

FARMERS' FRIENDS AND COTTON PESTS

Identification Guide for Ethiopian Cotton Fields



**PESTICIDE ACTION NETWORK UK
AND PAN ETHIOPIA**

Not all bugs in the cotton field are bad!! Many of them are friends of the farmer because they feed on pests like aphids or bollworms.

Take advantage of this free pest control service from nature and get to know the good bugs in your fields.

This pocket guide will help you recognise some of the most common ‘Farmers’ Friends’ in Ethiopian cotton fields. It also shows cotton pests observed most often in the southern Rift Valley.

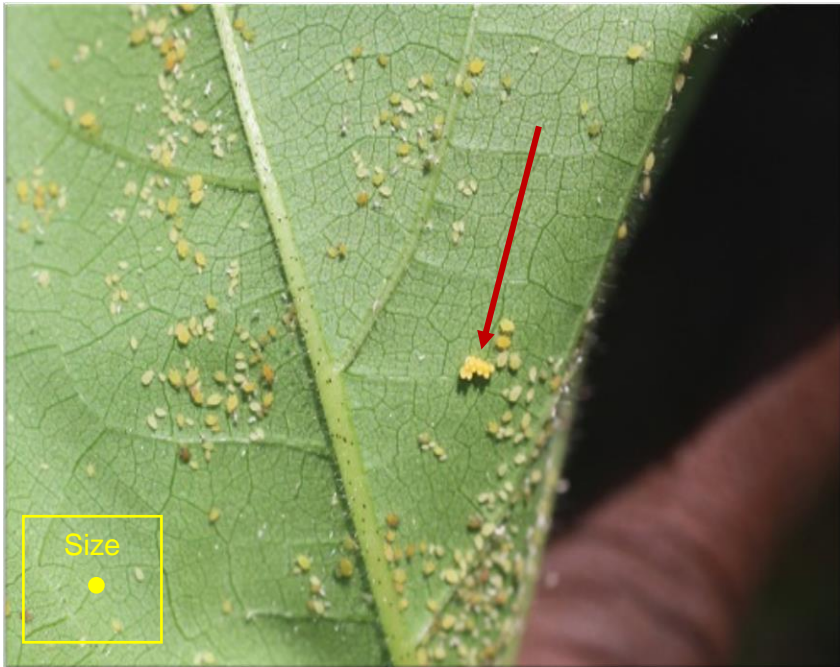
Note: Many photos in this booklet have been magnified so you can see each insect in detail. To give you a better idea of the approximate size of each insect, look at the yellow circles.

FARMERS' FRIEND

Ladybird Beetle

These are very common and easily spotted farmers' friends.

The female ladybird beetle lays clusters of yellowish eggs, shaped like cigars, often near colonies of aphids.



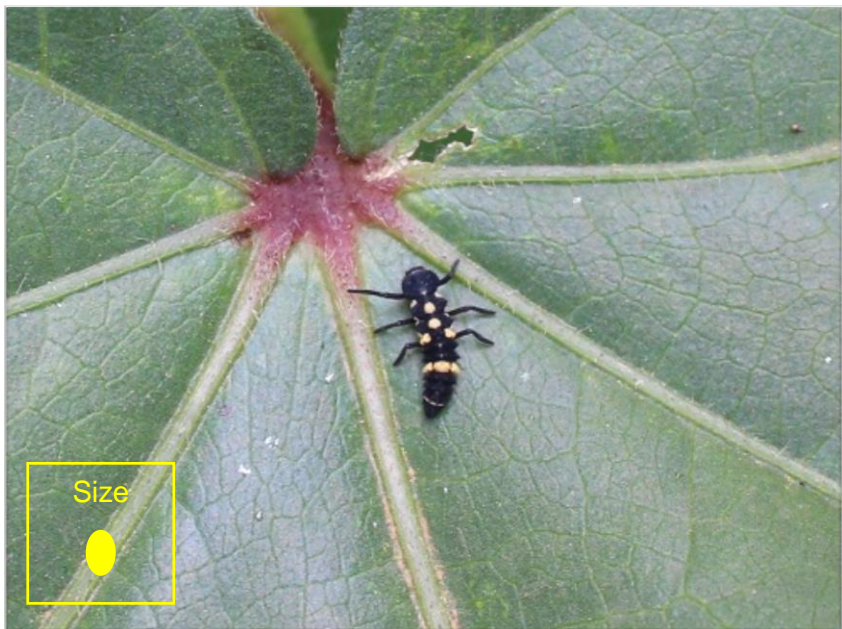
Ladybird eggs (surrounded by aphids).

