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Field insect pests of rice in Africa: biology and control

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Field insect pests of rice in Africa: biology and control

Objectives. This guide is intended to enable you to:

- identify important rice insect pests in the field and describe their biology, geographical distribution, symptoms, and damage;
- control pests.

Study materials

- Specimens of adults, eggs, larvae and pupae of the important pests.
- Infested plants showing damage by various pests.
- Specimens and or slides of known parasites and predators of important rice insect pests.
- Granular systemic insecticides e.g. Carbofuran or Isazofos.

Practicals

- Study specimens of the various developmental stages of the pests.
- Visit fields to identify various pests and their respective damage, and identify natural enemies.
- Demonstrate control methods.
- Inspect and evaluate damage in resistant and susceptible varieties for named internal stem feeders.

Questions

- 1 What is the importance of rice in Africa?
- 2 What are average yields of rice?
- 3 What are yield losses of rice due to pests in your country?
- 4 How can you classify insect pests of rice?
- 5 What are important internal stem feeders of rice?
- 6 What are general symptoms of lepidopterous stem borer attack?
- 7 Where is the African rice gall midge important?
- 8 What is the major symptom caused by the African rice gall midge attack?
- 9 Where is the stalk-eyed fly important?
- 10 What are the symptoms caused by the striped borer attack?
- 11 What crops does the spotted borer attack?
- 12 Where is the white borer distributed?
- 13 When does the yellow borer attack?
- 14 What plants does the pink borer attack?
- 15 Which are the important leaf feeders?
- 16 Where does the caseworm derive its name from?
- 17 What are the symptoms of leaf folder damage?
- 18 When are armyworms abundant?
- 19 Where is the ladybird beetle distributed?
- 20 How can you distinguish grasshoppers from field crickets?
- 21 What are characteristic symptoms of leaf and stem sucker attack?
- 22 When do grain suckers invade?
- 23 Which are the important root feeders?
- 24 What methods does cultural control of internal stem feeders include?
- 25 Why has the use of insecticides not always been successful to control internal stem feeders?

Field insect pests of rice in Africa: biology and control

- 1 Importance of insect pests of rice
- 2 Internal stem feeders
- 3 Leaf feeders
- 4 Plant suckers
- 5 Root feeders
- 6 Control
- 7 Bibliography
- 8 Suggestions for trainers

Abstract. Insect pests are a major constraint in rice production in Africa and elsewhere. They perennially result in crop loss which may range from 30-100 %. Measures of control include cultural and biological control, host plant resistance, and chemical methods. Chemical control has several disadvantages. Integrated pest management combines advantages of the various control methods to arrive at environmentally sound control measure. A good insect control system requires knowledge of identity and bioecology of the pests and their natural enemies.

1 Importance of insect pests of rice

About 6.9 million hectares are currently under rice cultivation in Africa. Rice production in 1992, for instance, stood at about 9.3 million tons. The majority of the production comes from small-scale, resource-poor farmers. The average yield per hectare in these farms is 1.3 tons.

One of the reasons for the low yield is depredation by insect pests. Yield losses of 30 % in upland rice and 100 % in lowland rice have been recorded. So far, damage caused by insect attack has not been given the full recognition it deserves as a production constraint in Africa.

The huge losses both in quality and quantity, in most cases could be reduced or even prevented. This, however, requires an understanding of the identity, biology, nature, and symptoms of damage in order to apply appropriate control measures.

Insect pests of rice are classified according to the plant parts they damage:

- internal stem feeders (stem borers),
- leaf feeders,
- plant suckers (leaf and stem suckers, grain suckers),
- root feeders.

A relationship exists between crop phenology and field infestation of major insect pests (Figure 1).

