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THE GIANT LOOPER "BOARMIA (ASCOTIS) SELENARÍA" SCHIFF (LEPIDOPTERA: GEOMETRIDAE),

A New Pest in Avocado Plantations in Israel

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Introduction

The Giant Looper, *Boarmia (Ascotis) selenaria* Schiff., has recently been discovered as a pest of fruit and foliage in avocado plantations in various districts of Israel—particularly Western Galilee—and situated near cotton fields which were frequently sprayed from the air. The drift from these sprays to the avocado plantations apparently upset the biological equilibrium.

As a result of the damage caused by the pest, large quantities of fruit were rejected for export and the home market. The insect itself it not new to the country; it has been recorded since 1937 (Bodenheimer, 1937).

In 1964, in cotton fields in Israel in the Upper Galilee district, 200 individuals of the pest were caught in light traps (Shoham, 1965). without incidence of damage or infection. In China in 1910, damage to cotton was reported to have been caused by an undefined species of *Boarmia* (Fo Ching Woo, 1926; Li Feng-suen, 1933).

Throughout the world, *Boarmia selenaria* is known as a serious pest in a number of crops: peanuts (Madagascar: Frappa, 1939), Margosa (India: Beeson, 1940), citrus (South Africa: Buitendag, 1965 and Sicily: Mariani, 1937), tea (Formosa: Hu Chia-Chien and Chen Huey-Kang, 1967 and India: Andrews, 1921), teak leaves (Burma: Garthwaite, 1940), white mulberry (Japan: Hoth, 1917; Tomizawa, 1922), coffee (East Africa: Abasa, 1972).

With the introduction of organic phosphorus spray treatments in African countries, there was an enormous rise in the population of *Boarmia selenaria; e.g.* in South Africa, the use of parathion in citrus (against scale mites) brought about an increase in the looper's incidence; in Tanzania, the Great Looper population in coffee, increased seven-fold (Bigger, 1969).

Description of the Pest

Egg: Green with many tiers of minute hollows. Size: 0.6-0.8x0.4-0.45 mm.

Larva: Head and first segment are dark; the color of the other segments varies with development stage. The young larva is light green, and less often greenish-brown; before pupating, it is reddish-brown. Its maximal length is 55 mm. The method of crawling is typical of the looper. Due to its color and twig-like shape it is difficult to distinguish it on the tree.

Pupa: Brown, long, 16-19 mm in length.

Adult: The forward wings are triangular, the back wings rounded. Both pairs of wings are light grey; on each wing there is a light brown spot with a dark ring, 2 mm in diameter. On the forward wing there are three stripes across, and two stripes on the back wings. The wing span is 3.8-4.8 mm. The feelers of the females are filamentary; those of the male are thicker and covered with short tufts, arranged rosette-wise.

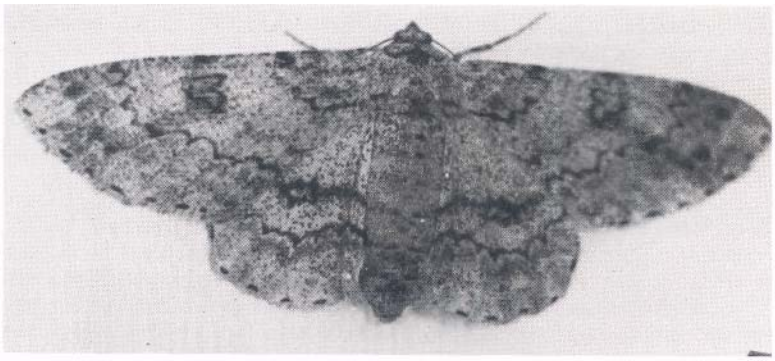

Figure 1. Boarmia selenaria Schiff—Adult in natural position.

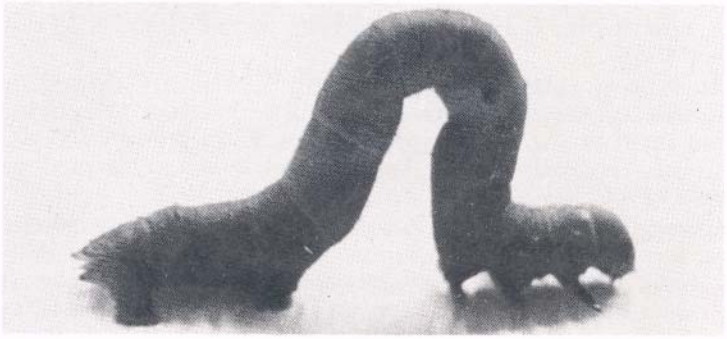

Figure 2. B. selenaria—larva.

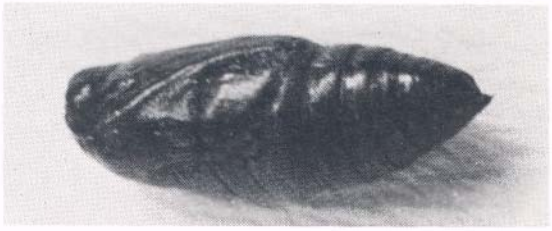

Figure 3. B. selenaria—pupa.

