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# TECHNICAL BROCHURE



## MANAGING FALSE CODLING MOTH

FOR PACKHOUSE STAFF AND MANAGERS



**COLEACP**

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## BACKGROUND

*Thaumatotibia leucotreta* (sometimes *Cryptophlebia leucotreta*) is commonly called False Codling Moth (FCM). Its caterpillars (larvae) attack more than 70 host plants, mainly in Africa. FCM primarily affects horticultural crops with fruit, pods and berries, such as beans, grapes, citrus, pepper, avocado, guava, pomegranate and ornamental plants. It also attacks macadamia, cotton, tea and a wide range of wild plants. However, it is particularly problematic on *Capsicum*, as female moths find the fruit attractive for egg-laying, leading to larvae being found inside the developing fruit.

In recent years, consignments of peppers from African, Caribbean and Pacific (ACP) countries to Europe have been intercepted due to the presence of FCM. The detection within a consignment of a single living individual of FCM at any stage of development leads to rejection of the whole consignment. This is because the European Commission (EC) includes FCM on its list of harmful organisms recommended for regulation as quarantine pests,<sup>1</sup> to prevent its introduction into Europe, where it could attack outdoor or glasshouse crops.

The European Union (EU) is also overhauling its plant health (phytosanitary) regulations. On 14<sup>th</sup> December 2019, a new plant health regulation (EU 2016/2031) came into operation, bringing rigorous new rules to prevent the introduction and spread of pests and diseases in the EU. This regulation takes a much more proactive approach, affecting both the European fruit and vegetable sector, and imports from third countries outside the EU.

Under the new regime, special measures have already been introduced for crops that are a known pathway into the EU for serious pests that could damage Europe's agriculture or environment. These measures include stringent new requirements covering the export of *Capsicum* to prevent the introduction of FCM and other pests.

The new rules stipulate certain conditions that exporting countries must meet before exports of *Capsicum* are allowed.<sup>2</sup> Meeting these new rules requires immediate and concerted action from producers, exporters and National Plant Protection Organisations (NPPOs). There is no room for complacency by any *Capsicum* exporting country. If there are any interceptions of these pests in exported *Capsicum*, the EU is expected to react and impose more stringent measures. The US authorities also consider that introduction of FCM could cause serious economic losses. This leaflet aims to help growers address the problem so that they can maintain access to European, US and other export markets.

Risk management must be carried out at all levels of the supply chain. Experience has shown that meeting the new EU rules requires effective dialogue and engagement between public and private sectors. All stakeholders must agree on the actions needed to ensure that exported *Capsicum* is free of the designated pests. This means identifying and agreeing on actions to be taken by private sector operators at all stages, from production to export. It also means agreeing to the responsibilities of the public sector authorities, in particular NPPOs.

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1 See <https://gd.eppo.int/taxon/ARGPLE> for more information.

2 For more detail see "[COLEACP guidelines on the export of \*Capsicum\* from Africa, Madagascar, Cape Verde, and Mauritius](#)".









# DEALING WITH FALSE CODLING MOTH - THE IMPORTANT STEPS

Along the supply chain a series of protective measures and checks should be put in place to ensure FCM is not present in exported produce. These cover six stages.

1. Farmers growing peppers for export should be registered by their NPPO.
2. Growers should monitor their fields for FCM and, when necessary, treatments should be applied. Growers must keep records of all monitoring and control operations, including: date, reason for applying pesticides, product applied, rate used, and pre-harvest interval. These records can be inspected by their NPPO.
3. Peppers should be inspected before they leave the farm. If even a single fruit with a larva is found, sale to an exporter should be stopped.
4. During transport to the packhouse, batches from individual farms/plots must be labelled and kept separate.
5. In the packhouse, each individual batch of peppers must be examined. Batches must be kept separate until they have been inspected and found to be clean, and only then can they be packed for shipment. The presence of even a single larva in a batch means that the batch must not be exported.
6. At the airport, phytosanitary inspectors must carry out official inspections. They should issue a phytosanitary certificate only if there is zero presence of larvae, insect frass or signs of infestation on the peppers. Each inspection involves a thorough visual examination of the consignment, and destructive dissection of approximately one fruit in every 100. Small samples should have at least five peppers cut open for assessment.

This leaflet is designed to help people working in packhouses to check, identify and remove any peppers that are affected so that no FCM is present in boxes sent for export.

# DESCRIPTION OF FALSE CODLING MOTH AND ITS LIFE CYCLE

			
<p>An adult moth, resting (7–10 mm long)</p>	<p>Actual size</p>	<p>The adult moth pinned (15–20 mm wingspan)</p>	<p>Actual size</p>
			
<p>The larva (caterpillar) can be up to 15 mm long and is pinkish with a brown head</p>	<p>Actual size</p>	<p>The pupa (5–7 mm long) can be found in the soil or in plant debris</p>	<p>Actual size</p>

Eggs are flat, oval discs (0.77 mm long by 0.60 mm wide) with a surface that feels slightly rough. When first laid they are white/cream coloured, and before hatching change to a reddish colour with a black head capsule.

