

CABI PEST AND DISEASE PHOTOGUIDE TO

Mango disorders

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

Sign or symptom	Box #
Insects and Mites	1–22
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Mango seed weevil (larvae)

Sternochetus mangiferae

Asia, Africa, Caribbean, S America, Oceania



Photo: www.agric.wa.gov.au

- Young larvae 1.5 mm long and slender (slim), with a white body, black head and no legs.
- Older larvae are up to 20 mm long and adopt a C-shape.
- Larvae (and pupae) develop inside the fruit.

Mango seed borer (larvae)

Deanolis albizonalis

Asia



Photo: L. Chandler, Biosecurity, Queensland

- Larvae, fat and shiny, with white and red bands and a black collar near the head.
- Creates a black entry hole.

Mango shoot caterpillar (larvae)

Penicillaria jocosatrix

Asia and Oceania



Photo: Ilse Schreiner, CABI

- Larvae are usually pale green, sometimes with tiny purple spots (up to 22 mm).
- Pupae are dark-brown, relatively rounded with no distinguishing lumps or bumps.
- Eggs usually laid on flowers, larvae eat young leaves.

Mango shoot caterpillar (adult)

Penicillaria jocosatrix

Asia and Oceania



Photo: Ilse Schreiner, CABI

- Head, thorax and abdomen are purple-brown.
- Underside of the thorax and legs are cream coloured.
- Forewings are dull purple with several darker stripes, including a dark-grey purple spot near the wing tip.
- Back wings are pale with a purple-grey border.

Mango seed borer (adult)

Deanolis sp.

Asia



Photo: Pest and Diseases Image Library, Bugwood.org

- Adult moth dark grey, no markings, 20 mm wingspan; eggs laid the at end of fruit.
- The mouth is prominent, and dense white scales on the top of the head appear as a diamond-shaped 'spot'.
- *Deanolis sublimbalis* is the species shown.

Mango seed weevil

Sternochetus mangiferae

Asia, Africa, Caribbean,
S America, Oceania



Photo: Wikipedia.org

- A short (7-10 mm long), compact insect, with a mouth.
- Body often covered in coloured scales, varying from reddish to greyish, sometimes with light markings.
- They don't fly a great deal and will generally stay close to fruit.
- Adults feed on leaves, young shoots and flower buds.

Mango tree borer

Batocera rufomaculata

Asia, Caribbean, African islands



Photo: Jvertman, Wikipedia.org

- Adult beetle 30-50 mm long; dark colour with fine greyish hairs; two red-orange spots on body and extremely long feelers (antennae).
- Larvae are cream coloured, no legs but with dark brown head; up to 10 cm long when fully grown.

Mango fruit fly

Ceratitis cosyra

Africa



Photo: E. Finkle, Flickr

- Adult a small fly, approx. 5 mm long, with yellowish body and wings; black spots on back, black and yellow stripes further down.
- Larvae creamy white, cylindrical shape, about 5 mm long.
- Eggs are small and white; laid in the fruit.

Gall midge

Erosomyia mangiferae

Asia, Caribbean, S America



Photo: Eric Coombs, Oregon Department of Agriculture, Bugwood.org

- Small, delicate insects, 1–3 mm long, with long legs.
- The head is dark with long segmented feelers (antennae), body is yellow and covered with fine hairs.
- They look a bit like mosquitoes.

Mango leaf hopper

Idioscopus nitidulus

Asia



Photo: C.A. Viraktamath, UAS, Bangalore

- Adult hopper light greenish-brown with black and yellow markings, shaped like triangle with a broad head.
- Body around 3-4 mm long.
- The insect hops (jumps) when disturbed.

Mango thrip

Scirtothrips mangiferae

Africa and middle east



Photo: Andrew Derksen, USDA-APHIS, Bugwood.org

- Very small (about 1 mm long), slim, insects; yellow body, pale feather-like wings.
- Eggs (extremely) small (0.2 mm long) and kidney-shaped.
- More commonly found on freshly emerged young leaves.