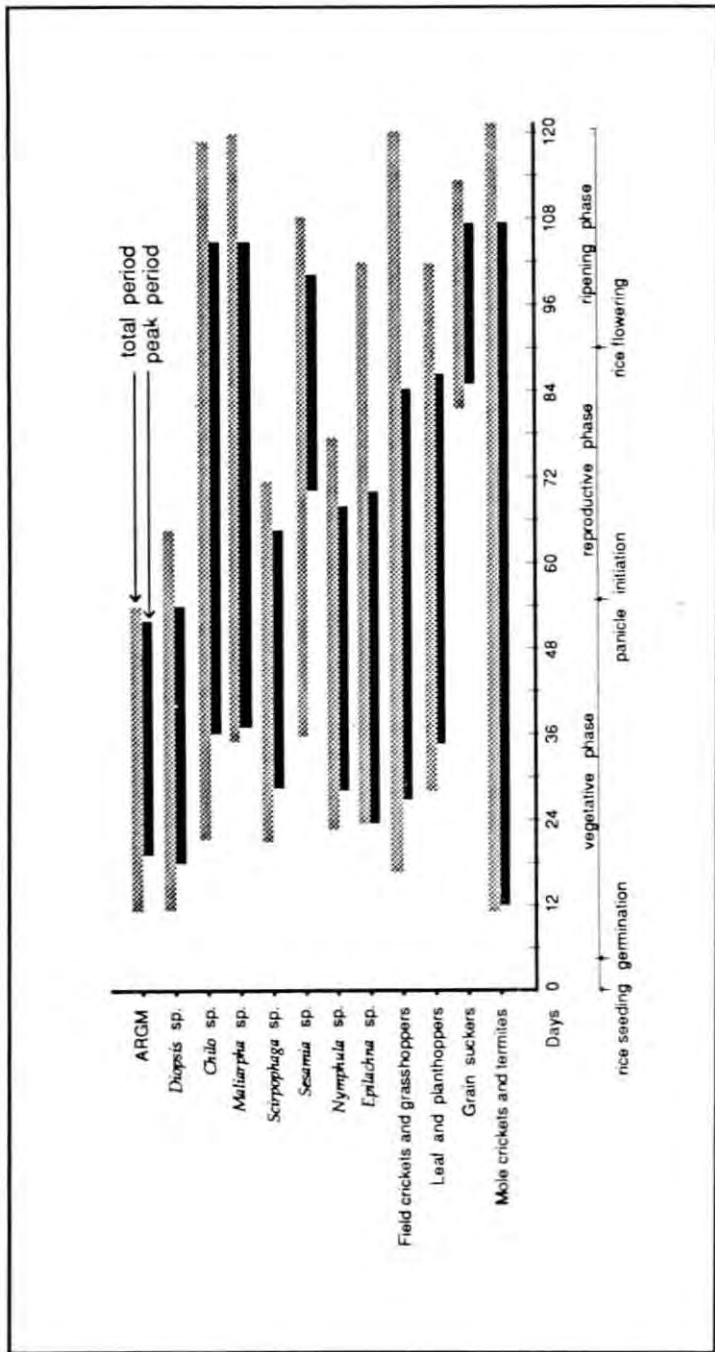


Figure 1. Periods of economic damage of rice pests.

2 Internal stem feeders

Internal stem feeders (stem borers) include:

- African rice gall midge *Orseolia oryzivora* Diptera
 Harris & Gagné
- stalk-eyed fly *Diopsis* spp. "
- striped borer *Chilo zacconius* Lepidoptera
 Bleszynski
- spotted borer *Chilo partellus* Swinhoe "
- white borer *Maliarpha separatella* "
 Rag.
- yellow borer *Scirpophaga* sp. "
- pink borer *Sesamia* sp. "

General symptoms of damage caused by stalk-eyed fly and lepidopterous internal stem feeders are:

- early symptoms are *dead hearts* (tillers with dead inner leaves) in young plants;
- whole tillers die as a result of lower stem tissues being eaten up by stem borers;
- lodging may occur particularly in tall varieties;
- panicles may fail to emerge and dry up;
- *white heads* (white empty panicles) may result when older rice plants are attacked;
- improperly filled panicles and low grade grains may also result from borer attack.

African rice gall midge. The African rice gall midge (ARGM), *Orseolia oryzivora* Harris and Gagné, is

principally a pest of lowland environments but recently, ARGM has been observed in uplands also. It is a bud borer and causes economic damage to rice during the vegetative stages (seedling to panicle initiation).

Adults are tiny, mosquito-like and about 5 mm long. Females have robust, orange colored abdomens. Males are smaller than the females and have slender, brown abdomens and longer antennae.

Adults are cryptic and nocturnal. They live for about 2-5 days during which the females lay 100 to 200 eggs each, mainly on rice leaves, leaf sheaths, ligules, and at the bases of stems.

Eggs hatch in 2-3 days and maggots (larvae) creep down the leaf sheath, often in a film of water, and enter buds. Larval feeding causes the bud to swell and develop a cavity where the larva is lodged. Continued larval feeding destroys the bud, and causes the leaf sheath tissues to elongate and form a tube-like structure which is called the gall. The rice gall is also called an *onion leaf* or *silver shoot* because of its resemblance to an onion leaf and its usually silvery, light green color. A few galls may be purple.

