

Fall Armyworm

Quick Growers Guide

How to identify and manage fall armyworm in New Zealand.



CONTENTS

ABOUT FALL ARMYWORM	1
Worldwide Distribution	1
How do they spread?	1
Lifecycle	2
Eggs	2
Larvae	2
Pupae	3
Adults	3
SIMILAR SPECIES	4
Distinguishing Features	4
MONITORING	5
Crop Inspection	5
How to identify signs of infestation	6
Pheromone Traps	7
How they work	7
How to use a pheromone trap	7
IF YOU FIND FALL ARMYWORM	8

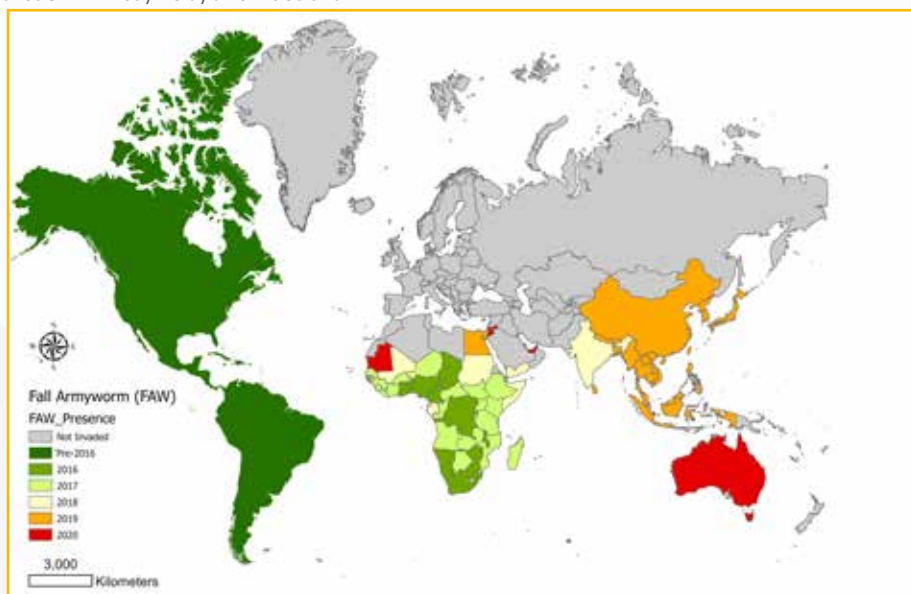
To report suspected pests or diseases call
0800 80 99 66

About Fall Armyworm

Fall armyworm (FAW; *Spodoptera frugiperda*) is a moth pest that feeds on over 350 plant species. Maize/corn are preferred hosts for FAW, however, other crops may also be affected including potatoes, tomatoes, capsicum, aubergines, and several Brassica species like cabbage.

Worldwide Distribution

FAW is native to the tropical and subtropical regions of the Americas. Since 2016, it has spread to areas in Africa, Asia, and Australia.



The pest was first detected in New Zealand in early 2022. Most finds have been in corn and maize crops, paddocks growing rye grass and in Chinese cabbage.

How do they spread?

FAW adults are moths which can travel up to 100km in a night during summer. They are excellent fliers and may migrate up to 500 km before laying eggs. Adults are also known to travel long distances on stormfronts.

Mature larvae can migrate when they reach the armyworm stage and migrate to adjacent crops. When in large numbers they consume nearly all vegetation in their path.

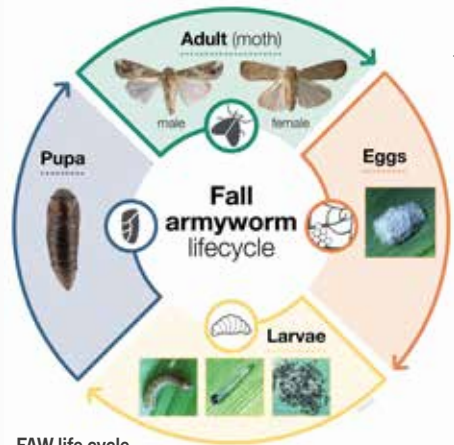


FAW adult.

Source: Dr Bertone, NCSU.

