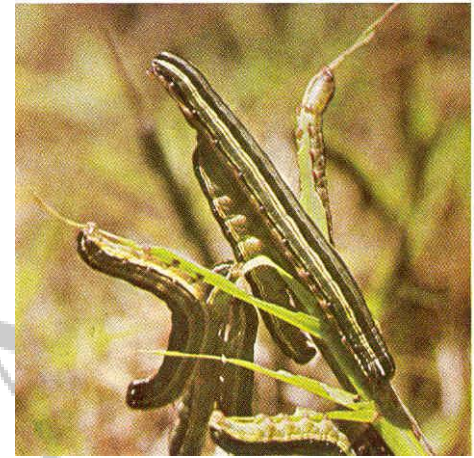


Contents

1. Insect Pests in Seed Production

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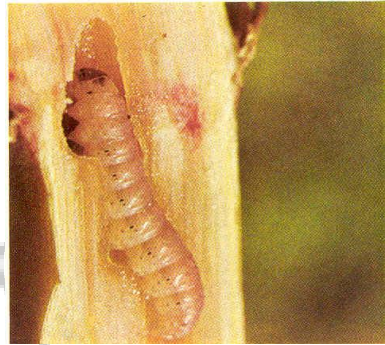


INSECT PESTS IN SEED PRODUCTION



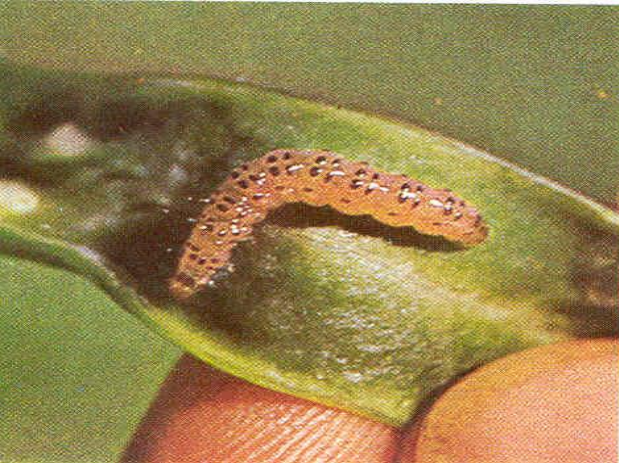
Prof. F. Olubayo
Department of Plant Science and Crop Protection

Introduction



- Generally grouped into **field pests** and **storage pests**
- **Field pests** attack crop while in the field from germination to maturity
- **Storage pests** attack crops that are storable in a dry state while maturing in the field and continue on into storage.





Field pests

- Loosely grouped according to common pests attacking related crops such as cereals or legumes, oil crops, flowers
- Also grouped based on individual crops and the part of plant damaged e.g root feeding pests, leaf eating pests, stem girdlers
- These groupings may overlap.

Pests of cereals

(maize, sorghum, rice and millets)

Major pests

- Maize stalk borer (*Busseola fusca*) Lepid. (O): Noctuidae (F)
- Spotted stem borer (*Chilo partellus*) Lepid. : Pyralidae
- Pink stalkborer (*Sesamia calamistis*) Lepid. : Noctuidae
- Armyworm (*Spodoptera exempta*) Lepid. : Noctuidae
- African bollworm (*Helicoverpa armigera*) Lepid. : Noctuidae
- Sorghum shoot fly (*Atherigona soccata*) Diptera: Muscidae
- Stock eyed shoot fly (*Diapsis thoracica*) Diptera: Diaspidae
- Maize leaf hopper (*Cicadulina mbila*) Homoptera: Ciadellina
- Sorghum aphid (*Aphis sorghi*) Homoptera: Aphididae

Pest of cereals contd'