FARMERS' FRIEND

Ladybird Beetle

Look out for the ladybird larvae, which look like tiny 'crocodiles'.

The adults and their young stage (larvae) are predators, feeding on small, soft-bodied prey, such as aphids, whitefly, small caterpillars, scale insects, mealybugs and bollworm eggs.



Ladybird larva

FARMERS' FRIEND

Ladybird Beetle

You may also find their cocoons, when they are turning into the adult form, stuck onto the leaf surface.

DID YOU KNOW?

A single ladybird may eat up to 300 aphids in its lifetime.



Ladybird cocoon underneath leaf.

FARMERS' FRIEND

Ladybird Beetle

There are several types of ladybird beetle, with different colour patterns.



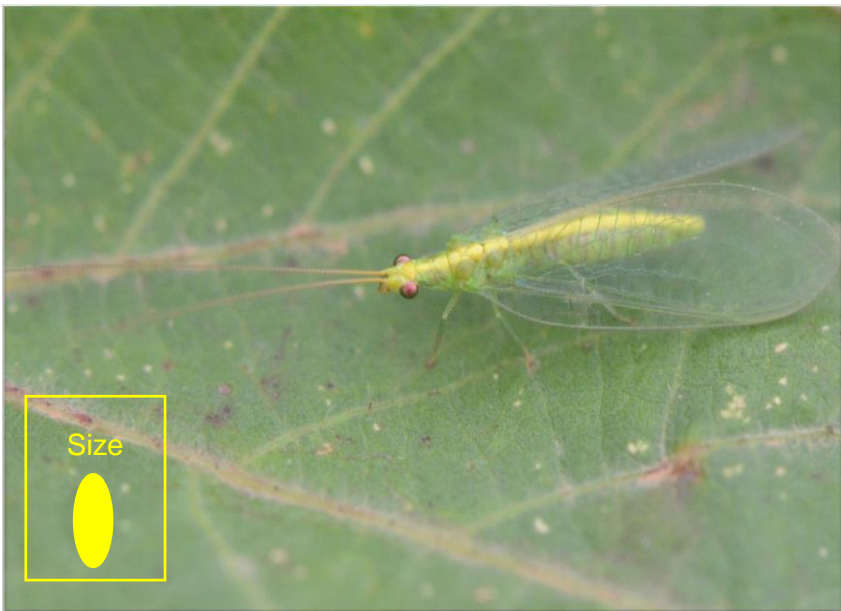
Adult ladybirds.

FARMERS' FRIEND

Lacewings

The adults are delicate creatures. They are either green or brown in colour, with long antennae, large eyes and long, transparent wings.

They feed mainly on nectar and pollen.



Adult lacewing.

FARMERS' FRIEND

Lacewings

Their larvae do the pest control work, using their curved mouthparts to puncture and suck out the body fluids of soft-bodied prey.

Some lacewing larvae hide themselves in a coat made from remains of their prey.



Lacewing larva in its protective 'coat.'

FARMERS' FRIEND

Lacewings

You may also notice the strange eggs of green lacewings, laid on a long stalk on the upper or lower sides of leaves.



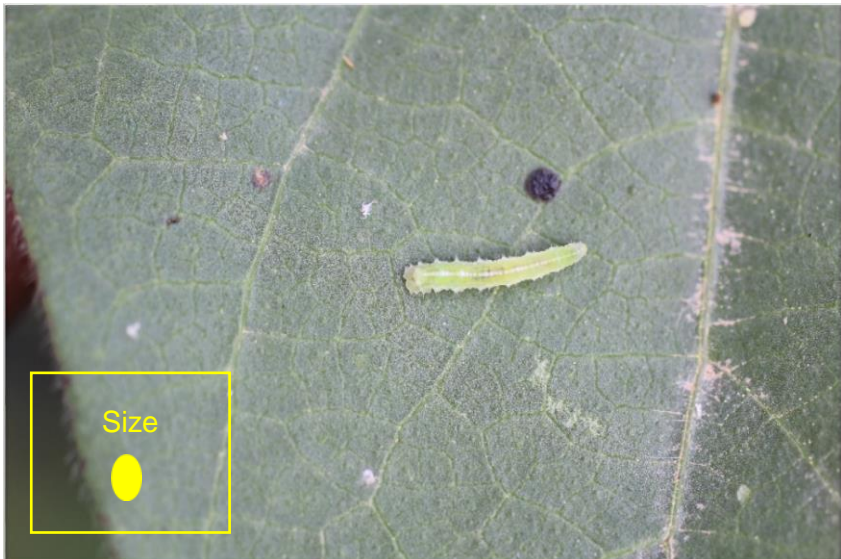
Lacewing eggs underneath a leaf.