Striped mealybug

Ferrisia virgata

Worldwide



Photo: PaDIL

- Small, segmented, slow moving dusty white insects visible on leaves, young shoots. Live in colonies usually on young tissue.
- Unlike other mealybugs adult female has a pair of dark stripes on its back, long glassy wax threads, an obvious tail and produces a waxy powder.
- Narrower body shape than other similar mealybugs.

Citrus mealybug

Planococcus citri

Worldwide



Photo: Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

- Masses of small, segmented, slow moving insects with a dusty white coating.
- May be hidden under a hard outer layer of greenish-white fungus.
- Often whiter and more waxy than other similar mealybugs.

Mango mealybug

Rastrococcus invadens

Africa and Asia



Photo: Goergen, IITA Insect Museum, Cotonou, Benin

- Adult female body greenish-white, 3-4 mm long.
- Waxy filaments surrounding the body except for a bare area down middle or its back; waxy fingers longer at head and tail.
- Found on underside of leaf or at the tip of fruit.

Wax scale

Ceroplastes spp.

Worldwide



Photo: Mourad Louadfel, Bugwood.org

- Oval and flat, with a waxy covering; body 2-6 mm long; nymphs (young) resemble adults.
- Feelers (antennae), legs and mouthparts not visible from above.
- Adult females are permanently attached to plant.
- Adult males tiny, delicate, white-yellowish, with one pair of wings (rarely seen).

Fig wax scale

Ceroplastes rusci

Caribbean, Africa, S America, Asia



Photo: Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

- Egg shaped and flat, body 2-6 mm long; body red-brown, covered with thick red/greyish-white wax.
- Feelers (antennae), legs and mouthparts not visible from above.
- Adult females are permanently attached to plant.
- Adult males tiny, delicate, white-yellowish, with one pair of wings (rarely seen).

Green soft scale

Coccus viridis

Worldwide



Photo: Plutarco Echegoyen, OIRSA, Bugwood.org

- Egg shaped and flat, 3-5 mm long; shiny pale green colour with black U-shaped internal marking.
- Front end rounded with two black eye spots (need hand lens); rear end has distinctive groove.
- Feelers (antennae), legs and mouthparts not visible from above.
- Adults seen on leaves, twigs and fruits.

Brown soft scale

Coccus hesperidum



Photo: P. Taylor, CABI

- Egg shaped and flat, 3-5 mm long; yellow-brown or green-brown in colour with brown irregular flecks of colour; darkens with age.
- Feelers (antennae), legs and mouthparts not visible from above.
- Adults seen on leaves, twigs and fruits.

Armoured scales

Diaspididae

Worldwide



Photo: Charles Olsen, USDA APHIS PPQ, Bugwood.org

- Small, 1-3 mm long, with flattened plate-like cover over body; variety of colours and vary in shape from circular to teardrop.
- Feelers (antennae), legs not visible from above.
- Adults often found on underside of leaves, or on branches.

Armoured scales

Diaspididae

Worldwide



Photo: Lorraine Graney, Bartlett Tree Experts, Bugwood.org

- Small, 1-3 mm, long with flattened plate-like cover over body; variety of colours and vary in shape from circular to teardrop.
- Feelers (antennae), legs not visible from above.
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Mango scale

Aulacaspis tubercularis

Worldwide



Photo: Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

- Female circular, flat, thin, often wrinkled.
- Shed scale skin oval, yellowish-brown, with black ridge down the middle.
- Male scales smaller egg shaped and develop a white shell with three ridges.
- The young (nymphs) are deep bright brick red.

Mango scale

Aulacaspis tubercularis

Worldwide



Photo: T. Gitonga, Plantwise, CABI

- Scales found in clusters on leaves and fruits.
- Causes yellowing of leaves, leaf drop, poor growth, dieback of branches, fruit drop and marks on fruits.

