



IPM PACKAGE NO. 73



**INTEGRATED  
PEST MANAGEMENT  
PACKAGE**

FOR

**CUSTARD APPLE**



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

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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.

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

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## P R E F A C E

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 4<sup>th</sup>-5<sup>th</sup> July, 2002 and 9<sup>th</sup>-10<sup>th</sup> January, 2003 respectively for 18 IPM Packages and Eighth National Workshop was held at NPPTI, Hyderabad on 28<sup>th</sup>-29<sup>th</sup> 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, Cucurbitaceous 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.

7<sup>th</sup> October, 2003



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# IPM PACKAGE FOR CUSTARD APPLE (*ANNONA SQUAMOSA*)

## I. MAJOR PESTS:

### 1. Insect Pests

- 1.1 Mealy bug (*Ferrisiana virgata*)
- 1.2 Fruit fly (*Bactrocera zonatus*)
- 1.3 Scale (*Ceroplastes floridensis*)
- 1.4 Fruit boring caterpillar (*Heterograthis vengallela*)

### 2. Diseases

- 2.1 Fruit rot & Anthronose (*Glomerella cingulata*)
- 2.2 Leaf spot (*Alternaria* sp.)

### 3. Physiological disorder

- 3.1 Stone fruit formation

### 4. Weeds

- 4.1 *Tribulus terrestris*
- 4.2 *Phyllanthus niruri*
- 4.3 *Mimosa pudica*
- 4.4 *Parthenium hysterophorus*
- 4.5 *Sporobotus diander*

### 5. Nematodes

- 5.1 Spiral nematode (*Helicotylenchus* sp.)
- 5.2 Stunt nematode (*Tylenchorhynchus* sp.)

## 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

### A. Custard apple Eco System Analysis

It is an approach employed by officers to analyse field situation on the following points.

1. Plant health at different stages every 15 days interval.
2. Compensatory abilities
3. Soil condition
4. Climatic factors
5. Farmers past experience
6. Pest and defender population dynamics.

This analysis of the field situation helps in decision making skill on management practices.

## III. IPM STRATEGIES:

### A. Cultural Practices:

- a. Apply FYM-250 kg/ha to improve health of soil which helps in uptake of all nutrients required for its growth.
- b. Application of Neem cake @ 450 gm/tree also helps to keep plants healthy and reduce soil borne pest.
- c. Avoid monoculturing and adopt mixed cropping system.
- d. Application of Castor cake and bone-meal in the ratio of 2:1 in soil is beneficial for developing tolerance ability for insect pests and diseases (500 gms +250 gms/tree).
- e. Avoid water stagnation condition for more days.
- f. Remove infected plant parts and burn it.
- g. Two sprays of Potassium Iodide (0.5%) at weekly intervals resulted higher yields.

## **B. Mechanical Practices :**

1. Pruning of branches with mealy bug infestation.
2. Infested/diseased fruits should be collected and destroyed.
3. Solution of Methyl eugenol, Jaggery, Malathion 50 EC and water in the ratio of 1:5:2:100 may be hanged at 10-12 places/ha @ 0.5 litre/wide mouthed bottle for Fruit fly management.

## **C. Biological Control**

### **Conservation**

Conserve potential predators, viz. *Cryptolaemus montrouzieri* and *Scymnus coccivora* for predated upon mealy bugs.

### **Augmentation**

Release 50 lady bird beetle per tree where the infestation of mealy bugs is noticed to prevent it from increasing up the population density.

### **Biopesticides**

1. Use 5% NSKE for management of sucking pests.
2. Prepare mixture of 2.5 kg *Trichoderma* sp. + 25 kg FYM. Keep it for one week under shade. Use 250 gm mixture/tree for soil borne pathogens.
3. Application of neem cake @ 500 gms/tree will help to reduce soil pests and nematodes.



#### **D. Chemical Practices:**

1. Apply relatively safer pesticides if needed in the orchards which conserve effective pollinators and avoid pollen sterility.
2. Apply Bordeaux paste to infected trunks.
3. Dipping of cuttings/grafts in Chlorpyrifos (0.05% solution) before planting helps in nematode management.

#### **E. Weed Management**

1. Weed control in the initial stages of growth (Nursery stage) is necessary to get vigorously growing healthy seedlings for transplanting to permanent sites at a later stage.
2. Manual method is common practice among the farmers.
3. Use of Pendimethalin @ 0.75 to 1.0 kg holds good prospect.

#### **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. Adopt of community approach.

## **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 levels/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.
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