CABI plantwise

CABI PEST AND DISEASE PHOTOGUIDE TO

Rice disorders

KNOWLEDGE FOR LIFE

Introduction

This photo booklet has been produced by the CABI-led **Plantwise** programme (www.plantwise.org) to aid extension officers and other plant health advisors in diagnosing the most common pests, diseases and abiotic problems of coffee around the world. The symptoms presented on a real plant sample can be compared with the photos in this guide to identify possible causes.

The booklet is organized into two broad sections, one showing the common insect pests that attack the crop and the other showing the various symptoms of poor health. In the symptoms section, the images are arranged by plant part, with similar-looking symptoms displayed together. Some biotic and abiotic factors cause more than one type of symptom, so there may be multiple images in different parts of the photo booklet for a specific problem. The photos for a particular problem are cross-referenced to make it easy to find all the relevant photos.

Contents

Rice leaf folder

Cnaphalocrocis medinalis

Photo: IRRI

- Larvae are slender, yellowish-green caterpillars with brown heads; 1-25 mm long.
- Eggs are yellow and flat, laid singly or in pairs on young leaves.

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Stem borer

Scirpophaga, Chilo, Sesamia species

Photo: IRRI

- Larvae are pale caterpillars, 2-3 cm long, often with a black head capsule and black plate behind the head.
- Species shown: *Scirpophaga incertulas*

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Rice skipper

Pelopidas mathias and *Parnara guttata*

Photo: IRRI

- Larvae pale green to yellow-green, with pink-red stripes on head.
- Body about 40 mm long when mature.
- Larvae eat large sections of leaf, often to the midrib.
- Lays singular, white spherical eggs on leaf blades.

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Armyworm

Spodoptera litura

Photo: IRRI

- Immature larvae are pale green to dark green caterpillars; mature larvae are brown with three yellow lines and a row of black dots on each side, plus a row of dark triangles each side of a central line.

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Zigzag leafhopper

Recilia dorsalis

Photo: IRRI

- Slender, wedge-shaped insects, yellowish brown (both nymphs and adults) with zigzag longitudinal bands on their backs.
- Causes dry leaf tips, orange, curled leaves and can transmit viruses.
- White eggs, laid singly in the sheaths.

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Green leafhopper

Nephotettix malayanus and *N. virescens*

Photo: IRRI

- Slender, wedge-shaped insects. Nymphs are yellow or pale green with or without black markings. Adults are pale green, 3-5 mm long, with black spots on wings and black wing tips.
- Eggs white or pale yellow, laid inside leaf sheaths or midribs.

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Planthoppers

Nilaparvata lugens and *Sogatella furcifera*

Photo: IRRI

- Small brown insects. Adults can be fully winged or short winged, 2-3 mm long.
- Eggs laid in batches of about 200 inside the leaf sheath.

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Armyworm

Spodoptera litura

Photo: D Hobern, Flickr

- Brown moth, 15-20 mm long, forewings grey to reddish-brown with a complex pattern of creamy streaks and paler lines along the veins; hindwings greyish-white with greyish-brown margins.

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Rice skipper

Pelopidas mathias and *Parnara guttata*

Photo: Troup Dresser, Flickr

- Orange-brown butterfly, have brown wing markings, a relatively large head and with balls on the ends of their feelers (antennae).
- Lays singular, white spherical eggs on leaf blades.

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Stem borer

Scirpophaga, Chilo, Sesamia species

Photo: IRRI

- Light brown moth with silvery scales, often with small black dots at the terminal margin of each front wing.

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Rice leaf folder

Cnaphalocrocis medinalis

Photo: IRRI

- Small, orange-brown moths, 8-10 mm long.
- Wings have several dark wavy lines and a darker band on the outer edge.
- Adult moths often fly by day.

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Rice caseworm

Nymphula depunctalis

Photo: IRRI

- Small white moth with semi-transparent wings.
- There are faint brown zig-zag lines and two black, marks on each forewing.

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Green stink bug

Nezara viridula

Photo: M Consollo, Flickr; H Pilcher USDA, Bugwood

- Shield-shaped insect, bright green in colour with reddish or black eyes and approximately 15 mm long.
- Female lays 30-130 eggs (insert) in an egg mass on underside of leaves.
- Infested grains do not fill completely, they shrivel and become covered with brownish spots.

