MANAGEMENT PROTOCOL

FALSE CODLING MOTH

in Rose Cultivation

2024

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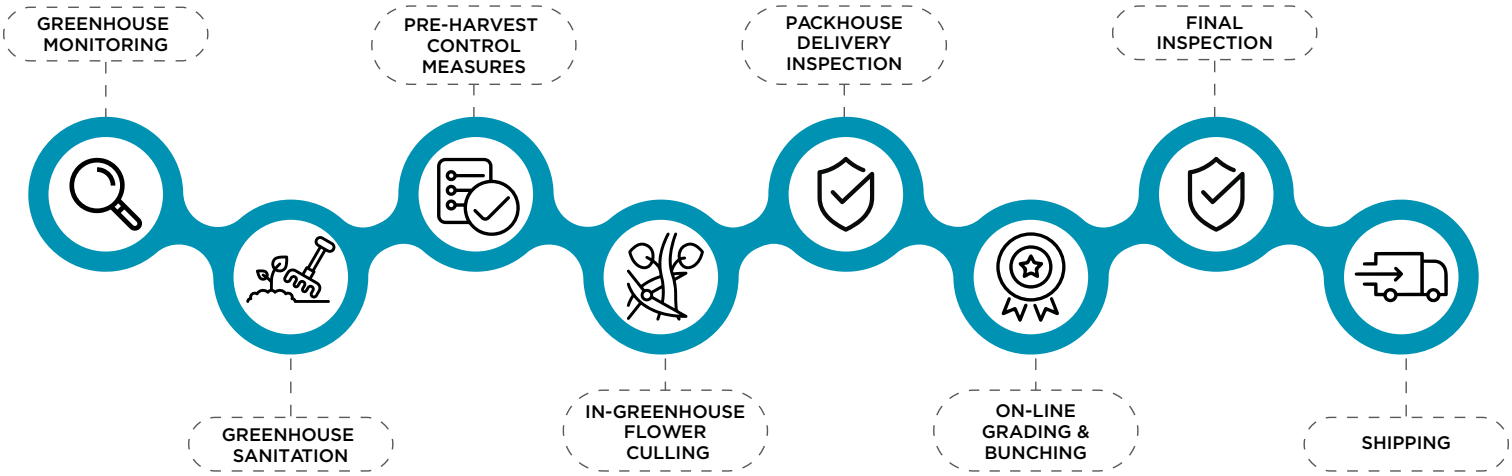
INTRODUCTION

