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A guide to the identification and control of insect pests in Ord peanuts

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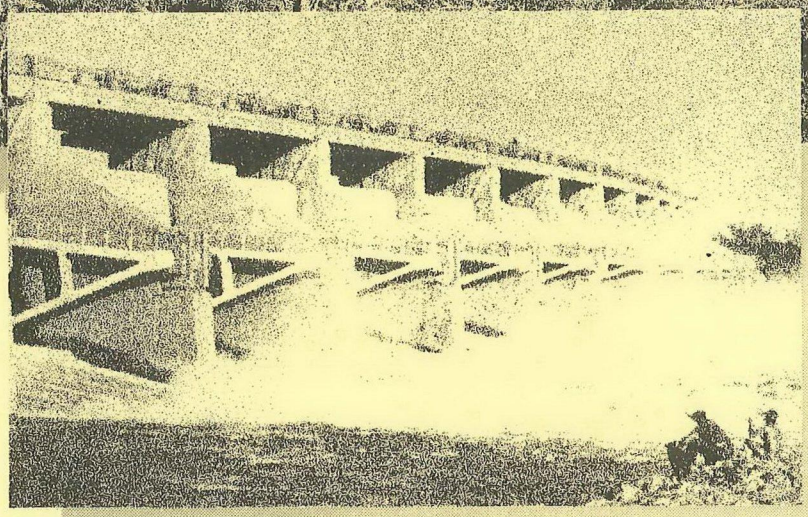

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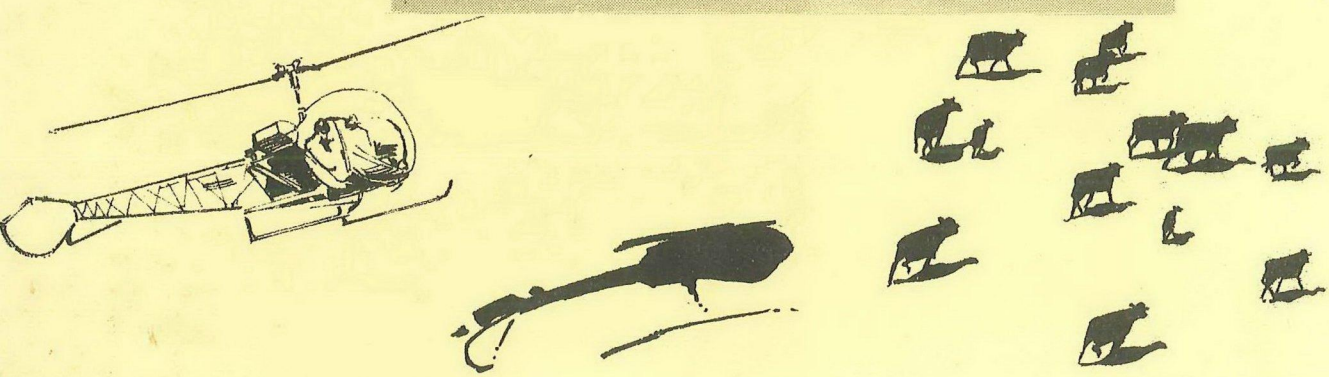

A GUIDE TO THE IDENTIFICATION AND CONTROL OF INSECT PESTS IN ORD PEANUTS

S.E. Learmonth, February 1986

Since peanuts were first grown commercially on the Ord Cockatoo sands in 1979/80, insects have generally been of minor concern but changes in the importance of some insects have occurred to the point where insecticides are required. Therefore, it is important that growers be able to recognize insects in their crops. Such is the objective of this guide which also includes some general information on the biology, feeding habits, methods of detection, and control of the more common insects.

Some of the insects discussed here are not represented by photographs and specific queries can be discussed with officers of the Department of Agriculture. As experience with insects in peanut crops grows, some of the information in this guide will require updating because insects previously of minor concern or insects not mentioned here may become more important.

The insects more commonly found in peanut crops, are discussed in groups according to their feeding habits. Only some of these insects are considered to be pests, while the pest status of others (such as termites and wireworms) is questionable at this stage and requires further assessment. Where insecticides have been used, such insects are marked with an asterisk.

DEFOLIATORS

LOOPERS (Chrysodeixis spp. and Mocis spp.) - Moth larvae that walk with a characteristic arching of the body are loopers (see photograph). Their abundance in crops has generally been low and consequently loopers have not been cause for concern. Their presence during early stages of crop growth may be advantageous because they could allow a build up of natural enemies such as egg and larval predators and parasites which also attack more serious pests such as Heliothis. 1

SPUR-THROATED LOCUST (Austracris guttulosa) - These locusts (grasshoppers) are often found in peanuts. The common name refers to a blunt spine protruding between the forelegs. Nymphs are green with a black stripe down the middle of the back. Adults are about 70 mm long with brownish forewings and clear hind wings; when the wings are folded, adults have a yellow-cream coloured line on their back. Defoliation by this insect has been of minor importance.