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Black bugs

Scotinophara spp.

Photo: IRRI

- Shield-shaped, shiny insects, adults about 10 mm long, brownish-black to black.
- Larvae are light brown, small, tick-shaped.
- Eggs laid in clusters on the basal parts of plant, near the water surface.

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Rice hispa

Dicladispa armigera

Photo: IRRI

- Small beetles, 5.5 mm long, shiny, blue-black, with spines on its back.
- Larvae are tiny, flat, creamy white to pale yellow and without legs.
- Eggs are laid singly, embedded in the lower side of the leaf.

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Rice bug

Leptocorisa oratorius and *L. acuta*

Photo: G Bohne, Flickr

- Slender, brown-green insects (adults and nymphs), feed on developing rice grains.
- Eggs oval, shiny, reddish brown, often laid at leaf midrib.
- Causes the rice grains to not fill properly.
- Can produce an offensive smell.

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Rice stem gall midge

Orseolia oryzae (similar insect shown)

Photo: USDA, Bugwood.org

- Small, fragile insects with long legs, brown body, black eyes and long segmented feelers (antennae).
- They look a bit like mosquitoes.

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Rice thrips

Stenchaetothrips biformis

Photo: IRRI

- Very small, slender insects, larvae translucent to pale yellow, adults are dark brown.
- Winged and wingless forms. Winged form has two pairs of elongated narrow wings that are fringed with long hairs visible with a hand lens.
- Eggs are cream-coloured and laid singly.

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Rice mealybug

Brevennia rehi

Photo: IRRI

- Pale-yellow to red, oval shaped, soft-bodied insect, covered in a waxy material.
- Eggs range from a glassy looking to yellow-pink.

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Panicle rice mite

Steneotarsonemus spinki

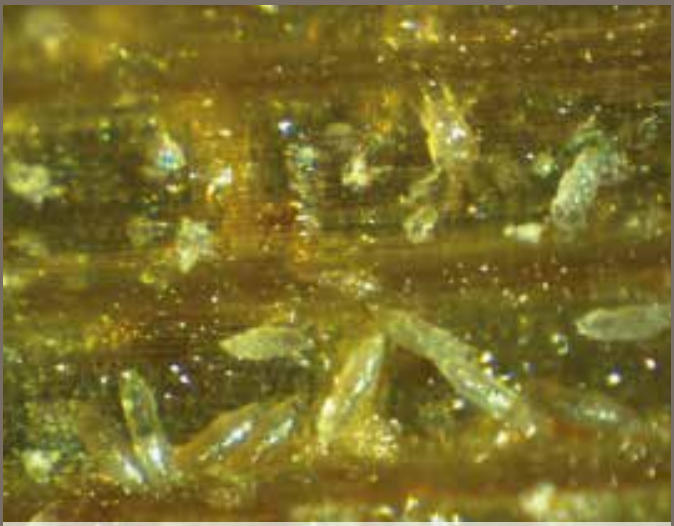

Photo: Natalie Hummel, Louisiana State University AgCenter, Bugwood.org

- Extremely tiny white "glassy" slow moving mites.
- A 20x hand lens is required to see them as they are very tiny.
- They are only a quarter of a millimeter long and are generally found inside the leaf sheath.

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Mole cricket

Gryllotalpa orientalis

Photo: IRRI

- Adults about 30-50 mm long, brown, with small eyes and shovel-like legs (for burrowing).
- Nymphs are tan in colour, similar in form to adults and live in the soil, near to the roots.
- Feeds on seeds, tillers and roots; cuts plants at the base.

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Armyworm damage

Spodoptera litura

Photo: IRRI

- Larvae chew/consume leaves, sometimes consuming whole plant.
- Skeletonised leaves leaving them tattered.
- They can cut seedlings at base of plant.

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Rice leaf folder damage

Cnaphalocrocis medinalis

Photo: IRRI

- Larvae fold leaves into a tube.
- Whitish streaks appear where the larvae feed.
- Leaf tips are sometimes fastened to the basal part of leaf.