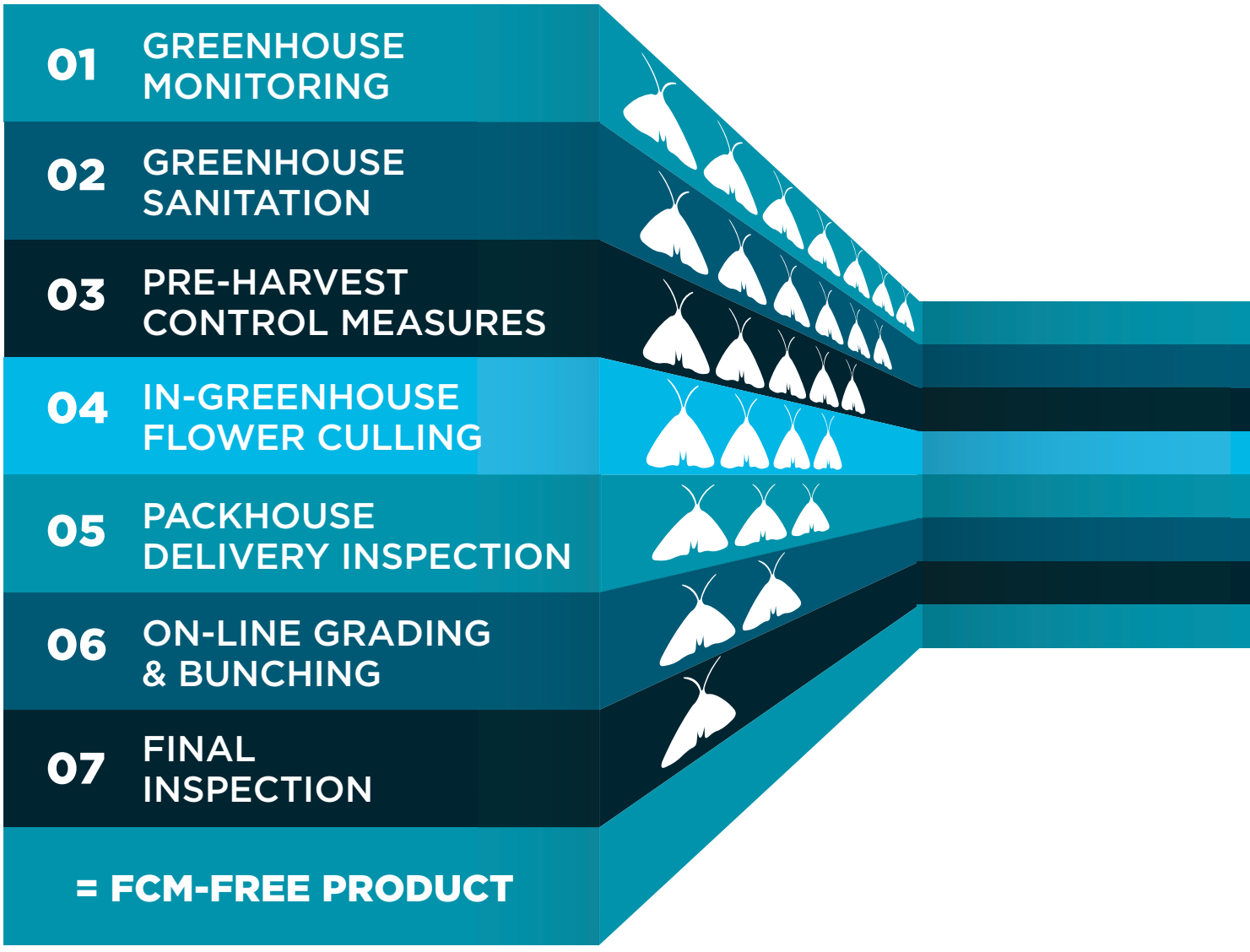
The outlined procedures comprise a multi-pronged approach requiring engaged implementation.

False codling moth (FCM) is endemic to sub-Saharan Africa and is an established pest on a wide variety of cultivated and wild plant hosts. The increasing incidence of False Codling Moth (FCM) has prompted the implementation of stricter control measures. FCM is classified as a regulated phytosanitary pest in Europe and other regions. This SOP provides comprehensive guidelines for managing the False Coddling Moth (FCM) in rose cultivation. The procedures outlined form a multi-stakeholder process requiring active involvement of field, postharvest, spray, scouting staff etc. It combines layers of management practices within an integrated system (illustrated on Pg 3) which reduces the risk of exporting infested flowers to negligible levels.

In 2019, inspection quotas on Kenyan exports doubled from 5% to 10%. Due to increased incidence, it rose again to 25% in 2024.