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DEFOLIATORS AND FLOWER AND PEG FEEDERS

*HELIOTHIS CATERPILLARS - Two species of Heliothis occur as pests on the Ord - H. punctigera (native budworm) and H. armigera (corn earworm). Larvae of these two species of moth are difficult to distinguish but they vary in their feeding preference and ease of control - H. punctigera preferring leaves and being more susceptible to insecticides. Moths are 20 to 30 mm long with 2
cream to brown fore-wings and hind-wings cream to whitish with a broad grey area around the hind margins (see photograph). They are strong fliers and when disturbed usually fly quite rapidly just above the crop before landing some distance away. Eggs of Heliothis are laid singly and hatch in 2 to 4 days depending on temperatures. Young larvae are invariably light-brown but as they mature, colour is variable from green through pink to brown. Larvae take 2-3 weeks to complete development before pupating in the soil.

Newly emerged larvae prefer feeding on the tender foliage of young unexpanded 3
leaflets (see photograph showing the effect of feeding by young Heliothis larva on a fully expanded leaf). Later they move to more exposed situations feeding on more mature leaves, flowers and pegs. (Photographs opposite show a 4
medium stage larva feeding on a recently opened flower; and a mature Heliothis 5
larva).

DEFOLIATORS AND FLOWER AND PEG FEEDERS (Cont'd)

Heliothis larvae (predominantly H. punctigera) have been consistently present at moderate to high densities in some crops. Until more information is available on the effect of larvae on yield, it is suggested that insecticide should be applied when a level of 4 or more larvae per metre of row is reached. Should H. armigera become more abundant, the level of one larva per metre of row recommended in Queensland peanut crops, could be used as a guide.

Predators which feed on young Heliothis larvae include a beetle larva (the photograph opposite shows a medium stage Heliothis larva and its predator - a beetle larva with brown head and shiny black body) and a bug (shown in the photograph opposite - a nymph of the damsel bug feeding on a medium stage larva of Heliothis). These predators may build up within crops during a season and have been thought responsible for preventing infestations of Heliothis from reaching damaging levels. For this reason, if control of early generations of Heliothis larvae is necessary, endosulfan is preferred because it is less toxic to such beneficial insects. 6 7

CLUSTER CATERPILLAR (Spodoptera litura) - The common name of this moth is derived from the fact that because eggs are laid in masses of 200-400 under hairlike scales, upon hatching, larvae feed gregariously for the first few days. Young larvae are blackish-green becoming light grey to dull grey at maturity. As they mature, black semi-lunar shaped markings on the abdomen become more prominent. (A medium stage Spodoptera larva is shown opposite.) Larvae pupate in the soil. Moths are similar in size to Heliothis but have black, grey, and white stripes across the forewings and white hindwings. 8

Young larvae characteristically skeletonize leaves but later, as they move apart and feed singly, entire leaves may be eaten. While capable of causing severe defoliation they are also thought likely to feed on flowers and pegs. Their abundance in peanut crops to date has not been high enough to warrant control.

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SUCKING INSECTS

*LEAFHOPPERS (Austroasca sp.) - Like all plant-sucking bugs, these insects have hollow needle-like mouthparts they insert into plant tissue and down which they inject saliva, and suck up plant juices. Young leafhoppers (nymphs) are green and as their name implies, achieve great mobility by hopping from plant to plant. Adults are winged and can both jump and fly (an adult leafhopper is shown). 9

When very abundant, leafhoppers can effectively reduce the leaf area of crops by their feeding. Leaves that are attacked become mottled yellow-green (see photograph opposite) and may die. Leafhoppers have only been a problem in dry season crops though are present in low numbers during the wet. 10

THRIPS - The importance of thrips in peanut crops is yet to be ascertained. These small (about 1 mm long) cigar-shaped insects are pale-yellow and feed with a rasping-sucking action on plant tissue. They characteristically feed within the unfolded young leaflets and their damage is not detected until the leaves mature. Symptoms of their presence are distorted (curled) leaves. Their abundance has been quite variable among Ord crops and at present, should not be regarded as a pest.