Sooty mould

Various fungi

Worldwide



Photo: P. Taylor, CABI

- Dark growth on leaf surface; often grows on honeydew excreted by insects.
- Amount of fungal growth varies from a fine soot-like deposit to a thick sheet of growth.
- The photosynthetic area of the leaves is reduced and leaves die prematurely.

Powdery mildew

Oidium mangiferae

Worldwide



Photo: S. Nelson, Flickr

- Irregularly shaped spots and/or greyish, necrotic (dead) lesions, on leaves.
- Youngest leaves may be completely covered with fungal spores.
- Leaves are distorted and become dry.
- Possible early leaf fall.

Mango thrip damage

Scirtothrips mangiferae

Africa and middle east



Photo: S. Nelson, Flickr

- Thrips scrape the underside of the leaf, producing downwards curl and silvery sheen.
- Leaves turn brown and if infestation is severe may die.

Brown spot; Mango

Pestalotiopsis mangiferae

Asia



Photo: S. Nelson, Flickr

- Grey, irregularly shaped leaf spots, often with dark raised margins, may join up to form large patches of necrotic (dead) tissue; black fungal dots observed in lesion centres.
- Wounded, unhealthy or poorly managed trees will favour infection.

Cercospora leaf spot

Cercospora spp.

Caribbean and S America



Photo: Fred Brooks, University of Hawaii at Manoa, Bugwood.org

- Small brown to black spots on leaves, with yellow edges.
- Spots enlarge and join up, turning the leaf completely brown or grey; leaves might fall off.
- Brownish soft velvet-like growth sometimes seen on the underside of the leaf.

Anthracnose

Glomerella cingulata

Worldwide



Photo: S. Nelson, Flickr

- Infection starts as small, dark, angular to irregular spots on leaves; often join to form large necrotic areas which may crack.
- Humid, warm conditions favour infection.

Salt damage (from sea spray)

coastal regions



Photo: P. Taylor, CABI

- Discolouration and necrotic tissue near leaf edge.
- Can look similar to a fungal infection of the leaf, however no fungal structures will be seen.
- Higher risk when close to the sea.

Mango leaf blight

Macrophoma mangiferae



Photo: www.growables.org

- Small yellow spots on leaves, becoming larger, irregular and brown as disease progresses, sometimes with purple margins.
- Fungal material appears on underside of leaf.
- Disease appears in rainy season and remains dormant on bark of twigs of young trees or blighted leaves.

Gall midge damage

Erosomyia mangiferae

Asia, Caribbean, S America



Photo: P. Taylor, CABI

- Small dark raised blister galls, 3-4 mm long (galls often contain midge larvae).
- Small exit holes may be present on galls.
- Infested leaves might be attacked by secondary pathogens.
- Buds, shoots and young fruits can be affected.

Mango scab

Elsinoë mangiferae

Caribbean, Africa, Asia, Oceania



Photo: Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

- Wide range of symptoms on leaves, including brown scab-like lesions on the lower leaf surfaces, brown necrotic (dead) spots, elongated, dark lesions along main veins under the leaf.
- More common in the rainy seasons.

Bacterial black spot

Xanthomonas axonopodis (campestris) pv. *mangiferaeindicae*

Worldwide



Photo: S. Nelson, Flickr

- Small, watery spots on fruits, can cause premature fruit drop when infection is severe.
- Black and raised/flat spots on leaves with light coloured borders; spots turn grey and leaves may fall.
- Cracked twigs or stems.

Mango scab

Elsinoë mangiferae

Caribbean, Africa, Asia, Oceania



Photo: Dept. of Primary Industry & Fisheries, Northern Territory, Australia

- Small black-grey raised lesions on fruit.
- Lesions enlarge to form large, light-tan, lesions with cracked/cork-like centres; can resemble scar tissue caused by insect injury.
- Younger tissue is most susceptible.

Anthracnose

Glomerella cingulata

Worldwide



Photo: S. Nelson, Flickr

- Sunken, dark brown/black spots on fruit; can occur before and after picking; spots join up and fruit may rot.
- “Crocodile skin” symptoms on the skin, cracking and scarring, can cause fruits to develop wide, deep cracks.
- Premature fruit drop from trees.

