South African Avocado Growers' Association Yearbook 1994. 17:113-116

IDENTIFICATION AND POTENTIAL PEST-STATUS OF LOOPER ON AVOCADO

C Erichsen[1] & A S Schoeman[2]
[1]Outspan International, P.O. Box 12154, Centrahil, Port Elizabeth 6006, RSA
[2]Department of Entomology, University of Pretoria, Pretoria 0002, RSA

ABSTRACT

The looper species reported to feed on avocado fruits in South Africa is identified as Ascotis reciprocaria reciprocaria *(Walker) (Lepidoptera: Geometridae) and is the same species found on South African citrus. The potential pest-status* of A.r. reciprocaria *in South Africa is examined.*

UITTREKSEL

Die landmeter spesie wat avokadovrugte in Suid Afrika beskadig is geïdentifiseer as Ascotis reciprocaria reciprocaria *(Walker) (Lepidoptera: Geometridae) en is dieselfde spesie wat op Suid Afrikaanse sitrus as plaag voorkom. Die potensiële plaag-status van* A.r. reciprocaria *in Suid-Afrika word ondersoek.*

IDENTIFICATION OF LOOPER ON AVOCADO

A looper pest of avocados in South Africa was reported by Annecke & Moran (1982) but was never identified, having been continually referred to as an "unidentified looper" (De Villiers & Van den Berg, 1987; De Villiers, 1990; Du Toit & De Villiers, 1990).

The looper has been identified as *Ascotis reciprocaria reciprocaria* (Walker) (Lepidoptera: Geometridae) (identified by M. Krüger) (Figure 1) and is also the species found on citrus. The citrus looper was identified as *Ascotis selenaria reciprocaria* (Walker) by Janse (1932), but A. *selenaria* does not occur in Africa (M. Krüger, personal communication). The type species of *Ascotis* Hübner is *Boarmia selenaria* Schiffermüller; the species *selenaria* occurs in southern Europe and Asia and the species *reciprocaria* in Africa (Pinhey, 1975; M. Krüger, personal communication). The use of *reciprocaria* for looper species from Africa and *selenaria* for Palaearctic species is employed amongst specialists of the group (Schoeman, 1960; Vari & Kroon, 1986). When originally describing the looper, Janse (1932) did make provision for *reciprocaria* as being possibly more suitable than *selenaria* as the African species. *A.r. reciprocaria* shows three aberrations (Pinhey, 1975) viz. a nominate, a melanistic aberration, and ab. *fasciata.* The looper specimen reared from avocados by the authors, and identified by M. Krüger, has been deposited in the Lepidoptera Collection of the Transvaal Museum.

ECONOMIC IMPORTANCE OF LOOPERS

Loopers have been recorded as serious pests on a number of crops, including

avocados and citrus and large quantities of fruit can be rejected as a result of looper damage (Schoeman, 1960; Wysoki *et al.* 1975). On avocados, loopers have been reported as pests in Israel, California (U.S.A), and South Africa. In Israel, the giant looper, *Boarmia (Ascotis) setenaria,* has been reported as a major pest of economic importance (Wysoki, 1975; Wysoki & Izhar, 1978) on avocados and citrus as a direct result of drift from insecticidal sprays applied to adjacent cotton fields (Wysoki *et al,* 1981; Harpaz, 1979; Swirski *et al.,* 1988). *B. setenaria* populations are restrained by local natural enemies, but in regions where cotton is widely planted the biological balance is upset by the insecticidal drift (Swirski *et al,* 1988). *B. setenaria* has also been reported as a pest of citrus in Sicily (Mariani, 1937 cited by Wysoki *et al.* 1975 & Wysoki 1982; Ebeling 1959).

FIG. 1 Male (below) and female (above) of *Ascotis reciprocaria reciprocaria* (Walker) (Lepidoptera: Geometridae).

In California (U.S.A), the omnivorous looper, *Sabulodes aegrotata* Gueneè, is an important pest of avocado, causing severe defoliation (Mckenzie, 1935; Ebeling 1959; Oatman & Platner, 1985) and fruit scarring when pest populations are high (Ebeling

1959; Oatman & Platner, 1985). *Anacamptodes fraguaria* (Grossbeck) has been reported to damage citrus in the same region (Ebeling, 1959).

A.r. reciprocaria, or citrus looper as it is more commonly known, is indigenous to Africa and found throughout Africa south of the Sahara. In South Africa, its range includes the Transvaal, Natal, and the eastern Cape (Schoeman, 1960, 1971; Annecke & Moran, 1982). *A.r. reciprocaria* attained economic status in South Africa on citrus as a result of the use of parathion for the control of red scale, *Aonidiella aurantii* (Maskell) (Schoeman, 1960, 1971). As a major citrus pest, the looper was restricted to Zebediela Estates (24°15'S 29°15'E) and has never been considered an important pest in other citrusgrowing areas (Schoeman, 1960, 1971; Annecke & Moran, 1982). At Zebediela Estates, the looper is at present satisfactorily controlled by an integrated pest-management programme (G.J. Begemann, personal communication).