FARMERS' FRIEND

Hoverflies

The larvae of hoverflies look like maggots, but they are effective predators, feeding on aphids, whitefly, leafhoppers, mealybugs and other pests and their eggs.

They are easy to miss when observing cotton plants because their greenish colour blends with the foliage and they tend to be more active at night.



Hoverfly larva on a leaf.

FARMERS' FRIEND

Hoverflies

Much more visible are adult hoverflies. These are small flies, brightly coloured, often striped. Some farmers call them 'helicopter' flies because of the way they move.

Adults feed on nectar and are often seen near flowers.



Adult hoverfly resting on a leaf.

FARMERS' FRIEND

Hoverflies

Hoverfly cocoons are tear-shaped.



Hoverfly cocoon.

FARMERS' FRIEND

Parasitic Wasps

Some types of wasp are helpful to the farmer because they are parasites on aphids, whitefly or bollworms. The adult females lay their eggs in or on their prey, which becomes the food for the wasp larvae when they hatch out.

Parasitic wasps are often very small and can be hard to observe in the field.



Parasitic wasp.

FARMERS' FRIEND

Parasitic Wasps

What you may notice more often are the dark, mummified corpses of whitefly that were parasitized by wasp larvae that have since turned into adults and flown away.

You can sometimes find the corpse of a bollworm consumed by wasp larvae, with exit holes cut by the wasps.



Exit holes of parasitic wasps in a ladybird larva corpse.

FARMERS' FRIEND

Praying Mantis

These common hunters wait patiently to jump on and devour larger moving prey, including bollworm caterpillars and adult moths, stainer bugs, flies and beetles.

They may eat some of the good bugs as well as the bad ones.



Young praying mantis.

FARMERS' FRIEND

Praying Mantis

Praying mantis have huge eyes, long antennae and keep their first pair of legs folded underneath their body until they attack.



Adult praying mantis.

FARMERS' FRIEND

Spiders

Many different types of spider live in and around cotton fields, feeding on a wide range of insects, including pests. Some types hunt their prey, others spin sticky webs to trap them.



Spiders are useful pest predators.

FARMERS' FRIEND

Predator Ants

Some types of ants are predators and will capture bollworm caterpillars and other pests, to take back as food to their nests. Other types are not useful to farmers because they 'shepherd' aphids, collecting the sugary fluid waste from the aphids' rear ends as food. These aphid-tending ants will drive away predatory insects like ladybirds. By watching ants closely in the field or capturing a few for close observation, you can work out which ones help to keep pests under control in the cotton crop.



Ant on cotton boll.

FARMERS' FRIEND

Others

Many other beetles and some bugs can be useful predators on cotton pests. There are also insect-eating birds, frogs, lizards and other animals.



Many types of beetles and bugs are useful predators.



Birds often keep pest numbers in check.

How can I tell if a bug is a farmers' friend?

A good way to find out whether an unfamiliar insect is helpful to the farmer is to capture it and place it in an 'insect zoo' to study:

1. use a clear, plastic food box as your study cage
2. make sure to also include some cotton leaves or small bolls with some pest prey, such as whitefly, jassids, aphids or bollworms
3. pierce a few very small holes in the lid to allow the air to circulate
4. keep the 'insect zoo' out of strong sunlight or heat and study it regularly over 2 or 3 days.

See if you can observe whether the unfamiliar insect is feeding on the cotton plant material or on the prey.

Many insects are neither helpful nor harmful - they may just be 'visiting' the cotton plant. Some might feed a little on cotton flower nectar or pollen but don't affect the cotton yield.

Give the good bugs a helping hand!

There are three ways you can help the Farmers' Friends in your cotton field:

1. Avoid spraying insecticides, especially early in the season.

Most insecticides (such as endosulfan, malathion, dimethoate and other chemicals) are very harmful to predator and parasitic insects, as well as the pests you want to control.

