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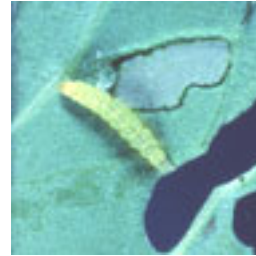
IPM Guidelines For Diamondback Moth In Vegetable Farms

The diamondback moth (DBM), *Plutella xylostella* is one of the major pests of leafy brassica vegetables in local vegetable farms, in particular gailan. In the early 1990's, the crop loss due to the pest was devastating. The larvae of the moths would skeletonise the plants with their voracious feeding. And resistance to the variety of pesticides applied quickly developed. The Primary Production Department then developed and introduced a series of Integrated Pest Management (IPM) measures for the control of DBM to the vegetable farms. Over the years, with the implementation of IPM by the farmers, the DBM population was on the decline and well under control by 2000 and 2001. However, in our continued surveillance on the pests, it is noted that a resurgence of the DBM population in local farms has occurred from 2002 to 2003 (Fig 1).

A recent follow-up on the cause of the higher populations in the local vegetable farms had pointed to a breakdown in the IPM control,



Adult DBM



DBM caterpillar



Pheromone trap

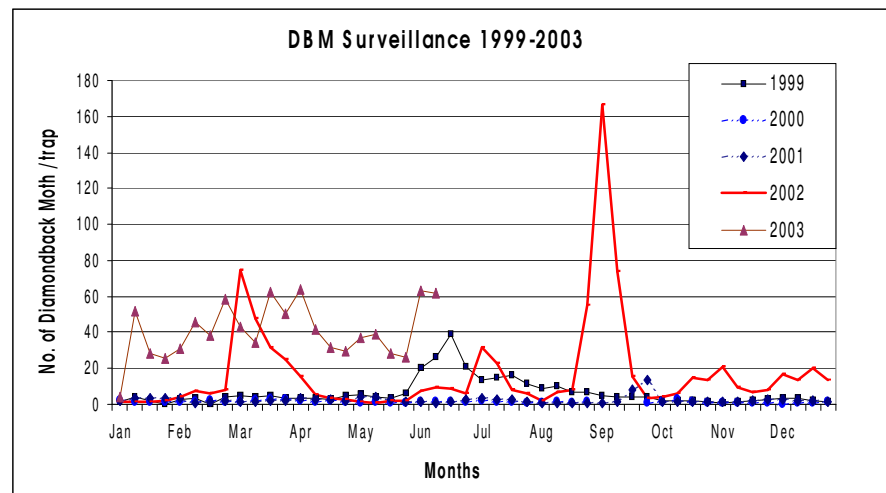


Fig 1: DBM populations were at their lowest during 2000 and 2001 when IPM was implemented. A resurgence occurred in 2002 and 2003 when control measures slacked off.

which were not rigorously implemented. The following were noted :

- No immediate repair to the damaged netted structures.
- Continuous planting of *Brassica spp.* without crop rotation to non-hosts.
- A lapse in replenishing pheromone traps in the vegetable farms.
- Excessive or inappropriate use of pesticides reducing the natural enemies of DBM.

Farms are urged to review their pest control programme and to follow closely the recommended IPM measures to ensure that DBM population is managed to below damage levels.

IPM Measures

- Maintain netting regularly to keep DBM out of the farms. Any tear should be repaired at once.
- Crop rotation to non-cruciferous crops e.g. kangkong, bayam, onions etc.
- Pheromone traps should be refreshed every 3 months and placed at 15 meters apart to monitor and to reduce the DBM population.
- Apply pesticides only when there are >10 DBM larvae/20 plants.
- Use bio-pesticides e.g. *Bacillus thuringiensis* or Abamectin, an organic pesticide to avoid the reduction of DBM's natural enemies which act as bio-control agents.