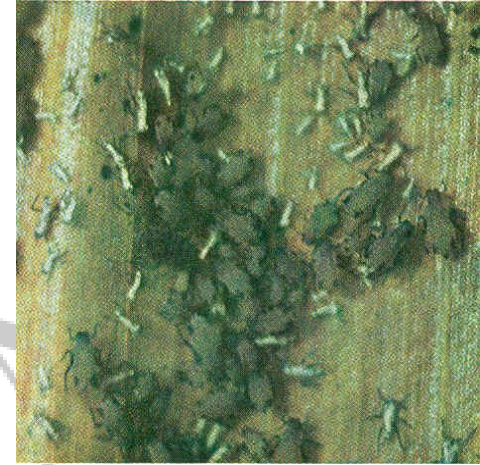


Minor Pests

- Cutworms *Agrotis sp* (Lepid: Noctuidae)
- Cotton leaf worm *Spodoptera littoralis* (Lepid: Noctuidae)
- Maize webworm *Marasmia trapezalis* (Lepid: Pyralidae)
- Maize ladybird beetle *Epilachna simulis* (Coleoptera: Coccinellidae)
- Corn lantern fly *Peregrinus maidis* (Homo: Delphacidae)
- Maize Aphid *Rhopalosiphum maidis* (Homo: Aphididae)
- Termites Genus *Microtermes* & *Macrotermes* (Isoptera: termitidae)

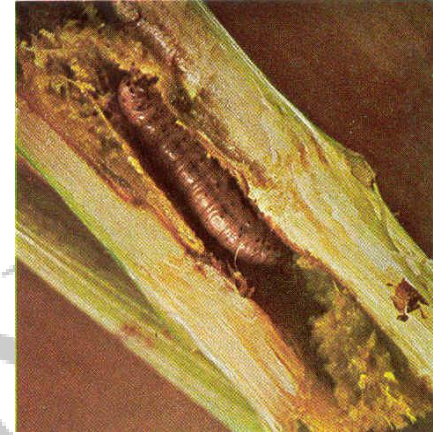
Pest of cereals

minor pests contd,



- **Edible grasshopper** *Hormocercus nitidulus / vicinus* Wlk (Orthoptera: Tetigonidae)
- **Elegant grasshopper** *Zonocerus elegans* (Orthoptera: Tetigonidae)
- **Green stink bug** *Nezara viridula* (Heteroptera: Pentatomidae)
- **Lygus bug** *Taylorilygus vosseleri* (Heteroptera: Miridae)
- **Wheat aphid** *Schizaphis graminum* (Homoptera: Aphididae)
- **Rice skipper** *Borbo barbomica* (Lepidoptera: Hesperidae)
- **Sorghum midge** *Contarinia sorghicola* (Diptera: Cecidomyiidae)

Maize Stem Borers

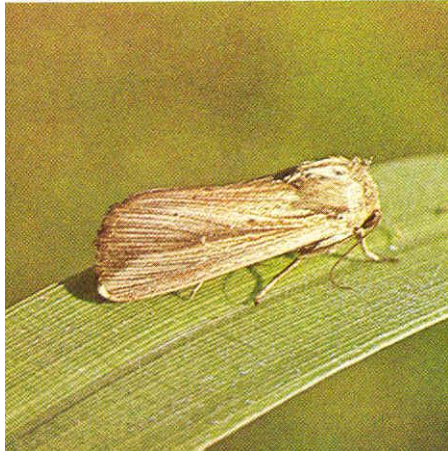


- major pests of maize and sorghum
- **Alternate hosts:** grasses of *Setaria spp*, *Eleusine spp* and other cereals

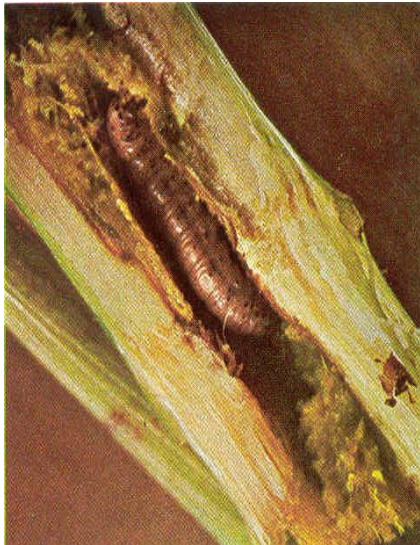
Damage:

- caterpillars feed on the tender leaves in the funnel or central shoot of the plant
- dead hearts' symptoms where the central shoot is killed
- larval feeding on the funnel produces characteristic line of windows across leaves as they unfold

Maize stem borers



Pink stem borer (*S. calamistis*)
adult and larvae



Maize stalk borer (*Buseola fusca*)
larvae and its damage on
leaves

Stem borer damage: windowing
on leaves and tunnelling of
stems

Management

Cultural control

- Destroy all crops residues which contain diapausing larvae
- Early planting at the same time in one area
- Eliminate thick stemmed grasses that may harbor larvae
- Enforcement of a closed season for at least two months

Chemical control: *Use registered products for control of stem borers e.g Bulldock granules, dimethoate + alphacypermethrin, put in the funnel or spray at one foot height of crop*

Armyworm (*Spodoptera exempta*)

- major pest of maize, wheat, barley, sorghum, pastures and rice.
- **Alternative hosts:** a wide range of cereals and wild grasses

Damage:

- Young caterpillars scrape off the tissues on one side of the leaf giving a scotched effect
- Older caterpillars eat the whole leaf except the midribs.
- high populations destroy whole fields of cereals quickly

Major pests contd'



Armyworms

(*Spodoptera exempta*) Chew the whole leaf blade and leave only the ribs during outbreaks



- *Helicoverpa spp* on maize eats leaves and seeds on cob are sporadic pests

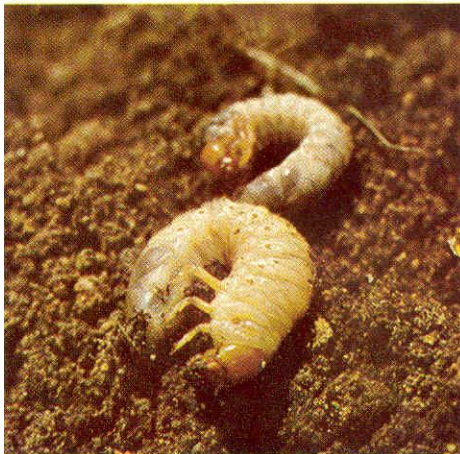
Armyworm-- Management

- Infestation can be controlled early using a number of chemicals e.g. Fenitrothion, Thiodan.
- A number of natural enemies have been recorded including viruses but they have difficulty in preventing outbreaks during optimal conditions. They take time to establish

Other minor pests



Maize aphids (*R. maidis*) late season pests
Aphids are suckers if 50% plants are infested by about 400 aphids/plant at late whorl to early tasseling stage, take control measures



Cutworm (*Agrotis spp*)

larvae cut young seedlings at ground level or hollow out the stem underground then plants wilt and die. Pests are sporadic
Control with chemical in the evening by soil drenching areas with the damage (use *Dimethoate*)

Pests of Pulses/Legumes

Beans, pigeon peas, cowpeas, green grams, black beans)

Major pests

- Bean fly *Ophiomya phaseoli* (Diptera: Agromyzidae)
- Spotted pod borer *Maruca testulalis* (Lepid: Pyralidae)
- Pod borer *Helicoverpa armigera* (Lepid: Noctuidae)
- Stripped bean weevil *Alciclodes leucogrummus* (Coleoptera: Cucurlionidae)
- Black bean aphid *Aphis fabae* (Homo: Aphididae)
- Groundnut aphid *Aphis craccivora* (Homo: Aphididae)
- Pea pod borer *Etiella zinkenella* (Lepid: Pyralidae)

Pests of Legumes contd'