Tillers bearing galls do not produce panicles, hence each gall represents a tiller lost. Early and severe infestation results in stunted growth and total crop failure, particularly under humid and cloudy conditions.

Larvae and pupae complete development in the cavity at the swollen base of the gall. The adult, still in its puparium wriggles up the gall and escapes through a hole at the end of the gall, leaving its pupal case half-stuck in

the hole. Development from egg to adult emergence from the gall takes 22-30 days.

In the dry season, a small population of ARGM survive in ratoons and wild rice.

Stalk-eyed fly. The stalk-eyed fly, *Diopsis longicornis* Macquart (= *thoracica* Dalman), is an important pest of lowland rice, but also constitutes a serious problem in upland environments where humidity is high. Other species of *Diopsis* recorded in Africa are *D. apicalis* Dalman and *D. colaris*.

The head of *D. longicornis* is orange and bears eyes on reddish stalks arising from the sides of the head. The thorax is shiny black with two backwardly directed spines and a pair of glassy wings.

Adults are gregarious and invade nurseries early in the season. They lay eggs on leaves and stems of seedlings and new rice transplants. On hatching, the maggots move down the leaf sheath and feed on the stem tissues below the growing zone. The apical part of the plant is cut off from the base so that the central whorl does not unfold and dries up. This results in a symptom known as *dead heart*.

The larva feeds on healthy plant tissues. As the decomposition caused by larval feeding begins to spread, the larva moves to a healthy tiller. The fully developed larva settles inside the last host tiller where it pupates.

Striped borer. The striped borer, *Chilo zacconius* Bleszynski, is widespread in West Africa. It is a polyphagous pest on both lowland and upland rice from vegetative stage up to ripening.

Adults are pale yellow. Both fore- and hindwings have black spots.

The eggs are pale yellow and flat, and laid in overlapping rows resembling fish scales. The larva is ivory colored with seven longitudinal stripes on the body. First generation larvae may develop as semi-borers. They may feed on leaves and leaf sheaths, and pupation takes place in the leaf sheaths.

Young larva may also bore into the stem of young rice plants and feed on the stem tissues. This results in the formation of *dead hearts* similar to those caused by the stalk-eyed fly. If attack is at panicle initiation stage or thereafter, panicles remain unfilled resulting in a symptom known as *white heads*.

Second generation larvae are responsible for the economic damage to rice plants.

Spotted borer. The spotted borer, *Chilo partellus* Swinhoe, is widely distributed in East and Southern Africa where it attacks rice as well as maize and sorghum.

Adults have beige colored forewings. The hindwings of the female are white, while those of the male are straw-colored.

Infestation starts in the vegetative stage. Eggs are laid in overlapping rows of 50-100 eggs on the undersurface of leaves. Each female may lay up to 300 eggs. Eggs hatch in one week. Larvae first feed on the leaves, and later penetrate the stem. Their feeding results in *dead hearts* in young plants. Mature larvae are buff in color with longitudinal broken bands. They pupate inside the stem.

White borer. The white borer, *Maliarpha separatella* Rag. is widely distributed in East and West Africa and Madagascar.

Adults are straw colored and have a prominent brown line on the anterior edge of the forewings. They attack rice plants at full tillering stage.

Eggs are laid in batches on the upper surface of the leaves. They hatch in about seven days. Emerging larvae are pearly white to pale yellow. Each larva penetrates a tiller just above the node.

As the larva gets older, its feeding impairs the lower parts of the stem and prevents grains in the affected panicle from ripening.

M. separatella damage does not result in the typical white head caused by other stem borers. *M. separatella* also attacks wild rice. At the end of the rice season, the sixth instar larva hibernates at the base of dried stubble.

Yellow borer. The yellow borer, *Scirpophaga* sp., is widely distributed in West Africa.

Adults have satin-like white wings which are folded in a roof-like shape when at rest. The thorax is black and legs are white. Females are slightly bigger than males.

The yellow borer is a pest of wetland environments and attacks new rice transplants up to the booting stage. Eggs are laid on leaves and leaf sheaths. On hatching, the caterpillar bores into the stem a few centimeters below the growing point. It eats up all the inside stem tissues down to the base, thereby destroying the tiller. It

then cuts a 4 cm section of the hollow stem in which it lodges as it moves to the next tiller. Once inside the new tiller, the old stem tube is discarded. The larva is semi-aquatic. The fully developed larva pupates at the base of the stem.