Lifecycle

FAW has four life stages: eggs, larvae (caterpillars), pupa and adults (moths). Their life cycle is temperature dependent and can take between 24 – 55 days to progress from eggs to adult. Some life stages won't happen if temperatures fall below 7– 10°C.



FAW life cycle.

Eggs



FAW egg mass.

After mating, females typically lay their eggs at night in clusters of 100 to 300 on the underside of leaves.

The maximum number of eggs a female can lay in a single night is approximately 2,000.

FAW egg masses are covered in a layer of white or greyish hairs, which can make them look furry or mouldy.

Larvae



Identifying features of mature FAW larvae. NZ one dollar coin included as scale for size.



FAW eggs hatch after two to four days, emerging as 6mm long larvae. Their appearance changes as they develop through their life cycle with mature larvae reaching between 30 and 36mm in length. When larval population numbers are high and uncontrollable, infestations can sometimes resemble an “army” as they move en masse from one location to another in search of preferred hosts.

Mature FAW larvae have several distinct features:

- Dark head with an upside down, pale Y-shaped marking.
- Four raised spots shaped like a trapezium on each body segment seen from above.
- Four spots forming a square on the second-to-last body segment.

Pupae

Once mature, larvae drop to the ground. The larvae develop into a reddish-brown pupa or cocoon, around 13 – 17 mm long. Development into a pupa takes place in soil, plant parts protected from the environment and predators, or in plant debris. This pupation stage lasts from eight to 30 days, depending on temperature. This stage is often difficult to observe.



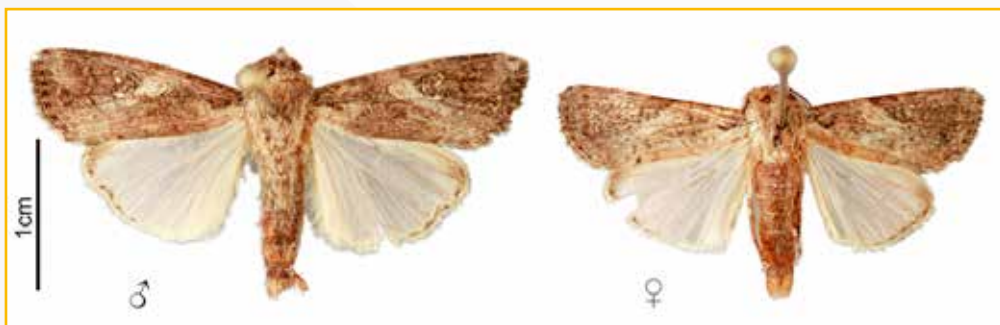
The reddish-brown FAW pupa.

Source: Dr Bertone, NCSU.

Adults

Following pupation, the adult FAW will emerge from the pupal case as a moth. This emerging behaviour occurs from two to three hours after sunset until about midnight.

FAW moths are 16 – 18 mm long with a wingspan of 38 mm. They have brown-grey forewings and cream-coloured hind wings. Adult moths are nocturnal and are most active during late summer and early autumn when populations are at their greatest.



FAW adult moths – male (left) and female (right)

Source: Biosecurity New Zealand Plant Health & Environment Laboratory).

Similar Species

Particularly in the larval stage, FAW can often be mistaken for closely related species. The most mistaken larvae are the Cosmopolitan armyworm (*Mythimna separata*), Tropical armyworm (*Spodoptera litura*), and Corn earworm (*Helicoverpa armigera*). All three species are found throughout the North Island.



Tropical armyworm.



Corn earworm.

Source: Stringfiver.

Distinguishing Features

- Tropical armyworm larvae have prominent black halfmoon markings running in two lines along the length of the back, two yellow lines running down each side of the back, and two yellow/white dots on the body segment behind the head.
- Corn earworm larvae can be many different colours. The body surface is rough with small spikes that are visible under a hand lens. The sides are dotted with circular black breathing holes.
- Cosmopolitan armyworm larvae are pale grey in colour with three white strips along the length of the body.



Cosmopolitan armyworm.

Source: Lucidcentral.

Monitoring

Early detection of FAW offers the best opportunity for effective management. Responding quickly to an infestation will reduce the chance of spread, and limit how much plant material they are able to consume.