OTHER PLANT-SUCKING INSECTS - The green mirid bug (Creontiades dilutus) (shown opposite) and the brown wood bug (Oncocoris favillaceus) are the two most abundant plant-sucking bugs in peanut crops. The redbanded shield bug (Piezodorus hybneri) is reasonably common while the green vegetable bug (Nezara viridula) is rare. 11

Of these bugs, nymphs of only the green mirid and the brown wood bug have been observed which indicates they are capable of completing their life cycle on peanuts.

None of these bugs has been linked directly with plant damage, but leaf distortion and peg death are possible symptoms. Their abundance has usually been low.

POD AND KERNAL FEEDERS

*LUCERNE SEED WEB MOTH (Etiella behrii) - Adults of the lucerne seed web moth are about 15 mm long and 4 mm wide (when resting). They characteristically 12
stand in an arched position with forelegs fully extended, as shown in the photograph. They are grey with a prominent silver/white stripe on each forewing (see photograph). Unlike Heliothis moths, they are poor fliers and move only a short distance when disturbed. Adults are thought to lay eggs on the plant rather than near the soil surface and the young cream-coloured larvae soon move downwards in the canopy to infest pods. As they mature, larvae become pink and blue/green. Damage to kernals is characterised by the 13
presence of webbing and frass, with feeding resulting in surface gouging (see photograph). After larvae reach maturity within a pod, they chew their way 14
out, leaving a hole in the pod wall as shown opposite.

Pupation of lucerne seed web moth larvae occurs in a silken cocoon spun by mature larvae in the soil or plant debris. Not all larvae pupate immediately within such cocoons - some are thought to hibernate in the larval stage and emerge as moths after pupating in the following wet season.

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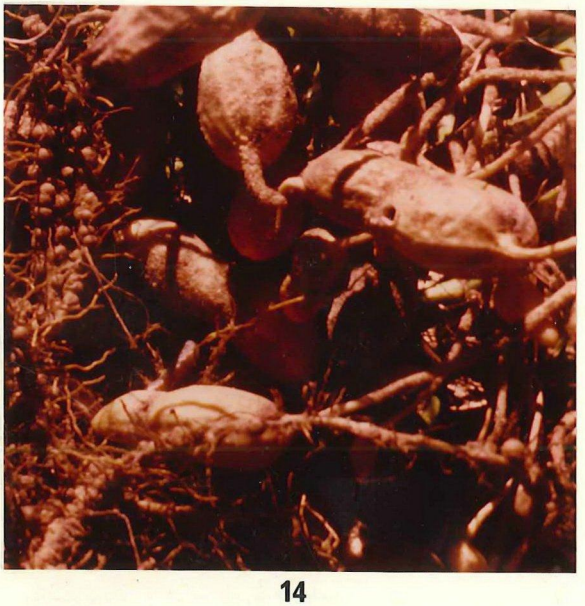

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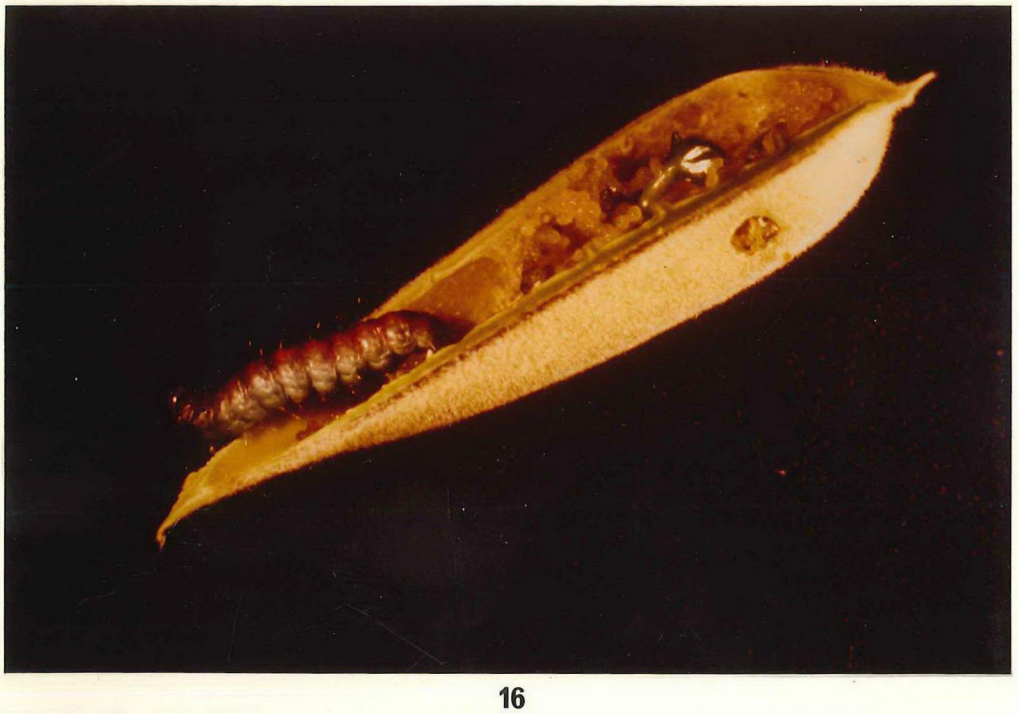