POTENTIAL PEST STATUS OF *A.R. RECIPROCARIA*

Economic losses and damage to avocado fruits

In South Africa, looper damage to avocado fruitlets by first, second, and third instar larvae has been illustrated (De Villiers & Van den Berg, 1987; De Villiers, 1990; Du Toil & De Villiers, 1990). However, mature fruit can also be damaged, particularly by the fourth and fifth instars (Figure 2). The skin of the avocado fruit is progressively eaten away and shallow depressions eaten into the flesh (Figure 2). The life history and larval instars of *A.r. reciprocaria* (formerly *A.s. reciprocaria)* have been described and illustrated on citrus by Schoeman (1960, 1971). The life history of looper on avocado has, however, not been studied.

TABLE 1

Percentage of avocado fruit damaged by looper per cultivar and corresponding loss in rands (rank in brackets) (*fruit damaged by looper as a percentage of the total number of fruit sampled).

Cultivar	No. of fruit sampled	% of fruit/cultivar damaged by looper	Damage (rands)
Edranol	6112	0.360 (1)	17280
Hass	26706	0.183 (2)	8784
Pinkerton	2437	0.164 (3)	7872
Fuerte	21908	0.078 (4)	3744
Ryan	3873	0.026 (5)	1248
TOTAL	61036	0.150*	38928

A survey of damage by insect pests to the fruits of five avocado cultivars in the Nelspruit (25°27'S 30°58'E)/ Hazyview (25°02'S 31°08'E) region, during the 1991 season, helped establish the pest complex associated with avocado fruits (Erichsen & Schoeman, 1992). Loopers were found to be responsible for 0.15% of the damage recorded from a sample of 61 036 fruits (Table 1). The number of fruit sampled per cultivar was proportional to the amount of fruit harvested from each cultivar in the Nelspruit/ Hazyview region. Of the cultivars examined, the percentage of fruit damaged by looper was greatest for Edranol, Hass, and Pinkerton respectively (Table 1). The percentage of damaged Edranol fruit was twice that of Hass or Pinkerton (Table 1). These three

cultivars also exhibited the largest percentage surface area damaged by looper per fruit, with up to 50% of the fruit surface on Edranol and Hass being removed (Table 2). Ryan was attacked to the least extent (Table 1; 2). In a survey in Israel, Wysoki *et al*. (1975) found Hass to be most susceptible to damage by looper, followed by Nabal, Fuerte, Benik, and Ettinger. The survey did not include Edranol. In the survey by Erichsen & Schoeman (1992), looper damage to Hass was also greater than that of Fuerte (Table 1; 2). Damage to avocado fruits by *A.r. reciprocaria* in the Nelspruit/Hazyview region is calculated as totalling to ca. R38 928 (Table 1). Damage to Edranol contributed 44.39% to the total, followed by Hass (22.56%) and Pinkerton (20.22%) respectively. Of the four lepidopteran pests recorded as damaging avocados, loopers were responsible for the least damage (Erichsen & Schoeman, 1992).