Eggs take from 2 to 22 days to hatch, depending on temperature. They are very sensitive to cold and dry conditions. Temperatures below freezing over 2–3 days can kill the eggs.

The larvae go through five different stages. In the first stage they are 1–1.2 mm long and have a spotted appearance. By the fifth stage, live caterpillars are 12–18 mm long, orange-pink, with pale sides and yellow in the middle. At this stage a brown head capsule is visible.

When the larvae hatch, they burrow into the fruit, where they grow and complete their development. As they burrow through the rind/skin of the fruit, they make holes about 1 mm in diameter. The entrances to these holes are often the first sign of the pest because the larvae leave deposits of faeces (frass). Also, the skin around the hole becomes discoloured and brown. In some fruits, such as avocado, the entrance is marked by a raised crater.

If the fruit has a hard skin, the hole is made at the base where it is softer. When the fruit has a soft skin, such as citrus, peach or pepper, the larvae can burrow in almost anywhere. Larvae prefer the navel end of fruit, an injured area, or a cut in the skin.

The larvae develop inside the fruit; this can take 12–33 days in warm weather, and 35–67 days in cool weather. Younger larvae feed near the surface of the fruit; older larvae burrow into the centre. Generally, only one to three larvae survive in each fruit. When fully grown, larvae bore their way out of the fruit and spin cocoons near the soil or in bark crevices.



False Codling Moth larva 1<sup>st</sup> stage



False Codling Moth larva 5<sup>th</sup> stage



False Codling Moth larva 5<sup>th</sup> stage

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## SYMPTOMS OF FALSE CODLING MOTH DAMAGE

In general, as the larvae feed inside the fruit and few signs are visible on the outside, it is not easy to spot infestations. When closely examined, the entry hole can be seen because of the frass deposits; also the skin around the entry hole can become yellowish-brown as the tissue rots and collapses. However, damage from the larvae entering the fruit can take a few days to become visible.

The larvae feeding inside can affect fruit development, causing premature ripening and secondary infections by bacteria and other organisms. Infestation by FCM also generally causes the fruit to drop before harvest. It is therefore very important not to include fruit that has fallen to the ground in produce that is going to be exported.

It is also important to note that when the crop is attacked close to harvest time, it is difficult for packhouse workers and graders to detect. Detailed checking is essential to avoid infested fruit being packaged for export.<sup>3</sup>

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<sup>3</sup> See also the COLEACP technical document "Support to inspection and phytosanitary certification".





False Codling Moth damage on *Capsicum*

## POST-HARVEST MEASURES TO MONITOR AND CONTROL FALSE CODLING MOTH

It is important to prevent and control FCM outbreaks in the field, and several control methods are available.<sup>4</sup> Post-harvest measures are also essential to prevent post-harvest infestation and reduce the chance of infested peppers reaching the packhouse. The following measures should be implemented.

- Ensure all operators involved in harvest and post-harvest activities can recognise FCM damage, and know what to do when they find it.
- Have procedures in place, in the field and packhouse, to inspect for FCM presence and damage at all *Capsicum* handling, packing and storage sites. This involves visual checks and slicing fruits open to check for FCM larvae. Slicing a minimum of two fruit from every 100 is recommended.
- Initiate the FCM Alert system and put intervention and isolation procedures in place when FCM-infested fruit is identified.
- Maintain a system for keeping records of packhouse inspections.
- Ensure practices and facilities are in place for the management of all *Capsicum* waste, including pest-damaged fruit.
- Use refrigerated storage facilities where possible.
- Apply post-harvest treatments, when necessary, using plant protection products:
  - as in the case of field applications, the national authorities should be able to provide guidance on which products to use and how to use them (e.g. application method, dose rate, pre-harvest interval);
  - these must be in accordance with the registration status in the country of origin and the maximum residue level (MRL) of the active ingredient in the EU.

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For more detail see COLEACP's "Technical notes for the coaching sessions for pepper growers on False Codling Moth, *Thaumatotibia leucotreta*".

- Ensure harvested fruit is never exposed to pest attack during packing, storage (including temporary storage), or transport (road, port or airport). This includes physical screening of transported consignments and packing areas to prevent pest entry. Use of pest-proof packaging is also an option.
- Train all people involved in post-harvest handling so they are aware of and apply good practices at all times to reduce the risk of pest damage.

This will reduce the chance of infested peppers reaching the packhouse. As mentioned above, it is essential to have a strict procedure in place in the packhouse to inspect all produce and identify infested peppers. On receiving the fruit, packhouse managers must:

- Have procedures in place to record the condition and phytosanitary status (pest presence) of the *Capsicum* when it arrives at the packhouse;
- Have a system in place to record all FCM control treatments applied pre- and post-harvest to each lot;
- Have a traceability system in place to ensure that each lot is identified and maintained separately through all post-harvest operations.

## COLEACP RESOURCES ON FALSE CODLING MOTH

- [COLEACP guidelines on the export of Capsicum from Africa, Madagascar, Cape Verde, and Mauritius](#)
- False Codling Moth, *Thaumatotibia leucotreta* for the coaching sessions for pepper growers
- [Support to inspection and phytosanitary certification](#)



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