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POD AND KERNAL FEEDERS (CONT'D)

No native food plants of lucerne seed web moth larvae have been found in the Ord, but two other species of Etiella have been collected on Crotalaria spp. (rattlepods). One of these (E. scitivittalis), infests the birdflower rattlepod (C. cunninghamii) and can complete the entire larval stage within one pod. A flower and pods of the birdflower rattle pod are shown opposite; 15
the circular area of brown discolouration on one of the pods was the point of entry for a newly hatched larva. As is the case for E. behrii in peanuts, mature larvae of E. scitivittalis chew their way out of the pod (see 16
photograph) to pupate in the soil.

Little is known about the biology of lucerne seed web moth, but in south-east Queensland (the only other peanut-growing area where it is recorded as a pest), damage is more likely to occur in dry seasons and on light soil types. In the Ord, serious infestations have only occurred in late sown crops, i.e. those sown after late January. Flights of moths have commenced in late April and early sown crops, which are approaching maturity at this time, avoid damage. Therefore the best means of control is to plant early.

Should control be required, apply insecticide on a schedule basis when invasions of moths commence. The aim is to either repel or kill moths and to kill young larvae before they infest pods.

POD AND KERNAL FEEDERS (CONT'D)

*TERMITES - With the shift in commercial production of peanuts to the light Cockatoo sands, termites were considered to be a likely pest because of their greater abundance on this soil type. The complex of species that occurs on the sands are primarily grass gatherers or feed on dry timber. When such land is cleared for peanut cropping, residual and peripheral colonies continue to forage within crops for food. As a result, plants of all ages have been killed and pods have been damaged. Termites usually enter plants through the tap root, feeding on the conducting tissue which eventually causes plants to wilt and die. Damage to pods is sometimes confined to external feeding on the pod wall or actually entering the pod and feeding on the kernal - typical surface scarification of kernals and soil deposition is shown opposite. With one exception, the effects of termite activity have not been considered serious although no crop has escaped damage. Reasons for the high level of termite-related losses on one farm are most likely associated with soil type and topography which favour termite activity and survival. With disturbance of soil through cultivation and eventual removal or decomposition of all sticks, stumps etc., termite numbers should decline.

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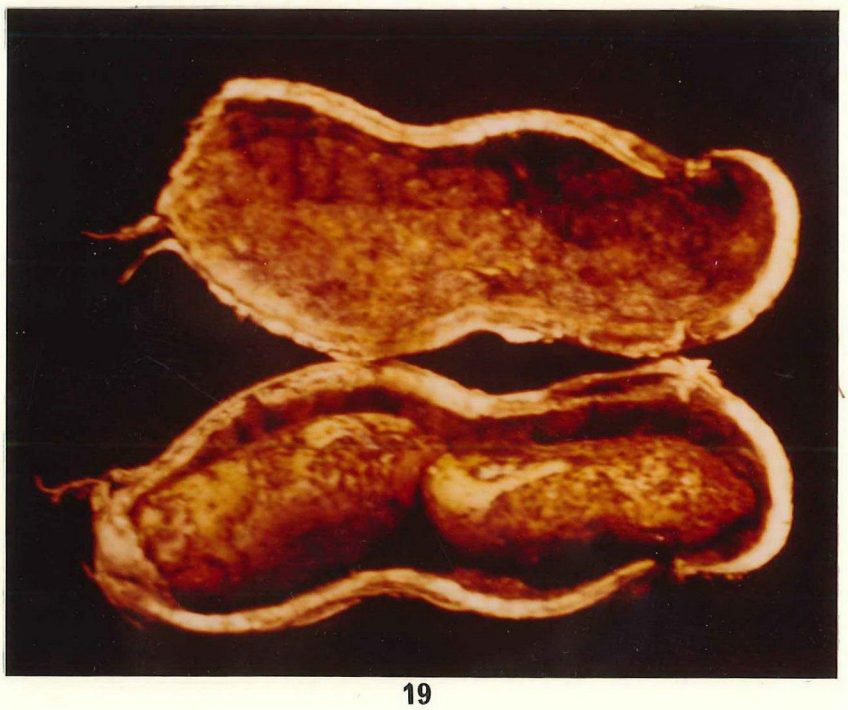