Pink borer. The pink borer, *Sesamia calamistis* Hamps, is the most important species of *Sesamia* in Africa. It is polyphagous, attacking rice, other cereals and grasses. It is more important in upland than in lowland rice, and attacks rice plants at the later stages of development.

Adults are light brown. The forewings have specks of dark patches and a wide, whitish fringe. The hindwings are pearly white. Adults are strong fliers.

Eggs are yellow and laid in batches on leaf sheaths. The caterpillar is pink with a light brown head capsule. The ventral surface, however, is lighter than the dorsal surface. The young larva first feeds on the leaf sheath and later bores into the stem. Older larvae feed more voraciously and may cut through the stem completely. When the panicle is attacked, *white head* results.

The fully grown larva is 30 mm long. Pupation takes place at the base of the stem in the fold of the dried up leaf sheaths. The pupa is reddish brown, but lighter on the ventral side. There are two dorsal thorns and a small ventral protuberance at the posterior.

3 Leaf feeders

Important leaf feeders include:

- caseworm *Nymphula depunctalis* Guen.
- leaffolders *Marasmia* sp. and
Cnaphalocrocis sp.
- ladybird beetle *Epilachna* sp.
- armyworm *Spodoptera* sp.
- field crickets
and grasshoppers

Caseworm. Adults of the caseworm, *Nymphula depunctalis* Guen., are small whitish moths, measuring 6-10 mm, with brown-black spots on the wings. The caseworm is a pest of rice fields with standing water.

The yellow spherical eggs are laid in batches of 15-20 on the undersurface of leaves usually touching the water surface. On hatching, the gregarious first instar larvae cover themselves with slimy material and feed by scraping off leaf tissues. On moulting, the second instar larvae disperse and each cuts a piece of rice leaf, rolls it up into a case, and seals the edges with silk materials, leaving only the anterior end open. The larva lodges inside the case where it is protected as it moves from leaf to feed, or floats in standing water.

The larva is aquatic. Water is trapped within the case which facilitates larval respiration through the thread-like gills along the sides of its body. The larva feeds on growing leaves by scraping leaf tissues from the under-surface, leaving only the papery epidermis.

At each moult, the larva discards its case and makes a new one. The mature larva crawls up the plant and attaches its case on a tiller. Within the case, the larva spins a cocoon and pupates.

Both adults and larvae are nocturnal. The larvae hide in their cases while floating on the water surface in the day, and crawl up the rice leaves to feed at night. Adults are conspicuous in the fields in the day but they rarely fly unless disturbed.

Leaf folders. Leaf folders, *Marasmia* sp. and *Cnaphalocrocis* sp. occur in the whole of tropical, equatorial, and southern Africa.

Adults are tiny, yellow-brown moths, measuring about 5 mm. The outer edges of the wings are dark brownish and fringed with hairs. Adults hide under the leaves of rice or grassy weeds during the day. Mating and egg laying occur in the night.

Eggs are laid in batches of 2-9 on the leaves. They are ovoid and transparent. As they mature, they gradually turn yellow.

Emerging larvae initially feed on the youngest leaves but later feed also on other leaves of the rice plant. The larva loosely stitches together the two edges of a leaf, stays in the chamber thus formed from the folded leaf, and feeds on the parenchymatous cells. This results in longitudinal transparent streaks on the leaf blade. A badly damaged leaf dries up. Heavily infested plants usually contain many folded leaves. When infestation is widespread in the farm, the field may appear scorched.

The mature larva is yellowish green with a dark brown head. Pupation takes place within the leaf fold in loosely woven silken strands.

Armyworm. Armyworms, *Spodoptera* sp., are occasional but serious pests of rice. The name is derived from their habit of appearing in large numbers. Armyworms are more important in upland than in swamp situations. They are highly polyphagous, preferring rice and other short sized Gramineae. Armyworms are abundant when rains are followed by prolonged drought. Adults can migrate over long distances. Thus, outbreaks may originate either from populations coming from distant places, or from local populations.

The larvae are green to brown and may have yellowish green longitudinal lines. Large numbers of larvae slowly march through rice farms defoliating the plants. Defoliation may be severe, often leaving only the base of the stems.

