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## MAJOR FIELD INSECT PESTS OF GROUDNUT IN INDIA AND ASSOCIATED CROP LOSSES

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Leafminer, white grubs, hairy caterpillars, tobacco caterpillar, aphid, jassid, thrips, and the termites are all important pests causing severe damage to groundnuts in India. The approximate value of the groundnut crop annually lost due to insect pests in various states has been estimated to be Rs. 160 crores (=US\$ 160 million). This does not include losses from Maharashtra and Orissa States.

Groundnut is the most important oilseed crop in India and is grown on 7.1 million ha in the rainy season (kharif) from June to October and on 1.3 million ha under irrigated postrainy season (rabi) conditions from November to June (Anon. 1981 a). India annually produces approximately 6.2 million tonnes of groundnuts in shell. The yield, however, is low averaging about 800 kg/ha compared with 2500 kg/ha in developed countries. The major constraints on yield are pests, diseases, and unreliable rainfall (Gibbons, 1980).

In Gujarat, for example, the hectareage under irrigated groundnut has increased from 25,500 ha in 1978-79 to 140,000 ha in 1981 (Anon 1981 b).

*Major Pests:* In 1968, only four pests; aphid, leafminer, hairy caterpillars, and termite were regarded as major pests of groundnuts (Rai, 1976). However, surveys during 1977-82 revealed at least eight pests to be economically important in various parts of the country (Amin and Mohammad, 1980) (Table 1).

Table 1. Major field pests of groundnut in India.

1968	1982
Aphid	Leafminer, <i>Aproaerema modicella</i> Dev (= <i>Stomopteryx subsecivella</i> Zell.)
Leafminer	White grubs, <i>Holotrichia</i> spp.
Hairy caterpillars	Thrips, <i>Scirtothrips dorsalis</i> Hood <i>Frankliniella schultzei</i> (Trybom) -- <u>Frankliniella</u>
Termites	Aphid, <i>Aphis craccivora</i> Koch. Tobacco caterpillar, <i>Spodoptera litura</i> Hairy caterpillar, <i>Amasecta</i> spp. Jassid <i>Empoasca kerri</i> Pruthi. Termite <i>Odontotermes obesus</i> Rambur

In Punjab, the groundnut crop during the last 7 years in farmers' fields at several locations gave an average of 13.4% plants killed by white grubs (Anon.

damage was negligible however, in Vertisol soils near Udaipur and Chittorgarh. September 1980, 50-60% mortality of plants was observed in the Laisot area. The (1977) and in the Jobner area the loss was 82%. During ICRIASAT surveys in (Kushwaha, 1976). In Laisot and Chorwara areas of Jaipur district the estimated losses ranged from 22% to 100% (Yadava and Yadava, 1973; Yadava et al., 1977). In Rajasthan, damage from the *consanguinea* was 40-80% plant mortality

55% at Vasi, 62% at Samo, and 73% at Kukarwada (Patel et al., 1967).<sup>H. G.</sup> losses were 51% at Jaswantpura, 42% at Bhagatna, 15% at Antroli, 63% at Pamol indicated a 40% plant mortality and, at different locations in Kaira district, the white grubs in unprotected fields. In Mehsama district the trials at Vijapur observed in Sabarkantha district where 30-40% of the crop was destroyed by 2000 ha in Amreli, Bhavnagar, and Mehsama districts, severe damage was 1700 ha and up to 30% damage in an additional 650 ha in Kaira district and over in Gujarat, Desai and Patel (1966) observed mortality of 30-70% of plants in loamy soils of northern India and the light red soils in parts of Andhra Pradesh. White grubs have become major pests of groundnut on the sandy and

*White grubs, Holotricha consanguinea, Blanch., Holotricha serrata F*

insecticidal protection of groundnut from leafminer attack has consistently resulted in higher yields. The reported yield increases ranged between 24 to 92 per cent (Vital and Saroja, 1965), 92% (Krishnanda and Kaiyar, 1965), 36% (Lewin et al., 1973), 71% (Lal et al., 1974), 85% (Sangappa and Ali, 1977), 24% (Palaniswamy and Ramchandran, 1978) and 49-56% (Tej Kumar, 1979).