Singapore-Australia Free Trade Agreement (SAFTA)

The Sectoral Annex for Horticultural Goods under the Singapore-Australia Free Trade Agreement (SAFTA) came into force on the 26th February 2003. Under this agreement, all cut flowers (orchids, *Anthurium sp.*) and foliage (*Chrysalidocarpus sp.*, *Rhapis sp.*, *Cordyline sp.*, *Dracaena sp.*, *Phormium sp.*, *Epipremnum aureum*, *Monstera sp.*, *Philodendron sp.*, cycads and all fern species except for *Asplenium sp.*) can be exported to Australia. These consignments are exempted from the mandatory fumigation with Methyl Bromide (MB) upon arrival in Australia provided no actionable pests are detected. The export of the above mentioned under SAFTA is applicable only for AVA accredited suppliers. Exports not under the Sectoral Annex is still allowed but is subject to inspection and appropriate treatment upon arrival in Australia.

For more information on SAFTA, please contact Dr. Mohd. Ali at Tel: 67519 842/ 843.

Import Requirements For Foliages

Plant importers are reminded that cut foliage, branches and other plant parts without buds or flowers and grasses (fresh/dried) that are imported for bouquets or ornamental purposes would require a phytosanitary certificate from the country of origin (except Peninsular Malaysia). This is to certify that the consignments are free from plant pests and diseases.

Imports from the South American Tropics, besides the phytosanitary

certificate would also require an AVA import permit.

The correct HS Code, Product Code and Unit of Measurement (UOM) to use in declaring these items are as follows :

Fresh foliage, branches and other plant parts without buds or flowers and grasses for bouquets or for ornamental purposes

HS Code – 06049100
Product Code – ALN00THF
UOM – Kgm

Dried foliage, branches and plant parts without buds or flowers and grasses for bouquets or for ornamental purposes

HS Code – 06049900
Product Code – ALN00THD
UOM – Kgm

Please contact Ms Ong Ai Khim at Tel: 67519 842/843 for inquiries.

What Are Pheromone Traps?

In the life cycles of the moths or insects, the females emit a scent, known as pheromones to attract their male species to their locations for reproduction. This ensures that females lay fertilised eggs. By applying the same scent into insect traps, we would be able to attract the male insects within the farm to the traps to be killed and reduce the number of adult males in the population to fertilise the females. This then leads to a decrease in the numbers of larvae or caterpillars in the next generation.

The DBM pheromone trap is a triangular-shaped trap made of sturdy yellow plastic placed amidst susceptible hosts e.g *Brassica spp.* The colour yellow is chosen as the moths are attracted to yellow light. The lure, a rubber piece containing the chemical simulating the DBM sex pheromones is suspended in the center of the trap. At the base

of the trap is a yellow sticky paper. When the males, following the pheromone scent, fly into the traps, they hit the walls of the trap and fall onto the sticky surface and are caught and die.

Consistent use of these traps helps in reducing the male moths in the population in the long term. It is suitable for organic farming systems, where chemical pesticides are not used for the control of pests in the production of the vegetables. For conventional farming systems, the method is combined with other control measures for an integrated pest management system.

Pheromone traps are specific to the different types of insects. Another example of its use is in the trapping of Rhinoceros beetles attacking the palms and coconut trees.

DBM pheromone traps are available from The Plant Health Centre, AVA. For more information contact Mr Ng B B at 67519814 or 67519829.

Gall Forming Insects

In recent months, gall forming insects were noted to severely affect the coral trees here. In particular, gall wasps belonging to Eulophidae were attacking *Erythrina variegata*, *E. crista-galli* and *E. glauca*. The symptoms were galls formed on leaves, petioles, shoots and twigs. Defoliation occurs in severe infestations. The infestation has been reported affecting the coral trees in Africa.



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The aim of this bulletin is to disseminate horticulture and plant health information to plant growers, exporters and importers in Singapore. If you have any suggestions, comments or enquiries, please contact us at :

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