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Rice caseworm damage

Nymphula depunctalis

Photo: H Maxwell-Lefroy, Wikimedia.org

- Leaf tips cut at right angles to make leaf cases for larvae.
- Rice leaves have a papery, upper epidermis, sometimes skeletonised.
- Larvae leaf cases can often be found floating on the water's surface.

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Rice mealybug damage

Brevennia rehi

Photo: IRRI

- Leaves turn yellowish and curl; plants appear wilted and stunted.
- Common on upland rice.

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Bacterial Blight

Xanthamonas oryzae pv. *oryzae*

Photo: IRRI

- Water-soaked yellow-orange lesions, often with wavy margins.
- Lesions progress towards the leaf base and may produce a bacterial ooze.
- Leaves may turn grey-green and roll up, may also turn yellow and wilt.
- Whole seedlings may dry up and die.

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Planthopper damage

Nilaparvata lugens and *Sogatella furcifera*

Photo: W M Brown Jr, Bugwood.org

- Leaves initially turn orange-yellow before becoming brown and dry (a condition called ‘hopperburn’).

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Rice thrips damage

Stenchaetothrips biformis

Photo: IRRI

- Leaves have silvery streaks and/or yellowish patches.
- The leaf surface develops a silvery sheen and appears translucent.
- Leaf curl from the margin to the middle.

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Rice tungro bacilliform virus

RTBV

Photo: IRRI

- Leaves turn yellow and orange-yellow and growth is stunted.
- Tiller numbers are reduced.
- Seed head with no grain or only partly filled grains develop.
- Transmitted by leafhoppers.

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Rice stripe virus

RSV

Photo: IRRI

- Lesions appear as tiny yellow and orange spots; as they age they become orange vertical stripes.
- Infected areas become necrotic and develops a blight appearance.

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Bacterial leaf streak

Xanthamonas oryzae pv. *oryzicola*

Photo: IRRI

- Small water-soaked lesions on leaves, limited by veins; translucent when held against light.
- Dark green to light brown/yellowish streaks on leaves.
- Leaves turn brown and die when severe.
- Yellow droplets of bacterial ooze may be seen on the leaf surface in the morning.

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Narrow brown leaf spot

Cercospora janseana

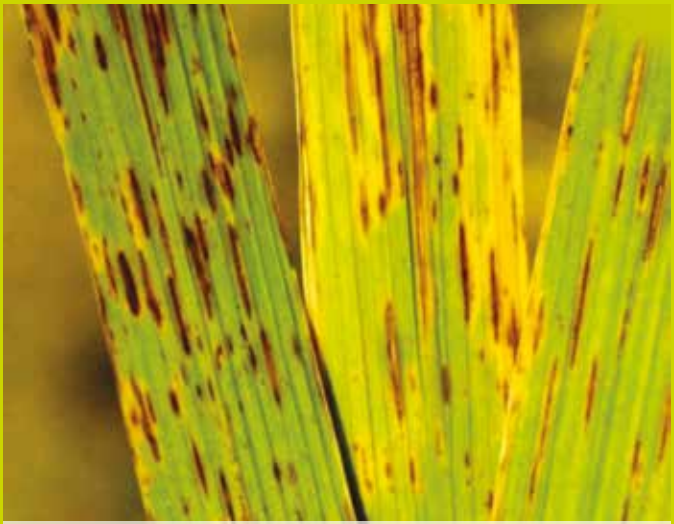

Photo: D Groth, Bugwood.org

- Linear lesions on leaves, light to dark brown, progressing parallel to the veins.
- Lesions enlarge and join together (coalesce), forming brown linear necrotic regions.
- Discolouration on sheath, net like pattern of brown to yellow areas ('net blotch').

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Brown spot

Drechslera oryzae

Photo: D Groth, Bugwood.org

- Young leaves develop small, circular, dark-brown to purple-brown lesions.
- As lesions age they can become more oval, with a light brown to grey centre and a reddish brown margin.

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FUNGUS

Rice blast

Magnaporthe oryzae

Photo: IRRI

- White to grey-green lesions on young leaves, with dark green borders; older lesions elliptical or spindle-shaped with white to grey centres and necrotic borders.
- Lesions enlarge and (join together) coalesce, sometimes covering entire leaf.