Minor pests

- Pollen beetles *Coryna spp* (Coleoptera: Meloidae)
Mylabris spp (Coleoptera: Meloidae)
- Red spider mites *Tetranychus spp* (Acarina: Tetranychidae)
- Bean flower thrips *Taeniothrips sjostedti* (Thysanoptera: Thripidae),
Megalurothrips spp (Thysanoptera: Thripidae) *Frankiniella spp*
(Thysanoptera: Thripidae)
- African bollworm *Heliothis armigera* (Lepidoptera: Noctuidae)
- Bean leaf beetle *Oothea mutabilis* (Coleoptera: Chrysomelidae)
- Spiny brown bugs *Acanthomia/ Clavigralla spp* (Heteroptera: Coreidae)

Pests of Legumes – minor pests contd'

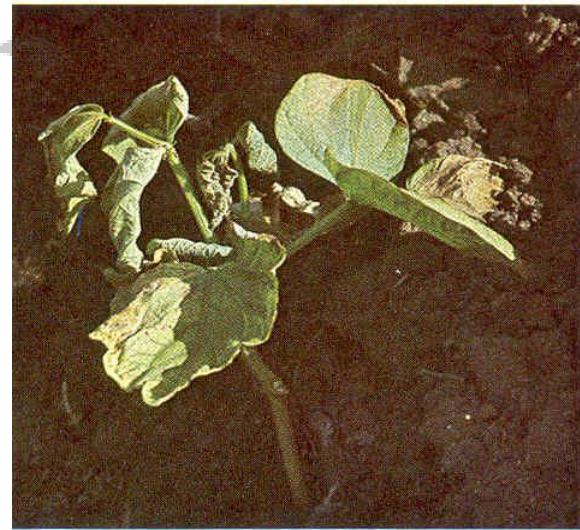
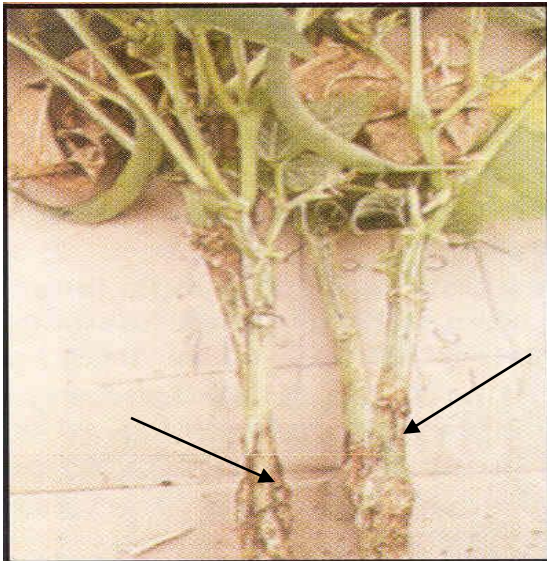
- Giant coreid bug *Anaplocnemis curvipes* (Hetero: Coreidae)
- Cotton lygus *Taylorilygus vosseleri* (Hetero: Miridae)
- Green stink Bug *Nezara viridula* (Hetero: Pentapmidae)
- Black helmet bug *Brachyplays testudoniga* (Hetero: Pentomidae)
- Helmet bugs *Coptosoma spi* (Hetero: Pentamidae)

Other Heteropteran bugs :-

Riptortus dentipe, *Aerosternum spp*, *Mirperus jaculus* and *Riezoderus hybeneri*

Bean Fly (*Ophiomyia phaseoli*)

- Main host: - Beans
- Alternate hosts: - A wide range of leguminous crops



- Damage: new larvae burrow down through the petiole of the leaf through stem until they reach the ground level where they feed on stem tissue

Result: swollen stems that eventually split, roots recede, plant wilts/wither and die

Control

Chemical:

- seed dressing with imidacloprid,
- sprays on seedlings using Dimethoate, lambda cyhalothrin,