Ladybird beetle. The ladybird beetle, (*Chonotriba similis*), is widely distributed throughout Africa. It is principally a pest of upland rice and attacks rice plants from seedling up to crop maturity.

Adults are orange-red with six black spots in each wing. Eggs are laid on leaves and hatch into grey larvae which turn white as they mature. Except for the legs, the larval body is covered with bristles. Pupation takes place on the leaves. Both adults and larvae feed on the surface of the leaves without piercing them.

Field crickets and grasshoppers. Field crickets and grasshoppers are found more in upland than in swamp situations.

Grasshoppers can be distinguished from field crickets by their short antennae. Field crickets have long antennae which extend beyond their abdomen and a

flattened head shape. Field crickets and grasshoppers lay their eggs in pods. Each pod contains 30 to 100 eggs. Pods are covered with a frothy secretion and deposited in the soil. The eggs hatch into nymphs which moult several times to become adults.

Both nymphs and adults feed on rice leaves. Field crickets eat up holes in the leaves while keeping the margins intact. On the other hand, grasshoppers eat up large portions from the edges of the leaves.

Nymphs of grasshoppers feed on germinating seedlings in the nurseries causing them to wither. Adults attack both leaves and stems of mature plants, causing the panicle to wither.

4 Plant suckers

Plant suckers include insects that feed by sucking on leaves, stems and grains.

Leaf and stem suckers. Important leaf and stem suckers in Africa are the leafhoppers belonging to the genera *Nephotettix* and *Cofana*, the plant hoppers belonging to the genera *Nilaparvata*, *Sogatella*, and *Sogatodes*, and spittle bugs belonging to the genus *Locris*.

Both nymphs and adults of all these insects suck plant sap. A high population may cause the plants to wilt and dry, resulting in the characteristic symptom known as the "hopper-burn".

Grain suckers. Grain suckers are the rice bugs. Important rice bugs in Africa belong to the genera of *Stenocoris*, *Mirperus*, *Aspavia*, *Riptortus*, and *Nezara*.

Adult rice bugs invade rice fields during the flowering stage and lay eggs on the foliage. Both adults and nymphs suck on developing grains, particularly during the milk and dough stages. The milk may be completely sucked up so that the grain is empty. Attack during the dough stage results in low quality grains, often with diffused brown spots indicating points of feeding by the rice bugs.

Adults are long lived and highly mobile. They are able to locate isolated rice farms.

5 Root feeders

Root feeders include termites and mole crickets. They are more important in upland rice.

Both adults and nymphs of mole crickets attack rice plants. They dig shallow tunnels in the ground and feed on young roots and basal portions of the plant below the ground. Feeding leads to wilting and death of the plants.

Termites attack roots of rice plants, resulting in yellowing and wilting of plants. Sometimes the stem is cut into small pieces which are carried into termite galleries for later consumption.

Both mole crickets and termites are also important on irrigated rice, if there is inadequate supply of water.

Internal stem feeders. Internal stem feeders can be controlled by the following methods.

Cultural control. Cultural control methods include:

- use of early maturing varieties and planting early in the season so that plants mature before pests build up;
- weeding regularly to eliminate alternate hosts of pests;
- use of moderate amounts of fertilizer in split doses over the main growth stages in order to discourage rapid development and multiplication of the borers;
- destruction of rice stubbles after harvest in order to destroy diapausing larvae of the lepidopterous stem borers. This reduces the population that initiates infestation during the next planting season. A dry season non-rice crop also reduces pest populations.

There are, however, certain cultural practices in Africa which encourage the rapid spread and build up of pest populations. **Avoid** the following cultural practices:

- buying and selling of rice seedlings in the market for transplantation in various locations. These seedlings often carry incipient infestation that is usually not apparent at the time of purchase;
- planting up farms in stages, as resources become available. This results in staggered planting which provides unlimited food and encourages pest population build up throughout the season;

-
- carrying out panicle harvesting (leaving tall stems), particularly in early maturing crops. Many lepidopterous stem borer species complete development and infest late crops, or lie dormant in the stubble after harvest until the next planting season.

Biological control. Biological control in the traditional sense involves the use of parasitoids and predators in the control of pest populations. Parasitoids and predators of internal stem feeders exist in Africa. They include wasps (Order: Hymenoptera), flies (Order: Diptera), dragon flies (Order: Odonata), beetles (Order: Coleoptera), spiders (Order: Araneida) and mites (Order: Acarina).