*Leafminer: Aproaerema modicella Dev (= Stomopteryx subsectivella Zell.) ;* areas, has a high damage potential and crops are subject to chronic infestation. This insect can cause losses to rainfed and irrigated groundnut, the damage being higher in drought-affected rainy season and in irrigated post-rainy seasons. Leafminer is the most important groundnut pest in India because it affects large

experimental stations that are not always representative of farmers' fields. The yield differences so reported have often resulted from only partial insect control. In several trials conducted during the All India Co-ordinated Research project on Oilseeds (AICORP), from 1977-82, the reduction in insect numbers in treated plots ranged between 13%-80%. Experimental plots are usually too small to permit the free interplay of insect populations and, usually, the effect of "intraplot interference", is not taken into account.

*Yield-curve losses* In most cases the trials have been conducted on

1977-81) and a 49% yield increase was obtained by controlling white grubs (Anon. 1977-81).

In Andhra Pradesh, 60-80% yield loss occurs annually (Rao *et al.*, 1976). In Uttar Pradesh, about 8500 ha, and yield loss has been estimated to be 40-59% (Anon. 1977-81).

In Madhya Pradesh, white grubs caused heavy yield losses to groundnut in 1972-73 in Indore division (Patel, 1971).

*Hairy caterpillar, Amsacta alhistriga* Wlk :

This was a serious pest of groundnut in Tamil Nadu, parts of Andhra Pradesh, and Karkantaka however no widespread outbreaks have been reported in recent years. Campaigns were organized in the Madurai region to control this pest on 10,000 ha in 1961 and on 20,000 ha in 1962 (Mukundan, 1964). Aerial spraying was also carried out in Pollachi region (Vijayaraghavan *et al.*, 1964). The campaign resulted in a saving of 14,000 tonnes of groundnuts worth Rs. 42 million (US \$ 4.2 million) in Madurai region where losses without the control of pest were expected to be about 75% (Mukundan, 1964). In Andhra Pradesh this insect has been described as menace to groundnut in Srikakulam, Vishakhapatnam, Cuddapah, Kurnool, Anantapur, and Chittoor districts (Rao *et al.*, 1966) and a severe outbreak in Anantapur district was reported in the months of August and September 1975 (Anon. 1977).

*Tobacco caterpillar Spodoptera litura* F.: The insect appeared in an epidemic form in coastal Andhra Pradesh in January and February of 1978, and localized heavy infestations were also observed in parts of Nellore district in the month of March 1979. Since then heavy infestations have been observed in almost all groundnut-growing areas of Andhra Pradesh. The economic importance of this insect in other states is not known, except in the Dharwad area of Karnataka state where it appears to be a pest of moderate importance in the post-rainy season (Anon. 1977-81).

*Trips*: Trips are less important as direct pests than as vectors of bud necrosis disease of groundnuts. The major thrips pest is *Scirtothrips dorsalis* Hood though *Caliothrips indicus* Bagnall has been mentioned as a menace to groundnuts (Ananthkrishnan, 1973). Our surveys have shown *S. dorsalis* to be the more important of the two species. Yield gains achieved by controlling thrips pests, mainly *S. dorsalis*, were 40% in Dharwad, Karnataka (Thimmiah and Panchbhavi, 1973), 25 and 30% at Patancheru, Andhra Pradesh, in 1979 and 1980, 40% at Parbhani (Saboo and Puri, 1978) when thrips and jassids were controlled and 29% at Sambalpur in Orissa (Sanapati and Patnaik, 1973; 1980).

Thrips: *Frankliniella schultzei* (Trybom) transmits tomato spotted wilt virus which causes the bud necrosis of groundnut and occurred in epidemic form in 1979 in Andhra Pradesh, Maharashtra, Uttar Pradesh.

*Estimation of Pest-caused losses to groundnut in India* : The information on area and production was taken from the data circulated by the Directorate of Oilseeds Research, Indian Council of Agricultural Research, Rajendranagar, Hyderabad, at the Annual Kharif Oilseeds workshop held at Bangalore in May 1982. The value of the groundnut crop is based on the prevailing market rate of Rs. 3000 per tonne of groundnut in shell.

*Tamil Nadu* : In 11 trials conducted from 1977 to 1982 at Tindivanam, vridhachalem and Allyarnagar the average yield gain was 42.7%, with an average yield of 788 kg/ha in nonprotected plots, as compared with 1374 kg/ha in pesticide protected plots. The annual losses resulting from the damage, can be estimated to be 245,691 tonnes which is worth Rs. 737 million (US\$73.7 million).