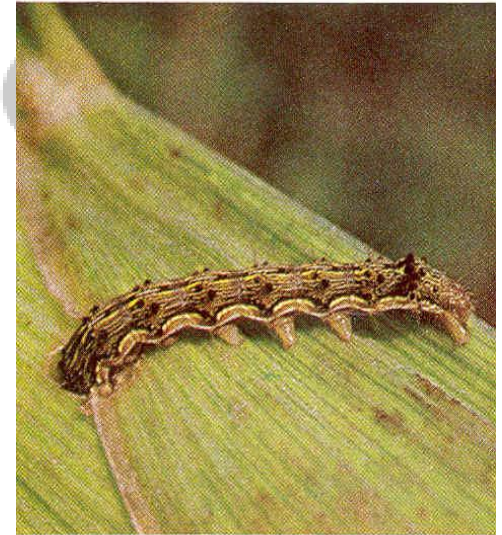
Nb. limited success once the seedlings have been damaged

Cultural:

- All planting in an area should be done at the same time
- Destruction of crop residue and removal of volunteer plants
- Avoid start seasons beans in dry areas

Pod Borers (*Maruca testulalis*) and *Helicoverpa* spp

- major pest of pigeon pea



Damage

- caterpillars eat leaves, flowers, flower buds and pods, serious damage on pods where seeds are destroyed
- Spray at flowering with alphacypermethrin, dimethoate, imidacloprid,

Pea Pod Borer (*Etiella zinkenella*)

- serious pest on pigeon pea and will feed on cow pea, green grams and other leguminous crops

Damage

- Early larvae feed inside developing seeds, later instars feed freely inside the pods. The partly grown caterpillar may leave original pod and penetrate one or more fresh pods before reaching maturity

Control

- Chemical control

Pod borers



- Maruca spp above
- Pea moth below



Pod Fly - *Melanogromyza obtusa*

- wide spread and major pest of pigeon pea, cow pea

Damage

- no obvious external symptoms of pod fly attack till fully grown larvae chew holes in the pod walls leaving a “window” from which adult flies out

Pod flies (Adult and damage)



- Adult fly is black, lays eggs in pods, pupae found in pod



- Larvae chew holes in pods and damage seeds

Pictures courtesy of ICRISAT training resource

Pod Fly -- Control

- use systemic insecticides e.g. Dimethoate and Monocrotophos, non systemic insecticides e.g. Endosulfan kill adults.
- Practice a closed season during which no pigeon pea pods should be available to help reduce infestation
- avoid growing a mixture of cultivators of differing durations
- Use resistant cultivars

Pod Sucking Bugs - *Acanthomia* spp

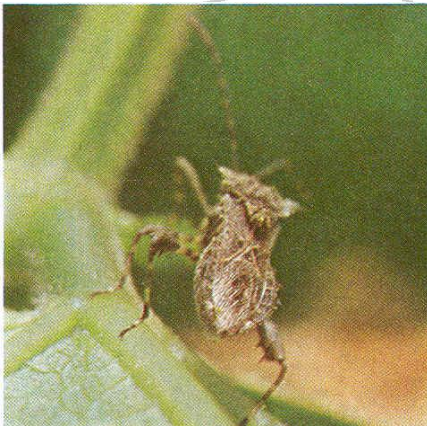
- Pests of beans, pigeon peas, cow peas and *Dolichos lablab* mainly. They also feed on other pulse crops

Damage:

- Bugs suck developing seeds through the pod wall. The seeds become shriveled with dark patches. Such seeds do not germinate and are not acceptable as human food

Pod Sucking Bugs --

- A fungus (*Nematospora coryli*) is often associated with *Clavigralla* damage but it is not certain whether the fungus is introduced by the bug itself or whether it enters the seed via the feeding punctures.
- Spiny brown bug (*Acanthomia* spp)



Pod Sucking Bugs -- Control

- Use insecticide with some systemic action e.g. Dimethoate and Monocrotophos
- Use/ screen for resistant varieties



Pests of flowers



- Blister beetles, feeds on flowers reducing no of pods formed

Control

- No insecticides are effective but synthetics may work reasonably
- Manual picking is best alternative



Acknowledgment

Pictures courtesy ICRISAT teaching resource and Bohlen

THANK YOU