IPM PACKAGE NO. 67

INTEGRATED PEST MANAGEMENT PACKAGE

FOR

LABLAB BEAN

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 LABLAB BEAN

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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.

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IPM PACKAGE FOR LABLAB BEAN

I. MAJOR PESTS:-

(A) Insect pests:

1.	Bean Aphid	(*Aphis craccivora)*
2.	Jassid	(*Empoasca tabae.)*
3.	Red Spider mite	(*Tetrancychus cinnbarinus)*
4.	Hairy caterpillars	(*Spilosoma obliqua, Euproctis fraternal)*
5.	Stem fly	(*Ophiomyia phasioli)*
6.	Pod borers	(*Helicoverpa armigera, Etiella zincknella, Adisura atkinsoni)*

(B) Diseases:

1. Anthracnose
1. Mosaic virus
2. Bacterial leaf spot
3. Ashy stem blight
4. Powdery mildew
5. Rust

(C) Nematodes:

1.	Root Knot nematodes	(*Meloidogyne spp.)*

II. PEST MONITORING:

1. Agro Eco System Analysis (AESA)

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 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 able to undertake exercises. 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. Yellow pan/sticky traps:

Set up yellow pan/sticky traps for monitoring thrips @ 10 traps per ha. Locally available empty yellow tins coated with grease/castor oil on outer surface may also be used as yellow pan trap.

III. INTEGRATED PEST MANAGEMENT PRACTICIES:

i) Grow resistant varieties to avoid viral diseases.
ii) Follow crop rotation.
iii) Use disease free seeds.
iv) Deep summer ploughing (3-5 times) to minimize nematode infestation.
v) Inter-cropping with American marigold (*Tagetes sp.)* is helpful to reduce nematode infestation.
vi) Apply neem cakes @ 120 kg/acre.
vii) Pre-sowing seed treatment with Thiram or Captan or Dithane M-45 @ 3 g/kg of seed to ward off seed borne diseases.
viii) The seed which is used for next season need to be coated with oil or dust to control seed weevil.
ix) Pod borer pests such as *Helicoverpa* and *Adisura,* however, can occur in severe form during early winter. These can be managed by:

a) use of sex pheromone traps for *H. armigera*
b) Application of *Bacillus thuringiensis* and Nuclear Polyhedrosis Virus (NPV) against *H. armigera*
c) Erect bird perches.

x) Use 1% Bordeux mixture against leaf spot.
xi) For powdery mildew, spray crop with mancozeb 75% WP @ 2 g/litre of water.
xii) For aphids control, install yellow sticky traps in the crop field.
xiii) Apply ash dust on sucking pest affected plants.
xiv) Collect and destroy egg masses and larvae during early gregarious stage of leaf eating caterpillar.
xv) Release of *Cotesia sp.* (larval parasite) is useful against caterpillars.
xvi) Spray 5% NSKE to control stem fly and sucking pest.
xvii) As the pods are consumed and plant is fed to cattle, use of insecticides should be avoided.
xviii) During severe infestation by insect pest, spray endosulfan @ 0.07%.

IV. VARIETIES RECOMMENDED:

(a) Pusa early prolific –Vasant
(b) CO 1 &2
(c) Wal konkan (resistant to mosaic virus)
(d) JAD-37, 53, 79, 85
(e) Kalyanpur Type-2
(f) Rajani
(g) Konkan Bhusan
(h) Pusa Sem – 2 & 3.

Tolerant to heat & drought – Arkajaya
Arkavijay.

V. PEST-WISE INTEGRATED MANAGEMENT PRACTICES

Pests/Disease	Practices
Mosaic Virus	Grow resistant varieties. Rough of affected plants.
Bacterial leaf spot	Adopt crop rotation. Use disease free seeds & resistant varieties. Use of cow urine @ 10 Lit/acre as per dilution required, may be helpful.
Leaf spot	Use 1% Bordeux mixture for the disease control.
Powdery mildew	Spray crop with mancozeb 75% WP @ 2 gm per litre of water.
Rust	Grow resistant varieties. Spray crop with mancozeb 75% WP @ 2 gm/litre of water.
Nematodes	Deep summer ploughing (3-5 times). Crop rotation with sorghum and other millets except pearl millet minimum period of 2 years. Inter crop with American marigold (*Tagetas sp.)*. Apply neem cakes @ 300 kg/ha.
Bean aphids	Install yellow sticky traps in the crop field. Use ash dust on affected plant. Apply 0.07% Endosulfan during severe infestation.
Mite	Spraying of 50 gm Hing in 50 lit. of water solution in affected field may be useful.
Hairy Caterpillara	Collect egg masses and larvae during early gregarious stage. Release ***Cotesia sp***. (a parasite). Spray Endosulfan (0.07%) in water during severe infestation.
Stem fly	Sow higher seed rate in endemic area. Rouge of affected plants. Spray 5% NSKE. Spray Endosulfan (0.07%) when initial puncher marks are noticed and spray again when 5 petioles are mined.
Fruit borer	Spray *Bacillus* ***thuringiensis*** var kurstaki @ 500 gm/ha. Spray should be done in late evening hours. Spray 5% NSKE.

VI. BASIC PRECAUTIONS IN PESTICIDE USAGE

A. Purchase:

1. Purchase only JUST required quantity e.g. 100,250,500 or 1000 g/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 your head with cap.
4. Use polyethylene bags as hand gloves, handkerchiefs or piece of clean cloth as mask and a cap or towel to cover the head (Do not use polyethylene 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.
11. The operator should protect his bare feet and hands with polyethylene bags.

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 tooth- brush tied with the sprayer and clean with water.
5. Do not use some sprayer for weedicide and insecticide.

F. **Precautions for applying pesticides:**

1. Apply only at 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 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 burried deep into soil away from water source.
3. Never re-use empty pesticide container for any purpose.