*Karnataka* : The tobacco caterpillar, *Spodoptera litura*, semilooper (*Plusia* sp.) and shoot borer (species not identified) are of moderate importance in the Dharwad area in rabi season. The average yields in nonprotected and protected plots were : 2080 kg/ha against 2659 kg/ha at Dharwad, and 1010kg against 1285 kg at Raichur. The estimated yield gain was 22% at both places.

The total loss from pests in these districts is approximately 42,000 tonnes of groundnut in shell valued at Rs. 125 million (US \$12.5 million).

*Andhra Pradesh* : At Rajendranagar, a 15% yield gain was obtained by controlling insects; however, the infestation was not severe. Combined losses from insect pests and bud necrosis disease are estimated to be about 170,000 tonnes, valued at about Rs. 505 million (US \$50.5 million). At Jalgaon plots protected with insecticides gave an average of 23% higher yield than non treated controls. At Digraj 25% yield increase was obtained from white grub control.

*Gujarat* : Aphids and jassids are reported to be major pests in the Saurashtra region, and white grubs in the sandy soil areas of northeast Gujarat. Junagadh, aphids and jassids were controlled to the extent of 95% and 65% respectively, showed 12% increase in yield. Yields in protected plots averaged 1057 kg/ha against 927 kg/ha in three trials on jassid control, and 2489 kg/ha against 2213 kg/ha in one trial aimed at aphid control.

Assuming a severe infestation of white grubs causing 40% yield loss in only 15% of the total area the annual loss estimated is about 36,500 tonnes of groundnut, valued at Rs. 94.5 million (US \$9.45 million)

**Orissa :** In nine trials at Chiplima the average yields in nonprotected plots were 892 Kg/ha against 1079 kg/ha in protected plots, giving an average loss of 35.8%. The major pests were thrips, jassid, aphid, leafminer, and the leaf webber *Anarsia ephippias*.

**Punjab:** White grubs are the major pests. About 49% yield gain was obtained by controlling white grubs (640 kg/ha yield in nonprotected plots compared with 1250 kg/ha in protected plots). The losses from infestation are estimated to be about 27,360 tonnes, valued at Rs. 82 million (US \$8.2 million )

**Rajasthan:** The white grubs problem in Rajasthan has been described as "acute" (Kushwaha, 1974 ) with 40-89% yield loss in several areas (Kushwaha, 1976). Assuming 50% yield loss in 40% of the area, the produce lost because of white grub damage is estimated at 13,400 tonnes valued at Rs. 40 million (US \$4 million)

Data for losses given above indicate the value of the groundnut crop lost due to insects to be Rs. 1600 million (US \$ 160 million) (Table 1). Estimates for Maharashtra and Orissa could not be made for lack of representative data.

The above figures of crop loss are at best only an approximate assessment. The estimates could be improved considerably if more centers were included in pest control trials and a more appropriate methodology was used.

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Table 1 : Yield loss associated with insect pests of groundnut in India.

State	Area ('000 ha)	Production ('000 tonnes)	Major pests	Secondary pests	Yield loss associated with pests	Loss in million Rs. \$
Gujarat	1971.0	1668.5	White grub	Jassid	40-70%	95 9.5
Maharashtra	723.0	538.0	Leafminer	Thrips, aphid white grub Termites	5-10%	Not known
Madhya Pradesh	401.4	199.3	None		—	Not known
Andhra Pradesh K	1101.4	808.2	Leafminer Hairy caterpillar	Jassid	15%	505 50.5
R	243.2	314.0	Tobacco caterpillar Leafminer	None	—	—
Tamil Nadu K	701.2	649.0	Leafminer Hairy caterpillar Leafminer	Jassid Jassid	42%	737 73.5
R	298.8	394.2	Leafminer	Jassid	—	—
Orissa K	91.3	48.8	Thrips	Leafminer	35%	Not known
R	83.3	88.7	Not known	Not known	—	—
Karnataka K	775.1	504.0	Leafminer, Thrips, hairy caterpillar	None	22%	125 12.5

	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Punjab	Tobacco	91	81	82	49%	8.2
	caterpillar					
Uttar Pradesh	White grub					
	Termite	249.7	95.3			Not known
Rajasthan	White grub					
	Termite	234.2	156.5	40	50%	4.0
Haryana	White grub					
	Termite	9.4	10.4			Not known
	Tobacco caterpillar					Not known
<b>Total</b>					<b>1584</b>	<b>1584 / 58</b>