Spraying insecticides when the cotton plants are young is usually unnecessary and you may kill off the predators by mistake, just when you want them to start searching for prey.

DID YOU KNOW?

PAN Ethiopia field agents counted over 100 dead ladybirds in just 6 meters of cotton plants, two days after a smallholder field was sprayed with malathion.

Give the good bugs a helping hand!

2. Provide dense foliage and flowering plants

Farmers' Friends thrive when there are plenty of shrubs, hedges and wild plants around the fields, where they can shelter, feed and breed.

Planting four rows of maize as borders to the cotton field and before the cotton is sown provides some shelter from the sun and heat for predatory insects when the cotton plants are still small. Leave some flowering weedy plants at field edges so that adult hoverflies, lacewings and parasitic wasps can feed on the nectar and pollen.

3. Attract more predatory insects into the cotton rows

Arba Minch farmers have had great results by spraying a 'food spray' prepared from fermented ground maize to attract Farmers' Friends onto the crop when the cotton is at 4-6 true leaf stage. The smell from this 'food spray' brings ladybirds, lacewings and hoverflies into the cotton rows so they are 'ready and waiting' before the first cotton pests arrive.

Give the good bugs a helping hand!

Find out more about the **food spray method** by contacting:

Mr Bazezew and Mr Shambel
PAN Ethiopia Arba Minch branch
Bureau of Agriculture and Plant Health Clinic Office,
Arba Minch



Making food spray.

COMMON COTTON PESTS

African Bollworm

Adult moths are dull brown or beige in colour, with a noticeable darker spot in the middle of each of the front wings and a darkish border to the wings. The female moth lays tiny, single, round, yellow-white eggs on plant surfaces.

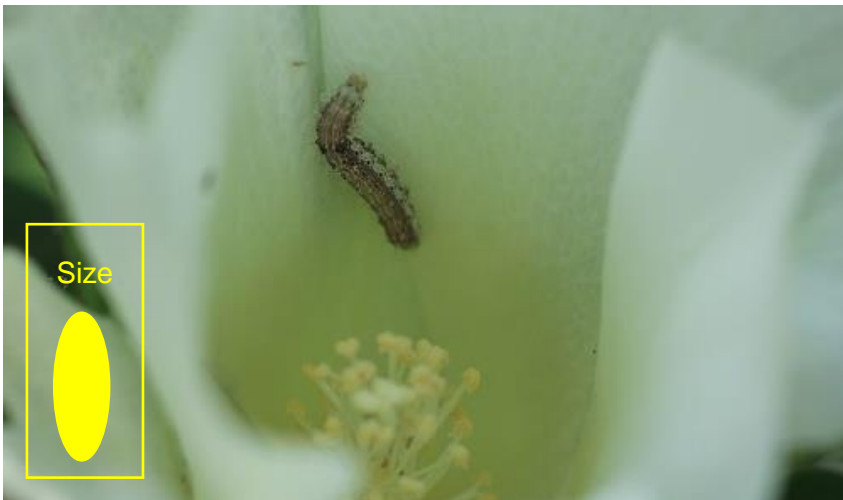


Adult African bollworm moth.

COMMON COTTON PESTS

African Bollworm

The colour of African bollworm caterpillars varies from greenish to brown or yellowish but they always have a pattern of wide, dark and light stripes along the body. The caterpillar feeds on cotton flowers, buds and developing bolls, often with its head and front parts hidden inside the boll. When the caterpillar is fully grown, it burrows into the soil or crop waste to slowly turn into the adult moth. During this process it is protected in a shiny brown cocoon.



African bollworm caterpillar inside a cotton flower.

COMMON COTTON PESTS

Aphids

Cotton aphids are greenish or yellow in colour. Only adults have wings and can fly from one plant to another. Aphids tend to live on the underside of cotton leaves, causing badly infested leaves to curl. They may also attack leaf buds and other growing points. Heavily infested leaves become sticky with the honeydew (sugary liquid) which aphids release as their waste. Aphids suck the plant sap but only cause serious damage if they reach very high levels.



An aphid colony.

COMMON COTTON PESTS

Flea Beetles

Adult flea beetles can vary in colour – yellowish-brown ones are common. They can jump like a flea when disturbed. The adults chew small holes in cotton leaves.

Flea beetle larvae live in the soil feeding on plant roots but cause no real damage to cotton.