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POD AND KERNAL FEEDERS (CONT'D)

WIREWORMS - Wireworms comprise two groups of insects - the click beetles (true wireworms) and false wireworms. True wireworm larvae are cream to yellow-brown with a flattened soft body whereas false wireworm larvae are straw-coloured and cylindrical with a hard, shiny skin. Larvae feed on vegetable matter as well as roots of plants and have been observed feeding on the kernals of peanuts (see photograph opposite for true wireworm larva feeding on kernals). Adults, usually brown to matt black, spend the day under plant debris, clumps of soil, etc. and feed at night. With peanuts, the larval stage is more likely to be of concern. At present, wireworms are not regarded as a serious pest of peanuts.

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MISCELLANEOUS

Salt and pepper moth (Utetheisa sp. lotrix?) is a native insect whose larvae feed on rattlepods and is a frequent visitor to peanut crops. The moth is easily recognized by the black, white, and red speckled pattern on its wings (see photograph of moth ovipositing on Crotalaria). While larvae sometimes occur as leaf-feeders on soybeans, they have not yet been observed feeding on peanuts.

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METHODS OF DETECTING INSECTS

HAND-THRASHING of plants is the simplest method for detecting the presence and abundance of moth larvae (loopers, Heliothis, Spodoptera). A measured length (such as 1 metre) of crop row is hand-thrashed over the adjacent inter-row furrow, taking care to gently pull the plants from the far side of the crop row towards the furrow so as not to dislodge larvae prematurely. Plants should be thrashed downwards so that larvae are not flung outside the searching zone. As crops mature and plants become large, to continue examining the same length of crop row, it is more practicable to thrash plants in adjacent rows but only half way across the row, into the furrow between them. After plants are thrashed, push them away from the furrow and examine the bare soil for insects. A number of such sites should be examined in a crop and from as little as 30 minutes, a reasonable estimate of larval abundance can be obtained. Experience has shown that when larvae are abundant (at 4 or more per row meter), about five sampling sites are sufficient. When densities are lower, it is best to sample over about ten sites to get a clear indication of abundance. Weekly sampling should be frequent enough until numbers start to build up, then the crop should be examined more often.

DIRECT OBSERVATION of crop damage or insects themselves is also useful.

While moving through crops, check for discoloured leaves (by termite-killed plants, young Heliothis larvae that fed in folded leaflets, or leafhoppers), distortion of newly-expanded leaves (thrips), gross leaf loss, flower drop and chewing and sucking of pegs.

In some cases the presence of the insect in large numbers may be more obvious than the damage they cause such as grasshoppers and plant sucking bugs; or may give an insight into potential problems, for example, if large numbers of Heliothis moths are present.

LIGHT TRAPS are currently the only reliable method of monitoring invasions by the lucerne seed web moth. Timing of insecticide applications should be based on such information.

POD DAMAGE caused by soil insects such as termites, wireworms and Etiella can be assessed by destructive sampling near and at crop maturity. Further monitoring of such damage is required to fully assess their pest status.

CONTROL OF INSECT PESTS OF PEANUTS

Insect	*Pest status	Insecticide and rate per ha	Comments on control
loopers	1	-	-
spur-throated locust	1	-	-
native budworm	3	endosulfan at 2 L of 250 g/L methomyl at 1.5 to 2 L of 225 g/L	Apply insecticide when there are 4 or more larvae per metre of crop row. If beneficial insects are present and Heliothis larvae are young and at a density of around 4/m, spraying may not be required.
corn earworm	1(3)	as for native budworm	This species has been much less abundant than native budworm. Should it become more abundant (more likely in late sown crops), spray at densities of 1 or more larvae/m crop row.
cluster caterpillar	1	-	-
leafhopper	3	endosulfan at 2 L of 350 g/L omethoate at 700 ml of 800 g/L	Apply insecticide when leaf damage is widespread
thrips	1	-	-
plant sucking bugs	1	-	-
lucerne seed web moth	3	endosulfan at 2 L of 350 g/L every ten days	Plant crop early to avoid infestations (before early January). Apply insecticide when invasions of moths commence.
termites	2		Cultivation and thorough removal of dry timber and sticks will reduce resident populations. Organochlorine insecticides result in pesticide residues in kernals. Suitable alternatives are currently unavailable.
wireworms	2		-

*Pest status:
1. non-pest
2. pod feeders not considered to be serious pests at present
3. occasional pest requiring insecticidal control