IPM PACKAGE NO. 70

INTEGRATED PEST MANAGEMENT PACKAGE

FOR

FIG

Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
Directorate of Plant Protection, Quarantine & Storage
N. H. IV, Faridabad - 121 001.

IPM PACKAGE FOR FIG

CONTENTS

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Government of India
Ministry of Agriculture
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DIRECTORATE OF PLANT PROTECTION, QUARANTINE & STORAGE
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FOREWARD

Integrated Pest Management (IPM) approach has been globally accepted for achieving sustainability in agriculture. It has become more relevant due to a number of advantages like safety to environment, pesticide-free food commodities, low input cost based Crop Production Programme etc. Though IPM approach has been taken up since 1981, its impact has not been felt until 1994. Human Resource Development has helped to sensitise extension functionaries and farmers about the usefulness of IPM.

For successful implementation of IPM, the scattered information on various components of this eco-friendly approach forms basic necessity. In this direction, initial attempts were made in 1992 to harmonise the IPM Package of Practices of various crops. Subsequently, concerted efforts were made in 1998, 2001, 2002 and 2003 to update and develop IPM Package of Practices for agricultural and horticultural crops. Presently, IPM Package of Practices for 77 crops have been finalized to help the extension workers and farmers to manage the pests and diseases and to minimize the over use/misuse of chemical pesticides. Efforts have been made to incorporate the relevant available technical input provided by the scientists of ICAR Institutes/ SAUs and State Departments of Agriculture/Horticulture. However, suggestions for further improvement in future publication/ revision will be of immense help. Hopefully, these IPM Package of Practices will be useful for the Researchers, Plant Protection Workers and Farmers alike.

Chandurkar. 14/8/03
(P. S. CHANDURKAR)

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PREFACE

In order to minimize the indiscriminate and injudicious use of chemical pesticides, INTEGRATED PEST MANAGEMENT (IPM) has been enshrined as cardinal principle of Plant Protection in the overall Crop Protection Programme under the National Agricultural Policy of the Govt. of India. IPM is an eco-friendly approach for managing pest and disease problems encompassing available methods and techniques of pest control such as cultural, mechanical, biological and chemical in a compatible and scientific manner. The greater emphasis has been given on biological control including use of biopesticides.

With a view to provide technical knowledge to the extension functionaries and farmers in the States, first National Workshop on IPM for harmonization of Package of Practices was organized at National Plant Protection Training Institute (NPPTI), Hyderabad during June 29-30, 1992. Subsequently workshops were organized on April 15-17, 1998 and Nov. 5-6, 1998 at the Directorate of Plant Protection, Quarantine & Storage, Faridabad and IPM Package of Practices for 20 crops were finalized on rice, cotton, vegetables, pulses and oilseeds. In this series, two National Workshops on IPM have been conducted at NPPTI, Hyderabad and Dte. of PPQ&S, Faridabad during 14-17, 2001 and Feb. 20-22, 2002 respectively to update 20 available IPM Packages and develop 31 new IPM Packages especially for horticultural crops. Sixth and Seventh National Workshop held at Central Insecticides Laboratory, Faridabad on 4th-5th July, 2002 and 9th-10th January, 2003 respectively for 18 IPM Packages and Eighth National Workshop was held at NPPTI, Hyderabad on 28th–29th May, 2003 for 8 IPM Packages. In these Workshops, 77 IPM Package of Practices for cereal crops (Rice, Wheat, Maize, Sorghum, Millets), commercial crops (Cotton, Sugarcane, Tobacco, Tea, Betelvine, Saffron), pulse crops (Pigeonpea, Gram, Black gram/Green gram, Pea, Rajma), oilseeds (Groundnut, Soybean, Rapeseed/Mustard, Sesame, Olive, Safflower, Castor, Sunflower, Oilpalm), vegetables (Potato, Onion, Tomato, Brinjal, Okra, Chillies, Cruciferous vegetables, Leguminous vegetables, Cucurbitacious vegetables, Broccoli, Spinach, Lablab bean, Garlic), fruits (Citrus, Banana, Apple, Mango, Guava, Grapes, Jackfruit, Pineapple, Sapota, Pomegranate, Litchi, Papaya, Apricot, Peach, Pear, Cherry, Walnut, Ber, Amla, Loquat, Strawberry, Watermelon, Fig, Phalsa, Persimmon, Custard apple, Raspberry, Kiwi, Passion fruit), spice and plantation crops (Small Cardamom, Large Cardamom, Black Pepper, Ginger, Coriander, Cumin, Fennel, Coconut, Cashew and Arecanut) have been finalized.

IPM technology manages the pest population in such a manner that economic loss is avoided and adverse side effects of chemical pesticides are minimized. The IPM packages encompass various management strategies for containing the pest and disease problems. Pest monitoring is one of the important components of IPM to take proper decision to manage any pest problem. It can be done through Agro-Ecosystem Analysis (AESA), field scouting, light, pheromone, sticky/yellow pan traps. The economic threshold levels (ETL) of important pests and diseases are also given in the packages to take appropriate control measures when pest population crosses ETL.