Flea beetle.

COMMON COTTON PESTS

Leafhoppers (jassids)

Leafhoppers are small, slender greenish bugs with large pale eyes, living on the undersides of leaves. They hop away quickly when disturbed, often with a sideways movement. Both the young and the winged adult stages suck the plant sap.

Affected leaves can curl and go brown at the edges but in low to medium numbers leafhoppers are not generally a problem. In badly infested plants, many leaves may die and boll yield can be reduced.



Leafhopper young stage.

COMMON COTTON PESTS

Cotton Stainers

Cotton stainers are large, strikingly patterned bugs. The young stages are bright red and lack wings. Adults and young suck the sap of cotton plants and attack developing seeds, once bolls start to open. Stainer bugs reduce cotton quality by making the lint dirty with their waste and when dead bugs remain in the lint.



Adult cotton stainer.



Young stage of cotton stainer.

COMMON COTTON PESTS

Whitefly

The young stages of this small sap-sucking bug are creamy yellow or grey, and live in colonies on leaf undersides. The winged adults fly up as a cloud when the plant is disturbed. Infested leaves are often covered in pieces of dusty white material. Large numbers of whitefly can deform leaves and the sugary honeydew they release makes the cotton leaves and stems sticky. Black mould can grow on the sticky surface, affecting the plant's health. Some whiteflies can transmit harmful virus diseases to the plant.

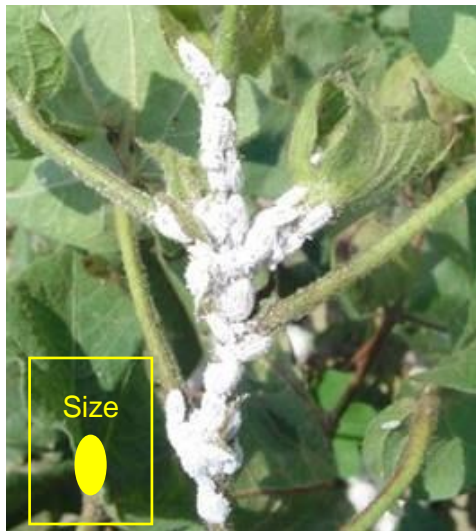


Whitefly colony. Credit: Robert Mensah

COMMON COTTON PESTS

Mealybugs

Mealybugs are small, flat insects, covered in powdery whitish material. They live in small colonies attached to the stems and branches of cotton plants or around fruits. Usually you notice only the wingless stages, which do not move much from their feeding site. Mealybugs suck plant sap and damage usually only comes from heavy infestations, which can cause leaves to drop and prevent good boll development. Large colonies can coat the plant surface with honeydew, leading to sooty mould, which affects the plant's ability to grow well.



Mealybugs.

COMMON COTTON PESTS

Pink Bollworm

The caterpillar of this bollworm is small and pinkish. It can attack cotton flowers, preventing them from opening properly. Look for 'rosette' flowers to see if this is happening. Pink bollworm usually feeds within the bolls, damaging the seeds, causing poor boll opening and staining the lint. They turn into the adult stage inside bolls left after harvest so it is important to take cotton stalks out of the field.



Pink bollworm. Credit: Mark Yokoyama

COMMON COTTON PESTS

Spiny Bollworm

The rough, spiny caterpillars of this bollworm attack shoot tips, flower buds and developing bolls. When they feed within the bolls, you may be able to see their waste plugging their entrance tunnel. They can move on to attack several bolls on the same plant, causing these to drop or rot inside. When fully grown, the Spiny bollworm forms its cocoon on the plant or in fallen bolls.



Spiny bollworm. Credit: www.infonet-biovision.org, A.M.Varela

COMMON COTTON PESTS

Semi-looper Caterpillar

These caterpillars are smooth, slim and greenish and feed on plant leaves. You may notice how they hold part of their body up in a loop. Some leaf damage is not a problem for cotton plants.



Semi-looper caterpillar. Credit: Graham Wise

COMMON COTTON PESTS

Cottony Cushion Scale

These scale insects live in colonies, like mealybugs, attached to plant stems, branches or on fruits, sucking the sap. They are flattish and white with noticeable ridges running along their body. They only become a problem in large numbers or when their honeydew waste attracts black mould or they contaminate the lint.



Cottony cushion scale. Credit: Mark Witwer

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