Many of these natural enemies are known to have great potential as biological control agents, and work is going on in different parts of Africa to quantify their effectiveness.

Host plant resistance. Broadly, resistance implies that the plant is either not preferred by the pest (antixenosis), has an adverse effect on the pest's survival or reproduction (antibiosis) or yields well in spite of pest attack (tolerance).

Use of resistant/tolerant varieties is an effective, and cheap method of control which is also compatible with other control measures. Many rice varieties resistant to various stem borers have been developed and released in many African countries. The problem with resistant varieties, however, is that resistance tends to break down after several years, as pests develop populations that can attack formerly resistant varieties.

Chemical control. Use of insecticides to control internal stem feeders has not always been successful, because the borers are protected within the stem. Only systemic insecticides can penetrate and kill the borers within the stem tissue. However, majority of African farmers cannot afford these insecticides. Systemic insecticides may come in liquid or granular formulations.

Liquid formulations are generally applied as foliar sprays which also kill natural enemies of the pests. Pests are able to multiply unchecked as a result of the imbalance in the pest/enemy system. This leads to pest resurgence as well as creation of new pests.

Granular formulations of systemic insecticide are the only type of insecticides that are effective, because of their selective action. They are recommended for use only when necessary. Extreme precaution is needed because of their high toxicity. Granular formulations include Furadan (carbofuran) 3G at 20-25 kg/ha and Miral (isazofos) 5G at 10-15 kg/ha.

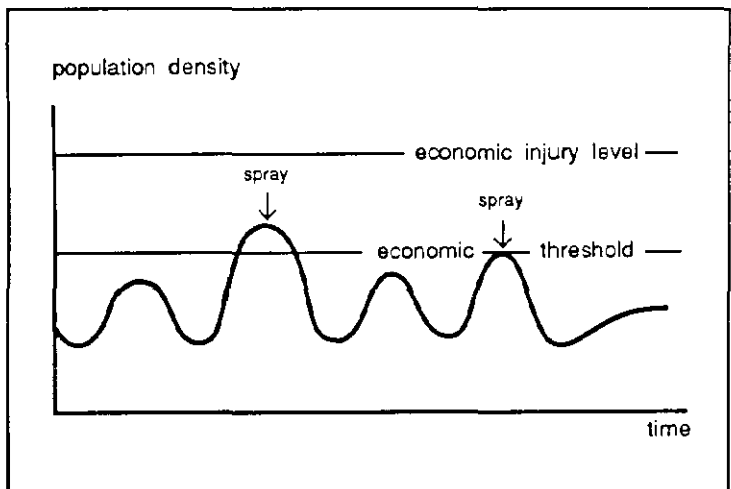
Integrated pest management. Integrated pest management (IPM) utilizes one or several control tactics in a compatible manner to keep pest populations below economic injury levels (EIL). Cultural, biological, and host plant resistance are emphasized in IPM, while selective insecticides are used only when pest populations reach the economic threshold (ET) (Figure 2). ET is the pest population that justifies the use of crop protection measures. EIL is the pest population that can cause economic damage.

With resistant varieties, good cultural and agronomic practices, and biological control, internal stem feeder

populations hardly reach ET, and there will be no need for chemical control.

Leaf feeders. Various leaf feeders have natural enemies (birds, parasites, predators, pathogens) that generally keep their populations below ET, particularly in fields where good cultural and agronomic practices are followed. Under some environmental conditions, populations of leaf feeders may rise above ET, requiring emergency control measures. Under such circumstances, less persistent, easily biodegradable contact insecticides can be used to avert economic loss. Some of those contact insecticides include Sevin (carbaryl), and Karate (lambda-cyhalothrin). Development of varieties resistant to various leaf feeders is in process. In Nigeria, lines have been identified that show resistance to the caseworm.

Figure 2. Economic threshold and economic injury level.



Plant suckers. Leafhoppers and plant hoppers are generally kept below ET by various natural enemies. Parasitoids attack eggs; predators attack both nymphs and adults. In addition to natural enemies, good cultural and agronomic practices help to keep populations below ET. Practices include early planting, using early maturing varieties, keeping farms weed-free, and judicious use of fertilizer.

Rice bugs are generally difficult to control. However, good cultural practices and biological control agents play an important role in controlling them. Eliminate grassy weeds from the farms, bunds and surrounding areas, and avoid staggered planting.

