



**IPM PACKAGE NO. 74**



# **INTEGRATED PEST MANAGEMENT PACKAGE**

FOR  
**RASPBERRY**



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 RASPBERRY

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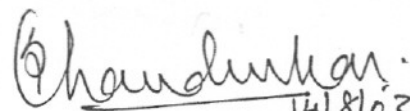
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**FOREWARD**

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)  
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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.

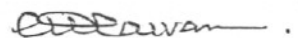
With a view to provide technical knowledge to the extension functionaries and farmers in the States, first National Workshop on IPM for harmonization of Package of Practices was organized at National Plant Protection Training Institute (NPPTI), Hyderabad during June 29-30, 1992. Subsequently workshops 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 RASPBERRY

## (Cape Gooseberry, *Physalis peruviana*)

### I. MAJOR PESTS:

#### 1. Insect pests:

1.1 Hadda beetle, *Epilachna vigintioctopunctata*

1.2 Fruit borer, *Helicoverpa virescens*

1.3 Cut worm, *Agrotis spp.*

#### 2. Other pests:

2.1 Red spider mite, *Penonychus sp.*

#### 3. Diseases:

3.1 Damping off (seedlings)

3.2 Mosaic virus

3.3 Powdery mildew

3.4 Fruit rot disease, *Alternaria alternata* & *Cladosporium cladosporioides*

#### 4. Weeds:

4.1 *Agropyron repens*

4.2 *Digitaria spp.*

4.3 *Amaranthus viridis*

4.4 *A. spinosus*

4.5 *Achyranthus aspera*

## 5. **Rodents:**

5.1 Soft furred field rat, *Rattus meltda*

5.2 Indian Mole Rat/Smaller Bandicoot, *Bandicota bengalensis*

5.3 Common House Rat, *Rattus rattus*

## II. **PEST MONITORING:**

### 1. **Agro-Ecosystem Analysis (AESAs):**

AESA is an approach which can be gainfully employed by extension functionaries and farmers to analyse field situations for pests, defenders, soil conditions, plant health, the influence of climatic factors and their relationship for growing healthy crop. A critical analysis of the field situations will help or enhance in decision making skill for implementation of management practices. The basic components of AESA exercise for pest monitoring are:

1. Plant health at different stages.
2. Built in compensation abilities of the plants.
3. Pest and defender population dynamics.
4. Soil conditions.
5. Climatic factors.
6. Farmers past experience.

## 2. **Field scouting:**

AESA requires skill and the trained farmers can undertake AESA. However, remaining farmers can do field scouting in their own fields at regular intervals to monitor the major pest situation. It helps to reduce pesticide usage to a large extent.

## 3. **Light traps:**

Use of light traps will help in monitoring cut worm population.

# III. **INTEGRATED PEST MANAGEMENT STRATEGIES:**

## 1. **Cultural practices:**

- 1.1 Deep ploughing in summer is helpful for exposing soil borne pathogens and resting stages of insect pests to unfavourable environmental conditions and predation by predators.
- 1.2 Water logged soil should be avoided for commercial cultivation.
- 1.3 It is suspected that mosaic disease appears on sites where tomatoes were grown previously. Therefore, avoid such sites.
- 1.4 Damping off seedlings occur at the seedling stage particularly in period of heavy irrigation. Therefore, give optimum irrigation.
- 1.5 Staking of the plants to avoid direct contact of fruits with soil borne pathogens be ensured.
- 1.6 Optimal and ensured irrigation will be helpful to minimize the loss of fruit cracking.
- 1.7 Rotatory cultivation and hoeing are commonly suggested for weed management.



## 2. Mechanical practices:

- 2.1 Field should be kept free from weeds by weeding and hoeing.
- 2.2 Remove the damaged and punctured fruits by caterpillars and grubs because these are source of pathogen infection.
- 2.3 Use light traps for cut worms monitoring and control.
- 2.4 There is considerable loss by fruit cracking – a physiological disorder. The cracking may be due to disturbed water and soil temperature relation. It occurs in ripe or over ripe berries and not in green berries. Picking fruits before they become fully ripen will reduce the incidence of cracking.
- 2.5 Mosaic disease is more prevalent and causes chlorosis and malformed growth in advanced stages. Diseased plants should be rogued out and destroyed.
- 2.6 Workers should avoid successive contact of diseased and healthy plants in carrying out cultural practices in the field, simultaneously avoiding contact of implements used for diseased plants.
- 2.7 Fruits are frequently damaged by birds if these are allowed to over ripe in the field. Therefore, over ripening of the fruits may be avoided to minimize the damage.

## 3. Biological control:

- 3.1 Conservation of general predators like coccinellids, *Chrysoperla*, spiders, dragon and damsel flies etc. must be followed.

- 3.2 Augmentation of biocontrol agents such as *Trichogramma brasiliensis*, *T. chilonis* and *T. pretiosum* should be carried out.
- 3.3 Use of Bt @ 1 kg/ha and also neem based formulations (5% NSKE or neem oil 0.3%) are suggested against lepidopteran pest.
- 3.4 Seed treatment with *Trichoderma viride* or *T. harzianum* @ 4 g/kg seed for damping off and soil borne pathogens is quite effective.

#### 4. **Chemical control:**

- 4.1 Where necessary, safer insecticides like endosulfan / chlorpyrifos may be used.
- 4.2 Simazine @ 0.75 to 1 kg/ha or paraquat @ 0.5 kg/ha or Glyphosate @ 0.75 – 1 kg/ha could be safely used for weed control.

#### 5. **Rodent management:**

- 5.1 Adopt orchard sanitation.
- 5.2 Don't cultivate fodder crops especially oats in the orchards.
- 5.3 Make use of Bromodiolon concentrate in bait @ 0.005% a.i. in two applications at the interval of a fortnight if required.
- 5.4 Adopt community approach.

## BASIC PRECAUTIONS IN PESTICIDE USAGES

### A. Purchase

1. Purchase only JUST required quantity e.g. 100, 250, 500 or 1000 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 LABELS.

### B. Storage

1. Avoid storage of pesticides in the house premises.
2. Keep only in original container with intact seal.
3. Do not transfer pesticides to other container.
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 Sun-light 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, shoulders or on the back.

### D. Precautions for Preparing Spray Solution

1. Use clean water.
2. Always protect your NOSE, EYES, MOUTH, EARS and HANDS.
3. Use hand gloves, face mask and cover head with cap.
4. Use polythene bags as hand gloves, handkerchiefs or piece of clean cloth as mask and a cap or towel to cover the head (Do not use polythene bag contaminated with pesticides).
5. Read the label on the container before preparing spray solution.

6. Prepare spray solution as per requirement.
7. Do not mix granules with water.
8. Concentrated pesticides must not fall on hands etc., while opening sealed containers. Do not smell the sprayer tank.
9. Avoid spilling of pesticide solution while filling the sprayer tank.
10. Do not eat, drink, smoke or chew while preparing solution.

#### **E. Equipment**

1. Select right kind of equipment
2. Do not use leaky, defective equipment
3. Select right kind of nozzle.
4. Don't blow / clean clogged-nozzle with mouth. Use old toothbrushes tied with the sprayer and clean with water.
5. Do not use same sprayer for weedicide and insecticide.

#### **F. Precautions for applying pesticides**

1. Apply only at recommended doses 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 etc., 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 etc. Throw it in barren isolated area, if possible.
  2. The used / empty containers should be crushed with a stone / stick and buried deep into soil away from water source.
  3. Never re-use empty pesticide container for any purpose.
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