These IPM packages developed with the technical inputs from experts from Indian Council of Agricultural Research, State Agricultural Universities, Central Directorate of Plant Protection, Pesticide Industries and State Departments of Agriculture/Horticulture will provide technical backup in the management of pests, diseases, weeds, nematodes and rodents in the agriculture and horticulture. These will also be useful in reducing the pesticide residues in agricultural commodities and would also help in the management of pests/diseases/weeds/nematodes which may get inadvertently introduced in the country.

IPM Package of Practices for agricultural and horticultural crops will be helpful to minimize the ill-effects of chemical pesticides to promote the IPM for sustainable production. These IPM packages will be useful for the researchers, extension workers and farmers alike who are engaged in the agricultural practices.

7th October, 2003

(A. D. Pawar)
Addl. PPA-cum-Director(IPM)

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		7.	Sh. N. K. Mishra, LDC, Dte. of PPQ&S, Faridabad.

IPM PACKAGE FOR FIG
(*Ficus carica*)

I. MAJOR PESTS

A. Pests of National Significance:

1- **Insect-Pests:**

1.1	Stem borer	(*Batocera rufomaculata*)
1.2	Fruit flies	(*Bactrocera spp.*)
1.3	Fig midge	(*Anjeerodiplocis peshawarensis*)
1.4	Mealy bug	(*Drosicha stebengi*)
1.5	Coccid	(*Pseudococcus lilacinus*)

2- Diseases:

2.1	Rust	(*Cerotelium fici*)
2.2	Anthracnose	(*Sphaceloma fici caricae*)
2.3	Leaf spot	(*Cylindrocladium scoparium*)

B. Pests of Regional Significance:

1. Insect-pests:

1.1	Leaf roller	(*Phycodes mina*)
1.2	Fig moth	(*Ephestia cautella*)
1.3	Thrips	(*Scirtothrips tabaci*)
1.4	Fig jassids	(*Velucariae* sp.)
1.5	Scale	(*Parlaloria oleae*)

2. Diseases

2.1 Leaf mosaic (viral disease)

3. Nematodes

3.1 Root-knot Nematode (*Meliodogyne sp.*)

3.2 *Hemicycliophora sp.*

3.3 *Helicotylenchus sp.*

3.4 *Hoplolaimus sp.*

3.5 *Xiphinema sp.*

4. Physiological disorders

4.1 Sun burn

4.2 Fruit splitting

5. Weeds

5.1 *Digitaria sanguinalis*

5.2 *Circium arvense*

5.3 Achyranthus aspera

5.4 Amaranthus caturus

6. Rodents

6.1 Soft furred field Rat (*Rattus meltada)*

6.2 Indian Mole Rats/Smaller Bandicoot (*bandicota bengalensis)*

6.3 Common House Rat (*Rattus rattus)*

II. PEST MONITORING

1. <u>Fig-Eco System Analysis :</u>

Fig-eco system Anaysis is an approach, which can be gainfully employed by extension functionaries and farmers to analyse field situations with regard to pests & diseases, defenders, soil conditions, plant health, the influence of climatic factors and their inter relationship for growing healthy crop. The basic components of Fig-eco system Anaysis are:-

1. Plant health at different stages.
2. Builtin-compensation abilities of the plants.
3. Pest and defender population dynamics.
4. Soil conditions.
5. Climatic factors.

2. Field Scouting:

AESA requires skill and so only the trained farmers can undertake their exercise. However, other farmer also can do field scouting in their fields at regular intervals to monitor the major pest situation. Simple field scouting on pest situation by the farmers help to minimize pesticides usage to large extent.

3. Field Monitoring through Traps:

Set up light trap @ 5 traps/ha for monitoring jassids, Stem Borer adults, Thrips, Fruit fly; operate light trap 2-3 hours after sunset.

III. INTEGRATED PEST MANAGEMENT STRATEGIES:

A. Cultural Practices:

1. Racking of soil around the tree trunks and mixing with some soil dust for the control of early instar of mealy bug in the early part of November.
2. Soil solarisation before planting
3. Application of Neem cake.
4. Prune and destroy affected parts before the onset of monsoon.
5. Maintain plant spacing (5x7 metres).
6. White washing of affected trunks can prevent sun burn.
7. Proper water management is advisable to prevent fruit splitting.

B. Mechanical Practices:

1. Use light trap @ 5 traps/ha,. for collection and killing adults of stem borer from April-July.
2. Stem borer and scale infested branches may be cut and destroyed along with larvae.
3. Collection and destruction of infested fruits regularly.
4. A 400 gauge 30 cm wide thick alkathene sheet should be fastened at about 30 cm above the ground level to the tree trunk with the help of a thin rope or thread after mud plastering in the month of November to check the ascending first instar mealy bug nymphs.
5. Solution of Methyl eugenol, Jaggery, Malathion 50 EC and water in the ratio of 1.0:5.0: 2.0:1000 may be hanged at 10-12 places @ 0.5 litre/wide mouthed bottle for Fruit fly management.
6. Incorporate 450gm. Caster cake per tree for each year to control Nematode population.