Mealybugs

Pseudococcidae

Worldwide

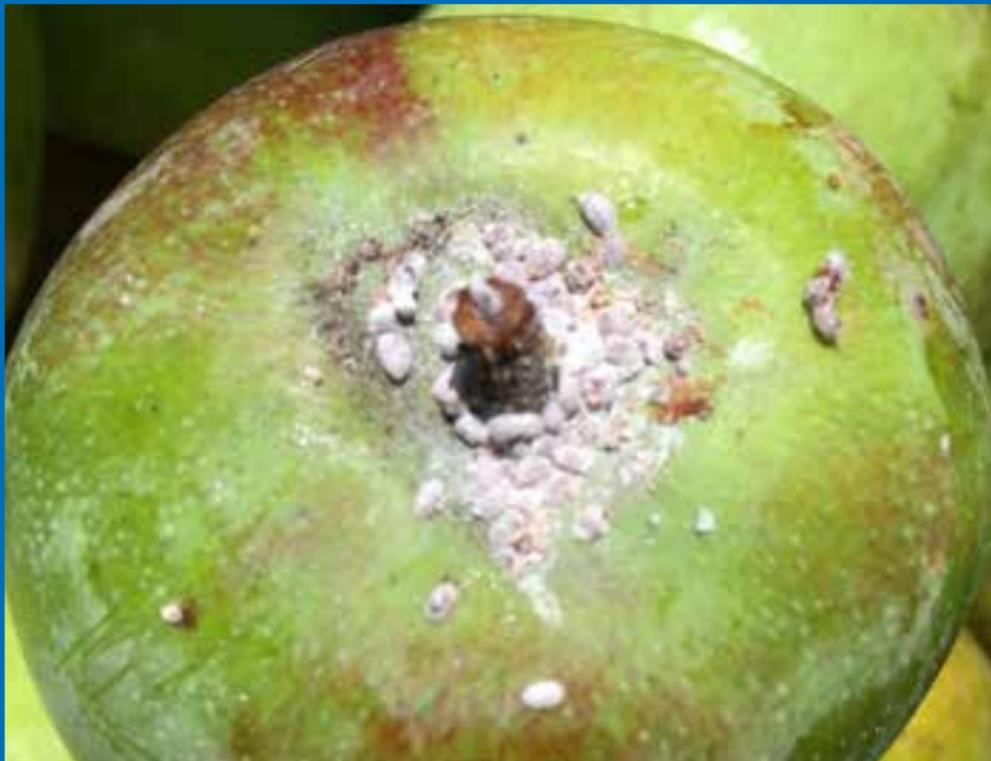


Photo: S. Nelson, Flickr

- Mealybug groups around the fruit stalk.
- Debris and frass (excrement) may accumulate in the area along with honey dew.

Mango seed weevil damage

Sternochetus mangiferae

Asia, Africa, Caribbean, S America, Oceania



Photo: Shamela Rambadan

- Larvae burrow into the seed creating hard tunnels inside, these may also be accompanied by rots.

Powdery Mildew

Oidium mangiferae



Photo: S. Nelson, Flickr

- Infected flower stalks become coated with whitish powder.
- Infected flowers eventually turn brown and dry, crumbling easily in the hand.
- Humid, warm conditions favour infection.

Anthracnose

Glomerella cingulata

Worldwide



Photo: S. Nelson, Flickr

- Infections on flower stalks appear as small brown or black spots which enlarge over time.
- Humid, warm conditions favour infection.

Mango leaf hopper damage

Idioscopus nitidulus



Photo: Eswara Reddy, esreddy-horticulture.blogspot.co.uk

- Leaf hopper sucks sap from shoots and flowers causing withering and shedding of flower buds and flowers and wilting and drying of shoots and leaves.
- Fruit setting can also be affected.

Mango malformation

Fusarium spp.