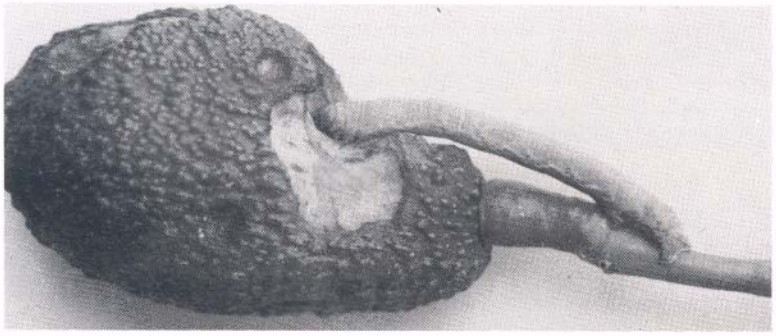

Figure 4. B. selenaria feeding on avocado fruit.

Biology

In various parts of the world the pest maintains 3-5 generations per year. Pupation takes place in the soil. The female lays between 302 and 445 eggs (Mariani, 1937; Frappa, 1939; Hu Chia-Chien and Chen Huey-Kang, 1967).

Damage and Phenology

The damage caused is due to the looper's gnawing fruit and foliage. Young larvae gnaw the fruit skin superficially, whereas mature larvae burrow coarely and deep, the holes often resembling those caused by the nibbling of rats. In leaves, only the central vein remains following a looper attack.

In Israel, *B. selenaria* has been trapped from February to late November. The larvae have been observed by us from July onwards. In July and August they gnawed the fruit, but from September onward no looper larvae were found on the fruit. However, the pest continued its activity on the leaves. Indeed, during September to November a considerable population of larvae was found on leaves; e.g. within 1½ hours on Sept. 27, 1971, 50 larvae were collected by one person.

A survey (Table 1) undertaken by us in 1971 in avocado plantations in Western Galilee, showed that differences exist between varieties, in the extent of gnawing by the looper. The most susceptible variety was Hass, followed by Nabal, Fuerte, Benik, and Ettinger. It should be noted that the rate of gnawing in fruit and leaves is not always correlated.

Natural enemies

1. Coleóptera: *Calosoma maximowiczi* Morawitz, the carabid beetle, is a predator of the looper larvae.

2. Hymenoptera: *Euplectrus parvulus* Ferriere, an exterior parasite of looper in India (Chatteryee, 1945); *Apanteles* sp. attacks the looper in Formosa (Hu Chia-Chien and Chen Huey-Kang, 1967), and *Apanteles* sp. nr. *prosper* Wilkinson, *Netelia* sp., *Horogenes* sp., *Cardiochiles* sp*., Rhogas* sp., *Syntomosphyrum* sp., *Mesochorus* sp. in South Africa and Kenya (Schoeman, 1960; Wheatley, 1964); *Afromelanichneumon sporadicus* Heinricht and *Cryptus nigropictus* Cam. Are pupal parasites in Kenya (Abasa and Mathenge, 1972).

3. Díptera; In South Africa, *Actia (Strioblomyia) cervina* Mesn., *Tachina (Podotachina) sorbillans* Wald., *(Tachinidae) Muscina stabulans* Fln. (Muscidae) (Schoeman, 1960; Wheatley, 1963), *Sturmia (Prosturmia) imberbis* Wild., and *Pales caerulea* Jaén *(Tachinidae)* attack the looper; the last two attack it also in Kenya. In Israel, the Tachinidae flies a *Compsilura concinnata* Meig. (which is an internal parasite) and *Exorista* sp. (an external parasite, close to *E. sorbillans).*

4. Nematodes of the genus *Mermis* destroyed larvae in Formosa (Hu Chian-Chien and Chen Huey-Kang, 1967).

5. Diseases: *Serratia marcescens,* types of Nosema and Microspor- idia, *Plistophora reciprocaría* (Buidentag, 1965; Hu-Chia-Chien and Chen Huey-Kang, 1967).

A noteworthy curiosity is the very effective use of frogs in the fight against *Boarmia* in cotton field in China (Li Feng-suen, 1933).

TABLE 1. The rate damage on avocado fruits infested by *B. selenaria* in Summer 1971.