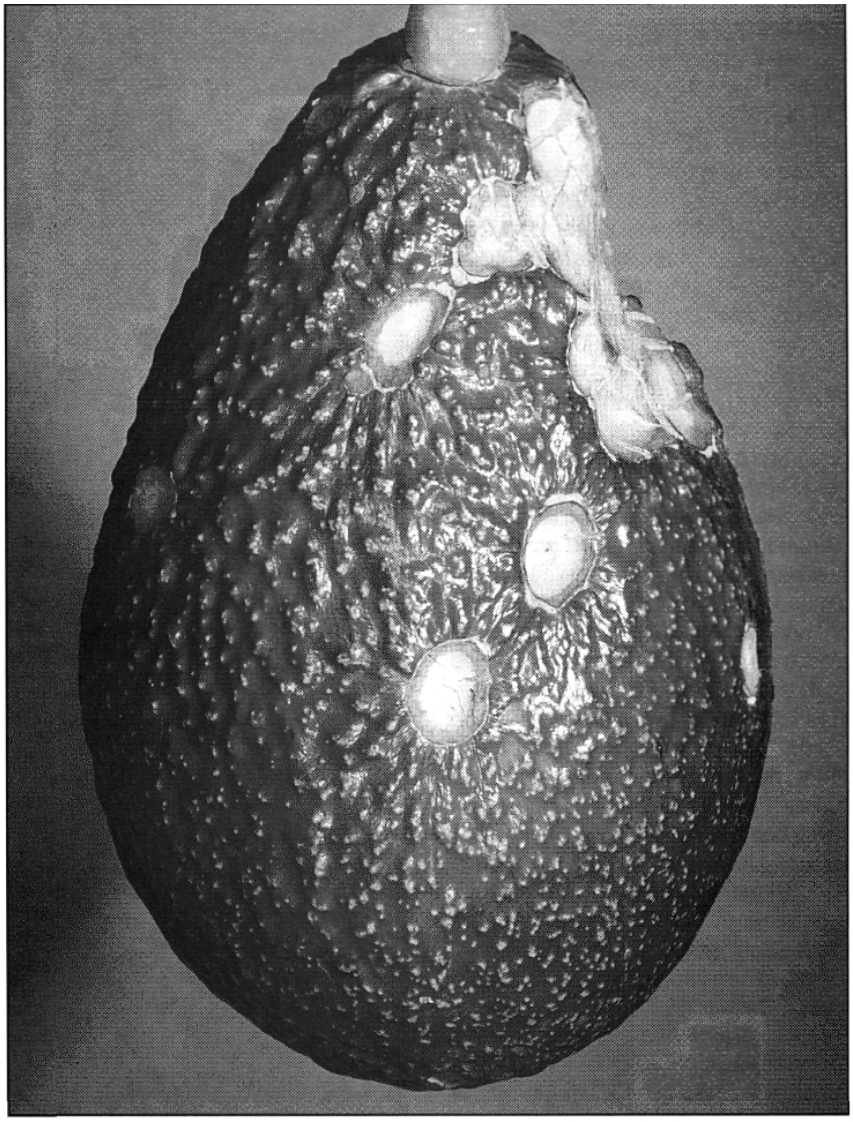

FIG. 2 Damage to a mature avocado fruit by a fifth instar *Ascotis reciprocaria reciprocaria* (Walker) larva.

Avocado pests have been shown to be highly mobile and sporadic and this may explain the low occurrence of looper damage in the 1991 season (0.15%), as opposed to that found in the 1990 season (0.34%) (Dennill & Erasmus, 1992). Monitoring of *A.r. reciprocaria* is required to establish the status of this avocado pest. Procedures when scouting for looper and resultant damage have been outlined by Erichsen (1993).

TABLE 2
Median (%) and range (%) of the extent of looper damage to fruits per cultivar (rank in brackets).

CULTIVAR (RANK)		LOOPER DAMAGE	
		Median %	Range %
Edranol	(1)	12.2	0-50
Pinkerton	(2)	10.0	0-20
Hass	(3)	7.7	0-50
Fuerte	(4)	5.7	0-20
Ryan	(5)	5.0	0-10

Using insecticides and its implications

An insecticide-spraying programme is not recommended for the control of any avocado pest; the South African Avocado Growers' Association having, since its establishment in 1967 (Durand, 1990), encouraged the preservation of the biological balance between pest, predator, and parasitoid. It has, however, been necessary for avocado growers to periodically combat severe insect-pest infestations with insecticide applications. A thrips outbreak in the Nelspruit/Hazyview region during 1989 resulted in some growers losing up to 80% of their produce (Dennill & Erasmus, 1992). The 1992/1993 season saw the avocado beetle causing heavy losses on farms in the same region (Erichsen, McGeoch & Schoeman 1993). Outbreaks by these pests necessitated chemical control measures. Although the monetary loss attributed to looper damage is rather insignificant when compared to that of other insect pests (Erichsen & Schoeman, 1992), the potential exists that looper may become an economically serious pest if the use of insecticides in avocado orchards becomes common practice. Such was the result with looper on citrus at Zebediela Estates and the omnivorous looper on avocados in California (Mckenzie, 1935; Ebeling 1959; Oatman & Platner, 1985).

In South Africa, avocados are grown in close proximity to citrus in some regions, and the insecticidal-spray programmes on the latter could affect the looper pest/natural enemy complex in a manner similar to that reported for avocados and citrus adjacent to cotton fields in Israel (Wysoki *et al.* 1975; Harpaz, 1979; Swirski *et al.* 1988). In apple orchards in England, Solomon (1981) found that insecticidal drift reduced natural enemies on adjacent windbreaks which resulted in an increase in phytophagous mite populations. Nelspruit is the largest citrus-growing region in the Transvaal, and should *A.r. reciprocaria* populations on avocados increase, it may have serious consequences for both the avocado and citrus industries in the region. An attentive approach towards the presence of citrus looper in avocado orchards is, therefore, advocated.