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Scald

Microdochium oryzae

Photo: IRRI

- Oblong lesions with light brown halos on mature leaves, can sometimes cover entire leaf.
- Translucent leaf tips and margins.
- Leaves dry out and appear scalded.

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False smut

Ustilaginoidea virens

Photo: S Nelson, Flickr

- Grains become a mass of spore balls, initially appear orange but turning greenish black.
- Chalkiness of grains and reduction in grain weight are common.
- Reduced seed germination.

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Brown rot

Pseudomonas fuscovaginae

Photo: IRRI

- Rotten grains develop in the growing panicle.
- Grains deformed and/or empty.
- Entire leaf sheath necrotic and dry; panicle withers.
- Seed-borne disease.

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Rice blast

Magnaporthe oryzae

Photo: IRRI

- Lesions on the neck are greyish brown and can cause girdling, making the neck and the panicle fall over.
- When this occurs plants develop few or no grains.

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Rice hispa damage

Dicladispa armigera

Photo: IRRI

- The insect scrapes the upper surface of the leaf blade leaving only the lower surface layer.
- Tunnels sometimes observed through the leaf tissues.
- Plants may lose vigour.

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Stem borer damage

Scirpophaga, Chilo, Sesamia species

Photo: S Nelson, Flickr

- Emerging panicles are whitish ('whiteheads'), partially filled and/or empty.
- Holes on tillers and stems; dried tillers; dead hearts; frass is sometimes seen.

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Rice blast (at neck)

Magnaporthe oryzae

Photo: S Nelson, Flickr

- Lack of grain formation if infection of neck before milky stage. If infection occurs later it can reduce grain quality.

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Black bugs damage

Scotinophara spp.

Photo: W M Brown Jr, Bugwood.org

- Reddish-browning of leaves, known as ‘bug burn’ (very similar to ‘hopper burn’).
- Whiteheads; empty grains; general stunting of plant.
- The insect often found at the base of stems rather than on leaves.

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Rice stem gall midge damage

Orseolia oryzae

Photo: www.mcdonaldbd.com

- Silvery-white, hollow cavities or tubular galls formed at the base of the tiller.
- Inhibited growth of leaves and failure to produce panicles.
- Elongated leaf sheaths (known as ‘onion leaf’ or ‘silver shoot’).
- Stunted plants.

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Sheath rot

Sarocladium oryzae and *S. attenuatum*

Photo: IRRI

- Oblong or irregularly shaped lesions, grey or brown-grey centres with dark red-brown margins, start at uppermost leaf sheath enclosing the young panicles.
- Grain quality and yield reduced.
- Panicles rot and grains become discoloured.
- Can appear similar to damage from the rice sheath mite.

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Panicle rice mite damage

Steneotarsonemus spinki

Photo: Natalie Hummel, Louisiana State University AgCenter, Bugwood.org

- Mites cannot be seen without magnification they live between the leaf sheath and the stem.
- The feeding makes reddish to brown discolouration of the leaf sheath.
- Damage is often seen on inside sheaths when the outer sheath is removed. They also feed wtihin developing grains.
- They may help to spread fungal diseases.

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Rice sheath blight

Rhizoctonia solani

Photo: IRRI

- Oval or ellipsoidal greenish-grey lesions on leaf sheath, usually 10-30mm long, initially just above the soil or water level.
- Lesions multiply and progress to the upper parts of the plant.

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Rice blast (at node)

Magnaporthe oryzae

Photo: IRRI

- Blackish to grey-brown lesions at the nodes, sometimes in a banded pattern.
- Infected nodes can cause the stem (culm) to break.

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Stem rot

Magnaporthe salvinii

Photo: Donald Groth, Louisiana State University AgCenter, Bugwood.org

- Initial symptoms are small, irregular black lesions on outer leaf sheath, near water level. Lesions expand and tiny black and white sclerotia and mycelium visible around points of infection.
- Chalky grains develop along with unfilled panicles.
- Tiller death is common.

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Root knot nematode damage

Meloidogyne spp.

Photo: IRRI

- Root swellings (galls), sometimes hook-like.
- Leaves distorted and crinkled along the margins.
- Stunted plant growth; chlorosis; early flowering.

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