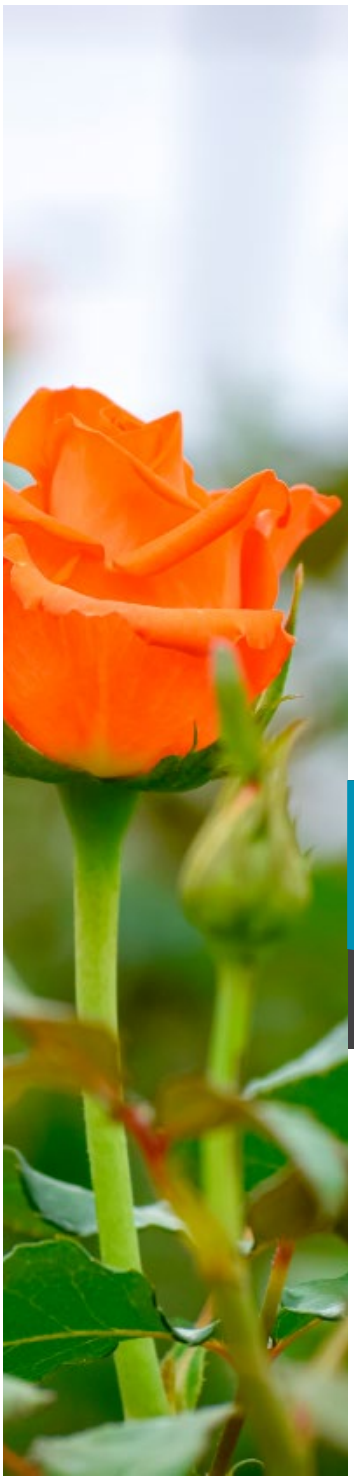


The procedures outlined establish a comprehensive system of FCM management practices. Sequential implementation of these protocols gradually eliminates FCM prevalence to negligible levels.



SECTION
02

EDUCATION AND AWARENESS CREATION



2.1 Importance

Since FCM is a fairly new pest in floriculture, educating all the relevant stakeholders to play an active role in early detection, management and reporting is of utmost importance.

2.2 Recommendations

The following groups should be trained regularly

- General workers
- Harvesters
- Scouts and quality controllers
- Spray department:
- Postharvest staff – Graders, bunchers, Quality controllers

Additionally, posters should be prominently displayed in the greenhouses and packhouses

SECTION
03

MONITORING

3.1 In-crop and Outside Borders

- Conduct efficient monitoring inside and outside greenhouses to determine flight peaks, susceptible cultivars, and external factors contributing to FCM infestations in roses.
- Establish a proper monitoring system with standardized trap placement and data collection.

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3.2 Determine Number of Traps

- 1 trap per 2 hactares inside greenhouses.
- Traps placed at least 150 to 200 meters apart.
- Monitor perimeter with traps every 300 meters.

3.3 Recording Information

- Compile a field census with details like farm name, block name/number, variety, and block size.
- Create maps on Google Earth to identify fields and trap locations.

SECTION
04

GREENHOUSE SANITATION

4.1 Shredding

- Shred discarded roses immediately to prevent FCM pupae from entering the soil.
- Use a small garden shredder outside each greenhouse to ensure thorough shredding.
- Ensure infested buds are destroyed through mulching to prevent FCM from completing its life cycle in the host

Larval Stage FCM Worms feeding on Citrus fruits

4.2 Crown gall removal

Crown galls (Agrobacterium) are breeding sites for of larvae and pupae of FCM. Remove the galls and place them in plastic bags and solarize before disposal.

4.3 Host Plant Identification and Removal

- Identify potential host plants like citrus trees, wine/table grapes, kei apples, and fig trees.
- Remove these plants where possible or treat them with insecticides to prevent FCM habitation.

PREHARVEST CONTROL MEASURES

5.1 Greenhouse screening

- Repair/replace torn greenhouse plastics
- Greenhouse doors, vents and sides should be screened with nsect-proof netting to prevent enry of migrating moths from outside

5.2 In-greenhouse culling

- Infested buds should be identified, removed and destroyed through shedding prior to composting, as soon as possible.

5.3 Mating disruption

- SPLAT or other products could be used to reduce the chances of mating taking place within the treated area which results in reducing the pest population over time thus increasing the efficacy of other interventions.
- Apply 550 application points per Hectare of 1.8g each for effective disruption.
- Use SPLAT FCM in plastic holders (e.g., M3s) within greenhouses.
- Measure trap shutdown to evaluate the performance of mating disruption products.

5.4 Attract and kill

Last Call FCM can be used on the within and on the edges of production areas to attract and kill male moths before they enter into the cropping area.

