such twigs cannot be saved by any mechanical means of control (see infra). Their loss mutilates the tree and automatically reduces the crop in the season to follow. In the second form of infestation one or very few galleries are drilled per shoot or limb. When such an attack

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is discovered early enough, the attained part of the tree can usually be saved by mechanical means, or by fumigating. If not controlled, the damages resulting from individual infestation are always more catastrophic than from the mass infestation.

The control of the larvae of the leopard moth, however, is not easy, because of the difficulty of discovering an early attack, and the great likelihood that such early attacks pass unnoticed due to the hiding effect of foliage.

The mechanical methods of control can be divided into two categories : (1) the cutting and burning of attacked twigs, and (2) wire extraction of the caterpillar especially in apple limbs, where the larva almost always drills its tunnel upwards. The mechanical method requires a lot of time and vigilance, and quite often, attacks pass unnoticed and later result in great losses.

Fumigating is effected by the introduction of a small piece of cotton saturated with gasolene into the larval gallery. The gasolene fumes are highly toxic to the caterpillar. Fumigating in this manner often results in severe injury to the bark that comes in contact with the gasolene. A safe method was developed by SCHNEIDER (1957) whereby delinted cotton seed is impregnated with BHC emulsifiable concentrate. Following the evaporation of the BHC solvent, a treated seed is inserted into the gallery and the hole is stopped with grafting wax. This method is nonphytotoxic and effective if all the galleries are discovered on time.

Inspired by the paper of BACHMANN read at the 4th International Plant Protection Conference in Hamburg 1957, the writer undertook a series of experiments with the systemic insecticide, Dimecron, then under the code number Ciba 570 *. The purpose of the experiments was to find if at reasonable concentrations the insecticide will prove effective against the larvae of the leopard moth.

Experimental Methods

Replicated trials were conducted during the two-year period, 1960 and 1961 in an already established orchard. The age of the trees varied between 12 and 15 years. Although the trees were generally in a good condition as far as growth is concerned, the attacks of the leopard moth were not scarce. The general layout of the orchard in which the experiments were conducted, and the fact that it is terraced, lent itself to the choice of consecutive trees for the treatment. Each treatment comprised 25 trees. The first spray application was done early in July for all treatments. Two concentrations of Dimecron 50 were

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* 2-chloro-2-diethylcarbamoyl-1-methylvinyl-dimethyl phosphate.

used : 40 cc and 80 cc per liters of water. The spray was applied on the foliage by means of a high-volume power sprayer. A number of trees received one spray application every other week, thus making the total of sprays equal to 7 per season, and another number received one spray every third week thus giving a total of 5 sprays during the same period of time.

TABLE 1

The number of applications of Dimecron, the concentrations used, and the percentage of infestation in comparison to the non-treated trees

Dimecron concentration (active ingredient)	Interval in weeks	Number of treatments *	Number of caterpillars per tree		Per cent infestation compared to non-treated trees
			treated	non-treated**	
1960					
0.02 %	3	5	0.44	1.25	35.2 %
0.04 %	3	5	0.16	1.25	12.8 %
0.02 %	2	7	0.20	1.25	16.0 %
0.04 %	2	7	0.08	1.25	6.6 %
1961					
0.02 %	3	5	0.92	2.41	38.2 %
0.04 %	3	5	0.24	2.41	10 %
0.02 %	2	7	0.44	2.41	18.3 %
0.04 %	2	7	0.16	2.41	6.6 %

* Number of applications of spray per season.
** One hundred trees were used as "controls".

Discussion and Conclusion

If the values in column four of the above table are examined, it will be seen that doubling the dose of the insecticide without changing the number of applications results in decreasing the infestation by 2.5–3.8 times. However, if the dosage was doubled, and the number of applications was raised from five to seven per season, the infestation seems to decrease by 5.5–5.8 times. Finally, it can be concluded from the last column of the table that the application of 0.04 % Dimecron active ingredient at three-weekly intervals reduced the infestation by *Zeuzera* caterpillars to between 10 % and 12.8 % compared to the non-treated trees, and when the interval was set at two weeks only, the percentage of infestation was reduced to 6.6 %.

Since an increase of the number of applications by 40 % results in a decrease in infestation of about 4–6 %, the expenses seem not to be justifiable. Therefore, five appplications should be considered as more profitable than seven.

Since this systemic insecticide is capable of controlling *Eriosoma lanigerum* HAUSM., *Aphis pomi* DE GEER, and *Sappaphis (Yezabura) discrepans* KOCH f. *malicola* MORDV., all of which being pests of the apple tree, and existing over an extended period of its vegetative growth, the expense of the treatment should be viewed accordingly.

Diskussion und Schlussfolgerung

Aus der vierten Kolonne der Tabelle geht hervor, dass das Verdoppeln der Insektizid-Konzentration, ohne die Anzahl der Spritzungen zu ändern, den Schädlingsbefall um das 2,5–3,8-fache vermindert. Wenn aber zusammen mit der Verdoppelung der Insektizid-Konzentration auch die Anzahl der Spritzungen von 5 auf 7 erhöht wird, vermindert sich der Befall um das 5,5–5,8 fache. Schliesslich ist aus der letzten Kolonne der Tabelle zu ersehen, dass die Anwendung von 0,04 % Dimecron (Wirkstoff) in Abständen von 3 Wochen den Befall durch Zeuzera-Raupen auf 10–12,8 % des Wertes auf den unbehandelten Bäumen verminderte. Wenn das Intervall der Spritzungen auf 2 Wochen herabgesetzt wurde, betrug der Befall noch 6,6 % im Vergleich zu den unbehandelten Bäumen.

Da also eine Vermehrung der Spritzungen um 40 % eine Verminderung des Befalles um 4–6 % ergibt, sind die damit verbundenen höheren Unkosten offenbar nicht gerechtfertigt. Deshalb kann angenommen werden, dass 5 Spritzungen im Endeffekt lohnender sind als 7.

Allerdings ist bei der Beurteilung der Spritzkosten zu berücksichtigen, dass dieses systemische Insektizid gleichzeitig gegen zahlreiche Schädlinge auf Apfelbäumen wirkt, die über einen grossen Abschnitt der Vegetationsperiode Schaden anrichten. Es seien beispielsweise genannt : *Eriosoma lanigerum* HAUSM., *Aphis pomi* de G. und *Sappaphis (Yezabura) discrepans* KOCH f. *malicola* MORDV.

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