Parasitoids attack eggs of rice bugs, spiders prey on nymphs and adults, and pathogenic fungi attack both nymphs and adults. However, if rice bug populations reach ET, contact/systemic insecticide should be sprayed to avert economic loss.

Root feeders. Root feeders are generally controlled with insecticides.

Termites are better controlled at the source, i.e., in their galleries or mounds. This approach is economical and also limits the area treated with chemical toxicants.

Some termites make mounds above ground while others make extensive galleries underground. Within these mounds and galleries, the queen termite is the center of activity. Once dead, activity within the mound collapses and the mound dies.

Therefore, control measures should aim at the queen. Locate mounds, and galleries. Depending on the size, poison each mound with 2-5 tablets of aluminum phosphide (Phostoxin), and seal all visible holes in the mound with moist mud.

Alternatively, you may break the mound and treat with granular carbofuran or drench with chlonpyrifos. In countries that permit the use of organochlorine pesticides, drench broken mounds with dieldrin.

Seed treatment before planting helps to protect the seedlings from termite attack. Carbofuran easily controls mole crickets.

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8 Suggestions for trainers

If you use this Research Guide in training:

Generally:

- Distribute handouts (including this Research Guide) to trainees one or several days before your presentation, or distribute them at the end of the presentation.
- Do not distribute handouts at the beginning of a presentation, otherwise trainees will read instead of listen to you.
- Ask trainees not to take notes, but to pay full attention to the training activity. Assure them that your handouts (and this Research Guide) contain all relevant information.
- Keep your training activities practical. Reduce theory to the minimum that is necessary to understand the practical exercises.
- Use the questions on page 4 (or a selection of questions) for examinations (quizzes, periodical tests, etc.). Allow consultation of handouts and books during examinations.
- Promote interaction of trainees. Allow questions, but do not deviate from the subject.
- Respect the time allotted.

Specifically:

- Ask trainees about their experiences with rice pests in their area (10 minutes).
- Present the content of this Research Guide considering the study materials listed on page 3 (45 minutes). You may photocopy the illustrations in this Research Guide on transparencies for projection with an overhead projector. Show color slides and overhead transparencies whenever appropriate.
- Have real samples of adults, eggs, larvae and pupae of the important pests, infested plants and equipment so that each trainee can see .
- Conduct the practicals suggested on page 3 in groups (3-4 trainees per group; 2 hours). Make sure that each trainee has the opportunity to practice. Have resource persons available for each group and practical.

Organize your practicals/demonstrations well. Keep trainees busy. Prevent trainees from scattering around the field.



International Institute of Tropical Agriculture (IITA)

Institut international d'agriculture tropicale (IITA)

Instituto Internacional de Agricultura Tropical (IITA)

The International Institute of Tropical Agriculture (IITA) is an international agricultural research center in the Consultative Group on International Agricultural Research (CGIAR), which is an association of about 50 countries, international and regional organizations, and private foundations. IITA seeks to increase agricultural production in a sustainable way, in order to improve the nutritional status and well-being of people in tropical sub-Saharan Africa. To achieve this goal, IITA conducts research and training, provides information, collects and exchanges germplasm, and encourages transfer of technology, in partnership with African national agricultural research and development programs.

L'Institut international d'agriculture tropicale (IITA) est un centre international de recherche agricole, membre du Groupe consultatif pour la recherche agricole internationale (GCRAI), une association regroupant quelque 50 pays, organisations internationales et régionales et fondations privées. L'IITA a pour objectif d'accroître durablement la production agricole, afin d'améliorer l'alimentation et le bien-être des populations de l'Afrique tropicale subsaharienne. Pour atteindre cet objectif, l'IITA mène des activités de recherche et de formation, divulgue des informations, réunit et échange du matériel génétique et encourage le transfert de technologies en collaboration avec les programmes nationaux africains de recherche et développement.

O Instituto Internacional de Agricultura Tropical (IITA) é um centro internacional de investigação agrícola pertencendo ao Grupo Consultivo para Investigação Agrícola Internacional (GCIAI), uma associação de cerca de 50 países, organizações internacionais e regionais e fundações privadas. O IITA procura aumentar duravelmente a produção agrícola para melhorar a alimentação e o bem-estar das populações da África tropical ao sul do Sahara. Para alcançar esse objetivo, o IITA conduz actividades de investigação e treinamento, fornece informações, reúne e troca material genético e favorece a transferência de tecnologias em colaboração com os programas nacionais africanos de investigação e desenvolvimento.