5.5 Biocontrols

5.5.1 Bacculovirus

Granulovirus Cryptogran is effective killing the neonate larvae before they bore their way into the flowers

5.5.2 Egg parasitoid

Trichogramma egg parasitoid – effective in reducing viable eggs and larval hatch, but sensitive to chemical applications especially if there are multiple sprays each week/Probably not practical under current management systems.

Egg Stage FCM magnified.

5.6 Foliar insecticides

ACTIVE INGREDIENTS AND MODE OF ACTION

5.6.1 Methoxyfenozide

Mode of Action: Methoxyfenozide is a molting acceleration product that mimics the action of the molting hormone of lepidopterous larvae (L1 to L2 stages). It differs from other insect growth regulators like chitin-biosynthesis inhibitors or juvenile-hormone mimic products. It acts best when ingested by younger instar larvae and has minimal contact effect on late instar larvae.

Effect: Upon ingestion, larvae cease feeding within 4 to 8 hours and undergo an incomplete and developmentally lethal premature molt. The larvae die due to their inability to feed and complete the molting process. Methoxyfenozide also shows good ovicidal effect.

5.6.2 Chlorantraniliprole

Mode of Action: Chlorantraniliprole has a novel mode of action and acts by binding to and activating insect ryanodine receptors. This activation stimulates the release and depletion of calcium from the internal stores of muscles, resulting in impaired muscle regulation, paralysis, and ultimately insect death.

Effect: Death of the pest occurs within 2-3 days, but inhibition of insect movement and feeding occurs rapidly. Chlorantraniliprole controls mainly Lepidopteran insect pests, but also some pests in other Orders (e.g., Coleoptera, Diptera).

5.6.3 Cryptogran/Cryptomax

Mode of Action: Cryptogran is a species-specific virus. FCM larvae ingest the virus particles, potentially even before they begin to actively feed. The virus eventually infects the entire body of the larva, killing it and causing it to rupture. Millions of virus particles are released back into the environment, ready for ingestion by other larvae.

Effect: The virus particles are ingested by newly hatched FCM larvae on the surface of the fruit, before fruit penetration occurs. Larvae ingest the virus while feeding on the surface of the fruit, leading to death shortly after.

Order Cryptogran Online: CLICK HERE

5.7 Spray Coverage

- Effective FCM control requires neonate larvae to ingest the chemical or virus, necessitating thorough spray coverage.
- Ensure the outside of the rose bud is fully covered with the product.
- Use water-sensitive paper to monitor spray coverage.
- Evaluate and optimize spray nozzles to provide proper spray coverage on the outside of rose flowers.

5.8 Water pH and Buffering

5.8.1 pH Range

Water pH should be between 5 and 8

5.8.2 Buffering

- Buffering is critical, not just pH adjustment with Nitric Acid.
- True buffers that are Citric Acid based do not easily change pH once the ideal pH is reached and do not react with most agrochemicals.

5.9 Premixing

- Do not premix products before delivery to spray tanks.
- Decant directly from the original container into tanks half-filled with pH 5-8 buffered water. The pH of each product in its concentrated form is unknown.

5.10 Resistance Management

- Alternate insecticides with different modes of action - i.e. methoxyfenozide, chlorantraniliprole, and Cryptogran to prevent resistance.
- Avoid repeated applications of insecticides from the same IRAC group to reduce the probability of developing resistance.

Sprayer making sure the flowers are fully covered

Staff trained on how to detect FCM and greenhouse sanitation

SECTION
06

ADDITIONAL CONSIDERATIONS

Pupal Stage FCM isolated and magnified

6.1 Root Drench for Sucking Pests

- Consider a root drench of insecticides like Thiamethoxam, depending on Pre-Harvest Interval (PHI) and acceptability in the EU.

6.2 Training and Follow-Up

6.2.1 Regular Training

- Train staff on monitoring, data collection, and SOPs for trap placement.
- Use platforms like KeyPhase for capturing and interpreting monitoring data.

6.2.2 Continuous Technical Support

- Conduct iterative innovation to improve management system performance, incorporating necessary modifications as conditions evolve.

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Learn how our Granulovirus solution, Cryptomax can help you manage FCM

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