ACKNOWLEDGEMENTS

The authors thank M. Krüger (Transvaal Museum, Pretoria) for identifying *Ascotis reciprocaria reciprocaria* (Walker) and the South African Avocado Growers' Association

for financial support.

REFERENCES

ANNECKE, D.P. & MORAN, V.C. 1982. *Insects and mites of cultivated plants in South Africa.* Durban: Butterworths, 383 pp.

DE VILLIERS, E.A. 1990. Avocado pests in South Africa. Farming in South Africa, *Avocados* H.1,3 pp.

DE VILLIERS, E.A. & VAN DEN BERG, M.A. 1987. Avocado insects of South Africa. *South African Avocado Growers' Association Yearbook 10*: 75 - 79.

DENNILL, G.B. & ERASMUS, M.J. 1992. The insect pests of avocado fruits: increasing pest complex and changing pest status. Journal of the *Entomological Society of Southern Africa* 55,1: 51 - 57.

DU TOIT, W.J. & DE VILLIERS, E.A. 1990. Identifisering van avokadovrugletsels wat deur insekte veroorsaak word. *South African Avocado Growers' Association Yearbook 13:* 56 - 60.

EBELING, W. 1959. *Subtropical fruit pests.* California: University of California Press, 436 pp.

ERICHSEN, C. 1993. Comparison of and scouting for beetle and looper damage to avocado leaves and fruit. *South African Avocado Growers' Association Yearbook 16:* 125 - 126.

ERICHSEN, C., MCGEOCH, M.A. & SCHOEMAN, A.S. 1993. Invasion of orchards by the avocado beetle *Monolepta apicalis* (Sahlberg) (Coleóptera: Chrysomelidae):
assessment of damage to leaves and fruit. *South African Avocado Growers' Association Yearbook 16:* 118 - 122.

ERICHSEN, C. & SCHOEMAN, A.S. 1992. Economic losses due to insect pests of avocado fruit in the Nelspruit/Hazyview region of South Africa during 1991. *South African Avocado Growers' Association Yearbook 15:* 49 - 54.

HARPAZ, I. 1979. Regulatory measures adopted in Israel regarding the screening and field application of pesticides within the context of integrated control. *International Pest Control* (March/April): 28-30.

JANSE, A.J.T. 1932. *The moths of South Africa. Vol. I: Sematuridae and Geometridae.* Pretoria: Janse, A.J.T.

McKENZIE, H.L. 1935. *Biology and control of avocado insects and mites.* California: University of California Press.

OATMAN, E.R. & PLATNER, G.R. 1985. *Biological control of two avocado pests.* California Agriculture (Nov Dec 1985): 21 - 23.

PINHEY, E.C.G. 1975. *Moths of Southern Africa.* Cape Town: Tafelberg.

SCHOEMAN, O.P. 1960. The biology, ecology and control of the citrus measuring worm, *Ascotis selenaria reciprocaria* Wlk. *D.Sc dissertation,* Pretoria: University of Pretoria.

SCHOEMAN, O.P. 1971. Citrus looper: *Ascotis selenaria reciprocaria* Wlk. Pages 179-183. In: Citrus pests in the Republic of South Africa. Science Bulletin, Department of Agricultural Technical Services, Republic of South Africa, no. 391. E.C.G. Bedford, ed.

SOLOMON, M.G. 1981. Windbreaks as a source of orchard pests and predators. In: *Pests, pathogens and vegetation.* J.M. Thresh, ed. London: Pitman.

SWIRSKI, E., WYSOKI, M. & IZHAR, Y. 1988. Integrated pest management in the

avocado orchards in Israel. *Applied Agricultural Research* 3, 1: 17.
VARI, L. & KROON, E.N. 1986. *Annotated checklist of South African lepidoptera: a series of cross-referenced indexes.* Pretoria: Lepidopterists' Society of Southern Africa & the Transvaal Museum.
WYSOKI, M. 1982. A bibliography of the giant looper, *Boarmia (Ascotis) selenaria* Schiffermüller, 1775 (Lepidoptera: Geometridae), for the years 1913 - 1981. *Phytoparasitica* 10, 1: 65 - 70.
WYSOKI, M., IZHAR, Y, SWIRSKI, E. & GREENBERG, S. 1975. The giant looper, *Boarmia (Ascotis) selenaroa* Schiff. (Lepidoptera: Geometridae), a new pest in avocado plantations in Israel. *California Avocado Society Yearbook 58* (1974 - 1975): 77 - 81.
WYSOKI, M., SWIRSKI, E. & IZHAR, Y. 1981. Biological control of avocado pests in Israel. *Protection Ecology 3:* 25 - 28.