Variety	Site	Date	% Damage fruit	Number fruits examined	Number trees examined
Hass	Rosh Haniqra	4.VIII	13.0	877	17
	Yehiam	4.VIII	11.5	340	26
	Saad	18.VIII	13.1	809	15
	Regba	14.VII	10.0	309	—
	Regba	12.VIII	11.7	705	41
	Regba	28.IX	7.1	310	30
	Kv. Schiller	11.VIII	0.5	200	—
Nabal	Rosh Haniqra	4.VIII	2.0	558	50
	Rosh Haniqra	12.VIII	4.5	138	16
	Saad	18.VIII	2.1	438	32
	Regba	12.VII	2.1	679	20
	Kv. Schiller	11.VIII	0	130	—
Fuerte	Rosh Haniqra	4.VIII	1.6	502	32
	Cabri	27.IX	1.0	505	30
	Saad	18.VIII	2.7	420	16
	Regba	12.VIII	2.8	803	30
	Kv. Schiller	11.VIII	0	200	—
Ettinger	Rosh Haniqra	4.VIII	0	208	27
	Saad	18.VIII	0.5	204	27
	Regba	12.VIII	2.3	362	45
Benik	Rosh Haniqra	4.VIII	1.8	111	19
	Saad	18.VIII	1.5	271	15
	Regba	12.VIII	2.3	310	21

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REFERENCES

1. ABASA, R. O. 1972. Field and laboratory studies on the adult of Ascotis selenaria reciprocaria (Wlk.) (Lep., Geometridae) a pest of arábica coffee in Kenya. Bull. ent. Res. 61:559-563.
2. ABASA, R. O. and MATHENGE, W. M. 1972. Observations on the biology and host-searching behavior of Afromelanichneumon sporadicus and Cryptus nigropictus (Hymenoptera: Ichneumonidae), pupal parasites of Ascotis selenaria reciprocaria (Lepidopetra: Geometridae). Entomophaga 17: 93-97.
3. ANDREWS, E. A. 1921. On Caterpillar Control by Collection of Chrysalides. Q. J1 Sci., Dep. India Tea Assn. Calcutta 4: 175-194.
4. BEESON, C.F.C. 1940. Entomological Branch.—Dep. for Res. Inst. India 1938-1939 pp. 334. Dehra Dum, Forest Research Institute 1940.
5. BIGGER, M. 1969. Giant Looper Ascotis setenaria reciprocaría Walk, in Tanzania, E. Afr. Agric. For. J. 35: 45-51.
6. BODENHEIMER, F. S. 1937. Prodromus Faunae Palaestinae. p. 89.

7. BUITENDAG, C. H. 1965. Plistophora reciprocaría spec, nov., a Microsporidian parasite of Acostis selenaria reciprocaría Walk. (Lepidoptera, Geometridae). S. Afr. J. agric. Sci. 8: 79-85.

8. CHATTERYEE, P. N. 1945. On the biology and morphology of Euplectrus parvulus Ferr. (Hymenup. Eulophidae). Indian J. Ent. 6*:* 95-101.

9. CROWE, T. J. 1966. Recent advances in the use of insecticides on coffee in East Africa. Agric, vet. Chem. 7: 33-35.

10. FO CHING WOO. 1926. The Chinese Cotton Geometrid (Boarmia sp.) and its possible introduction (Lepid). J. econ. Ent. 19: 412-413.

11. FRAPPA, C. 1939. Note sur deux nouvelles chenilles nulsibles a l'arachide a Madagascar. Bull. econ. Madagascar N.S. 17: 51-54 Tananarive.

12. GARTHWAITE P. E. 1940. Entomological Research. Rep. Silv. Ent., Burma, 1938-1939. pp. 94-105. Rangoon.

13. HOTHS, G. 1917. Geometrids injurious to the foliage of tea. Special Report of Tea Plantation Experiments, Prefecture of Shidzuoka, Agric. Exp. Station, October 1917.

14. HU CHIA-CHIEN and CHEN HUEY-KANG. 1907. (A study on Aseotis selenaria cretácea Butler.) (in Chinese) J. agrie. Asso. China (N.S.) 58: 73-86. (Rev. appl. Ent. 511, 1970).

15. LI FEN-SUEN. 1933. The life-history and control measures of the Cotton Geometrid (Boarmia sp.). Tech. Bur. Ent. Chekiang 13, also Chekiang Agric. 1(3): 99-110. (Chinese, with English summary).

16. MARIANI, M. 1937. New species and forms of Sicilian Lepidoptera and a new pest of citrus. Giom. Sci. nat. econ. 39(3).

17. SCHOEMAN, O. P. 1960. The Biology, Ecology and Control of the Citrus Measuring Worm, Ascotis selenaria reciprocaría Walk. D. Sc. Thesis, University of Pretoria.

18. SHOHAM, Z. 1965. (The new pest of fruit trees) Hassadeh 45: 1073-1075. (in Hebrew).

19. TOMIZAWA, V. 1922. (Noxious Insects of Mulberry trees in the Region of Iga.) (in Japanese) Konchu Sek (Insect World) 26(10):335-340. (Rev. appl. Ent. 14: 142, 1970).

20. WHEATLEY, P.E. 1964. The giant coffee looper, Ascotis selenaria reciprocaria Walk. (Lepidoptera: Geometridae). E. Afr. Agric. For. J. 29: 143-146.