Asia and Oceania



Photo: Plutarco Echegoyen, OIRSA, Bugwood.org

- Misshapen shoots with short internodes and leaves that easily snap.
- Flower stems or flower stalks are thickened and highly branched, producing up to 3 times the normal number of flowers.
- Symptoms often more severe on younger trees.

Pink disease

Erythricium (Corticium) salmonicolor (symptoms on Coffee)

Worldwide



Photo: Chris Prior, CABI

- Tips of twigs and branches become yellow and leaves on the branches are wilted and dead (necrotic), giving a burnt appearance to affected plant parts. A pink fungal layer forms on the underside of branches.
- In severe attacks a thick layer of material may grow right around the main stem and the plant may die.

Mango crown gall

Agrobacterium tumefaciens

Worldwide



Photo: S. Nelson, Flickr

- Large swellings with a rough feel and look to them.
- Can become very large.
- Often occurs at soil level in young trees but may be found much higher up.

Mango sudden decline

Ceratocystis fimbriata

Worldwide



Photo: S. Nelson, Flickr

- Amber coloured gum from bark of branches or trunk.
- Wood under the surface becomes discoloured, firstly blue-grey then chocolate brown.
- Part or all of the tree may wilt.

Contact us

Africa

Ghana

CABI, CSIR Campus, No. 6 Agostino Neto Road
Airport Residential Area, P. O. Box CT 8630, Cantonments
Accra, Ghana

T: +233 (0)302 797 202

E: westafrica@cabi.org

Kenya

CABI, Canary Bird, 673 Limuru Road, Muthaiga,
PO Box 633-00621, Nairobi, Kenya

T: +254 (0)20 2271000/20

E: africa@cabi.org

Zambia

CABI, 5834 Mwange Close, Kalundu,
P.O. Box 37589, Lusaka, Zambia

T: +26 (0) 967619665

E: southernafrica@cabi.org

Contact us

Americas

Brazil

CABI, UNESP-Fazenda Experimental
Lageado, FEPAF (Escritorio da CABI)
Rua Dr. Jose Barbosa de Barros 1780
Fazenda Experimental Lageado
CEP:18.610-307
Botucatu, San Paulo, Brazil

T: +5514 38117670

E: y.colmenarez@cabi.org

Trinidad & Tobago

CABI, Gordon Street, Curepe
Trinidad and Tobago

T: +1 868 6457628

E: caribbeanLA@cabi.org

USA

CABI, 745 Atlantic Avenue
8th Floor, Boston,
MA 02111, USA

T: +1 (617) 682-9015

E: cabi-nao@cabi.org

Contact us

Asia

China

CABI, Beijing Representative Office, Internal Post Box 56
Chinese Academy of Agricultural Sciences
12 Zhongguancun Nandajie, Beijing 100081, China

T: +86 (0)10 82105692

E: china@cabi.org

India

CABI, 2nd Floor, CG Block, NASC Complex, DP Shastri Marg
Opp. Todapur Village, PUSA, New Delhi – 110012, India

T: +91 (0)11 25841906

E: cabi-india@cabi.org

Malaysia

CABI, PO Box 210, 43400 UPM Serdang, Selangor, Malaysia

T: +60 (0)3 89432921

E: cabisea@cabi.org

Pakistan

CABI, Opposite 1-A, Data Gunj Baksh Road
Satellite Town, PO Box 8, Rawalpindi, Pakistan

T: +92 (0)51 929 2064/2063

E: sasia@cabi.org

Contact us

Europe

Switzerland

CABI, Rue des Grillons 1
CH-2800 Delémont,
Switzerland

T: +41 (0)32 4214870

E: europe-CH@cabi.org

UK

CABI, Nosworthy Way
Wallingford, Oxfordshire
OX10 8DE, UK

T: +44 (0)1491 832111

E: corporate@cabi.org

UK

CABI, Bakeham Lane
Egham, Surrey
TW20 9TY, UK

T: +44 (0)1491 829080

E: microbiologicalservices@cabi.org

E: cabieurope-uk@cabi.org