C. Biological Control

1. Conservation:

1.1 Conserve the Parasites and Predators like Coccinellids, Spiders, Reduvid bug, Predatory Thrips, Dragonfly, Damselfly & Wasps which actively suppress the pest population. Avoiding unnecessary sprays are the best way to conserve them.

2. Augmentation:

2.1 Release *Chrysoperla carnea* against soft bodied insect @ 50 grubs/tree upto 5 years old plant and it can be increased later depending upon pest population.

2.2 Release *Cryptolaemus montrozeeri* and *Chrysoperla carnea* grubs against mealy bug and coccids.

2.3 Use 250gm. *Trichoderma spp.*/tree in 4-5 kg FYM to manage root rottings.

3. Bio-pesticides:

1. Apply neem cake 80-100/Kgs/ha at the time of nursery preparation.
2. Dip the cuttings in *Trichoderma viride* and *Paecilomyces lilacinus* suspension 4gm/litre of water for fungal disease and nematode management.

D. Chemical Control Measures:

1. Apply fine Sulphur powder 250-500gm./tree or Zineb/Mancozeb 2gm./Lit of water for management of Anthracnose disease.

E. Weed management

1. Tillage to keep down weed is necessary
2. Initial stage weeds must be kept under check by using hand tools or small bullock drawn or machine drawn weeding tools.
3. Herbicide is not recommended for weed control . However, if it is necessary Pendimethalin @ 0.75 to 1.0 or Oxyflourfen @ 0.15 to 0.25 Ltr./ha can be used safely for management of broad leaf weeds.

F. Rodent management

1. Adopt orchard sanitation.
2. Don't cultivate fodder crops especially oats with the orchards.
3. Make use of Bromodiolon concentrate in bait @ 0.005% a.i. in 2 applications at the interval of a fortnight.
4. Adoption of community approach.

Annexure-I

BASIC PRECAUTIONS IN PESTICIDE USAGE

A. Purchase:

1. Purchase only JUST required quantity e.g 100,250,500 or 1000g/ml for single application in specified area.
2. Do not purchase leaking containers, loose, unsealed or torn bags.
3. Do not purchase pesticides without proper/approved lebels/leaflets.

B. Storage

1. Avoid storage of pesticides in the house premises.
2. Keep pesticides only in original containers with intact seal.
3. Do not transfer pesticides to other containers.
4. Never keep them together with food or feed/fodder.
5. Keep away from the reach of children and livestock.
6. Do not expose to sunlight or rain water.
7. Do not store weedicides along with other pesticides.

C. Handling

1. Never carry/transport pesticides along with food materials.
2. Avoid carrying bulk-pesticides(dusts/granules) on head, shoulder or on the back.

D. Precaution for preparing spray solution

1. Use clean water.
2. Always protect your NOSE, EYES, MOUTH, EARS, and HANDS.
3. Use hand gloves, face masks and cover your head with cap.
4. Use polythene bags as hand gloves, handkerchiefs or pieces of clean clothes as masks and a cap or towel to cover the head(Do not use polythene bags contaminated with pesticides).
5. Read the label/leaflets on the container before preparing spray solutions.
6. Prepare spray solution as per requirement.
7. Do not mix granules with water.
8. Concentrated pesticides must not fall on hands or other body parts while opening sealed container. Do not smell the sprayer tank.
9. Avoid spilling of pesticides solution while filling the sprayer tank.
10. Do not eat, drink, smoke or chew while preparing and applying spray solution.
11. The operator should protect his bare feet and hands with polythene bags.

E. Equipments

1. Select right kind of equipments.
2. Do not use leaky, defective equipments.
3. Select right kind of nozzles.
4. Do not blow/clean clogged-nozzles with mouth. Use old tooth-brush tied with the sprayer and clean with water.
5. Do not use same sprayer for weedicide and insecticide.

F. Precaution for spraying pesticides:

1. Apply only recommended dose and dilution.
2. Do not apply on hot sunny day or strong windy condition.
3. Do not apply just before the rains and also after the rains.
4. Do not apply against the wind direction.
5. Emulsifiable concentrate formulations should not be used for spraying with battery operated ULV sprayer.
6. Wash the sprayer and bucket etc. with soap water after spraying.
7. Containers/buckets used for mixing pesticides should not be used for domestic purposes.
8. Avoid entry of animals and workers in the fields immediately after the spraying.

G. Disposal:

1. Left over spray solution should not be drained in ponds or water lines but should be dumped in barren isolated area.
2. The used/empty containers should be crushed with a stone/stick and buried deep into soil away from water sources.
3. Never re-use empty pesticide container for any other purpose.