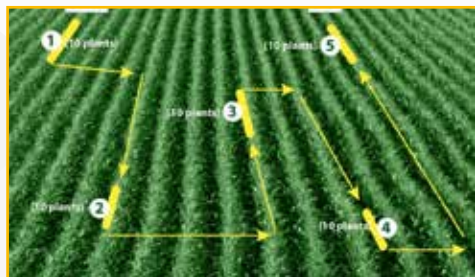
There are two main ways to monitor for and detect FAW:

1. Crop inspection.
2. Pheromone traps.

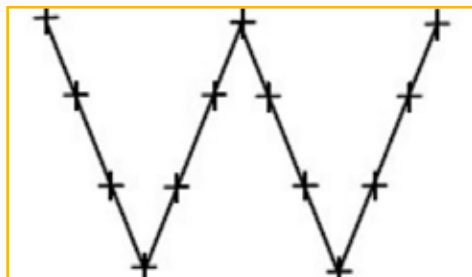
Crop Inspection

Plant inspections should be conducted regularly, starting from the seedling stage, using either the “along the row” or “W-shaped” methods.

- For crops planted in rows, use the “along the row” method, or search across rows diagonally.
- For crops planted in a solid block use a “W” shaped search pattern across the crop.



“Along the row” crop inspection method.



“W” crop inspection method.

For each method:

- Check 10 consecutive plants in a row and count the number of larvae per plant.
- Repeat this in at least five sites in the crop at intervals of 100 – 200m to ensure you have a good representation for the entire area.
- For large fields, increase the sites from five to 10.

How to identify signs of infestation

- The first sign of FAW infestation is usually the pin hole-like feeding marks by new larvae.
- These larvae typically only feed on the outside of one side of the leaf, causing damage which looks like small windows.
- As the larvae grow, feeding will cause larger holes right through the leaf.
- Once established in the whorl or plant interior, feeding will result in large, jagged holes. This creates a complete tear across the blade of the leaf.
- Severe infestation can cause defoliation, particularly when larvae are in the armyworm stage.
- On corn, larvae attack the ear, silks, cob, and kernels which reduces leaf mass, fruit, pods and seeds, and plant health.



FAW first instar larvae damage.

Source: Grains Research and Development Corporation Australia.



FAW larvae damage on sweetcorn.



Source: Biosecurity New Zealand

Pheromone Traps

Combining crop inspections with pheromone traps (which specifically attract FAW) increases the chances of detecting this invasive pest throughout its various life stages.

How they work

Pheromone traps have a lure inside that works by mimicking the natural chemical signals that FAW adults (moths) use to communicate with one another. Pheromone traps can be very sensitive, attracting insects present at very low densities. Pheromone traps only attract and capture male adults (moths) and cannot be used as a FAW control method.

How to use a pheromone trap

The traps should be placed either on the edge of the crop field or in an open area nearby. The trap should start about 1 – 1.5m off the ground and be moved higher (about 30 cm above the plant) as the plants grow. To increase opportunities for FAW detection, consider ensuring that the trap is:

- safe to access;
- close to preferred host plants;
- placed away from artificial lighting;
- not hidden in vegetation.

Pheromone traps need to be inspected weekly, and the lures and insecticide strips should be replaced regularly as per the manufacturer's guidelines.



Pheromone trap.



Example of suitable placement of FAW pheromone traps.

If you find Fall Armyworm

Farmers and growers should continue to keep a lookout for FAW on their properties. This will help with the long-term management of the pest.

If you suspect fall armyworm on your property, please contact your crop manager or industry group for the actions to take and advice on the best management options for your crops.

If FAW is found in volunteer crops, the following actions should be taken:

- spray the volunteers with any herbicide with an approved label claim, and follow-up by tilling to a minimum 10cm depth; or
- hand pull the volunteer plants and securely dispose of them if there are small numbers;
- mow or graze the field with the volunteer plants to remove the host material and starve the caterpillar;
- practice crop rotation for the next season;
- harvested maize/corn plants can be used for silage/balage; ensure that the host material is removed from site.

Disclaimer

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