

### The situation in 1966-67

Trichogramma minutum has been imported from Russia and Australia, and are being bred for release in the groves. The American strain of this parasite did not attack eggs of P. citri.

### V A R I A

#### The Alfalfa seed Chalcid-Bruchophagus gibbus Bohn.

In a study on the status of the Alfalfa seed Chalcid, Harpaz (1954) found in July 1952 about 80% of the Alfalfa seed at the Kubeiba farm were infested with Bruchophagus gibbus Bohn. Of the wasps which emerged from the seeds there were many parasites. These belonged to Habrocytus medicaginis Gan. and Tetrastichus sp. Being so numerous, Harpaz thought, they would reduce the number of hosts in the following generations.

#### The Green Bug Nezara viridula L.

In Israel the green bug Nezara viridula L. is a pest of secondary importance. It attacks certain vegetables, especially tomatoes, it may leave its unpleasant odour on fruit and berries, and may suck dry the seeds of various plants. Ordinarily it is not extremely abundant, and may be controlled by certain insecticides. However, outbreaks of the bug occur in certain years, as happened in 1935 and 1949. The eggs of this bug are parasitized by a Scelionid, Telenomus megacephalus (Ashm) which keeps the bug fairly under control. It was thought that the outbreaks of the bug were due to the fact that the parasite, for one reason or another, failed to keep its host under control. Peleg (1958) made a study of this parasite and host with the endeavour to clarify the role of the parasite, its biology, phenology and ecology, details of which were lacking for Israel. Peleg reared the bug and its parasite both in- and out-doors and made field surveys. The following are his findings:

The wasp completes its development within 24 days at a temperature of 20°C, and R. H. 70%; and within 10 days at a temperature of 27-28°C and the same R. H. The threshold of development was set at 14.3°C while the development required 317 day degrees C.

The preoviposition period is very short; right after mating the female searches for host eggs to oviposit. One female may lay as many as 198 eggs; on the average 165 are laid by one female. Most of its eggs, about 70%, are laid during the first two days, the rest within the following few days. The female may live a few days after completing its oviposition. In all, ovipositing females may live 10 days, the average length of life is 6 days at 24°C; and 4 days at 27°C; at this temperature also oviposition decreased. Parasitized eggs of Nezara are more resistant to extremely high temperatures than non-parasitized. The former totally succumbed to a 37°C and 40% R. H. after 72 hours, the latter after 36 hours. The eggs may be parasitized within the first third of its development period. After this it seems that the embryo is less susceptible to the parasite which can not feed

on it, but it nevertheless interfered with the development of the host embryo. Parasitization in the field may be as high as 80% during June-August.

The parasite overwinters as an adult. Females which were not allowed to oviposit lived three months in the summer, and in the winter twice as long. Adult which emerged in September had to wait till March before they could oviposit in the first host eggs which are then laid. If bugs, due to low temperature, retard their oviposition, overwintered adults may die before having a chance to oviposit. Still Peleg is of the opinion that the reason for the outbreaks are due more to the conditions which may have prevailed in autumn before the spring conditions and which may have been favourable to the host and not to the parasite.

### Thysanoptera

In his studies on the biology and population dynamics of Thysanoptera in Israel, Rivnay made note of predators and parasites associated with these pest.

Franklinothrips myrmicaeformis Zan. attacks Heliothrips haemorrhoidalis Bouch and Retithrips syriacus Mayet (Rivnay 1933). Breeding of this predator in the laboratory showed that it fed on the eggs and pupae of the phytophagous thrips.

Ectemnus sp. This anthocorid is found frequently in the gall pods made on the leaves of Ficus nitida by Gynaikothrips ficorum March. In Italy a cogeneric bug feeds on Liothrips oleae (Mellis). In Israel this bug feeds on the eggs and larvae of G. ficorum; the development of the bug in August lasts only 12 days, and one bug may exterminate the entire population in a pod. Late in the summer over 90% of the pods contain bugs or show traces thereof, causing thus a great reduction in the G. ficorum population (Rivnay 1947).

Sethosiella priesneri Krg. This trichogrammatid was reared from eggs of Rehithrips syriacus. Kryger in the original description of the species, raised the question as to whether this wasp was not a parasite of psocid eggs. In Israel R. syriacus were definitely parasitized and a description of such eggs is given (Rivnay 1939).

### Snails

In recent years a few snail species of the family Helicidae became conspicuous in agricultural areas more than they have been before. Of course, the exact reasons for the increase of their populations can not be given without definite facts behind it, or demonstrative experimentations, but it may be suggested that the comparative recent wide use of contact insecticides may have decreased the populations of Lampyridae and Silphidae which feed upon the snails. Also the growth of artificial irrigation and its new overhead sprinklers may have offered better conditions of existence for the Helicidae.

In the citrus groves of Israel, in vineyards and other gardens along the coastal plain, Thebana pisana Mueller especially is often abundant, to the extent of causing damage.

This snail gnaws holes in the leaves, and feeds on the peel of the fruit, causing blemishes which render the fruit unmarketable.

Control is made by hand collecting or by applying bait; the latter must be renewed at weekly or 10 day intervals. Both methods proved to be expensive and biological control methods were sought.

A survey carried out by Harpaz and al. (1961) revealed two insects which destroy snails. The Silphid (Col) Ablattaria arenaria Kr. and the Calliphorid (Dip) Sarcophaga pumila Meig.

#### Ablattaria arenaria Kr.

This species attacks mainly Th. pisana. In the laboratory it was offered snails of other species which were refused. The adult beetle can not feed on individuals smaller than 8 mm. This excludes the young stages of the snail, but these are devoured by the larvae of the beetle. While the latter attack the snails on the ground only, the adult beetles can reach them also on the plants. The beetles are especially active in aggregates of the snails where each adult may devour 3-4 snails in 24 hours. The activity of the beetle lasts from February to May, (but not below 25°C), which means before the snails enter aestivation. The limitations in time of activity of the beetle render it inadequate in the control of its host.

#### Sarcophaga pumila Meig.

This fly lays its eggs in the snail and the larvae feeding on the soft body develop therein. When the prey has been devoured, the maggot may move out to attack another snail; it prefers a large individual.

Parasitized snails were found from February to the middle of June, the highest percentage of parasitization occurred in May and June, when a 20-25% parasitization was recorded. In the experimental plot where this parasite occurred, the population diminished; this decrease was felt also in the following generation. The only drawback of this fly is its ecological limitation; so far it was found only along the sand dunes and adjacent fields, and even here not everywhere.

Attempts were made to introduce and establish predator snails in this country. Some individuals of Euglandina rosea were introduced from Hawaii. These were first bred in the laboratory by Mrs. R. Gavriality-Span. According to her statement (personal letter) a pair of snails laid about 100 eggs when reared in favourable conditions, namely humidity conditions about 90% R. H. and a temperature above 28°C. Under conditions of low relative humidity such as exist outdoors in Israel, the snails did not survive. The project was, therefore, abandoned.

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The pest is controlled by "Halizan" of Tamogan a bait in granular form. This bait is more stable, more durable and less expensive.