



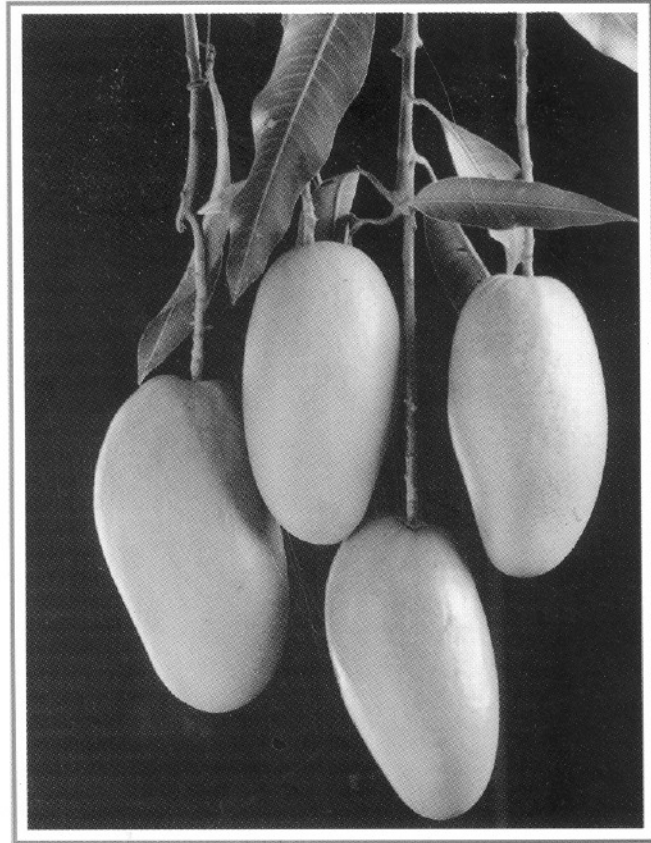
IPM PACKAGE NO. 34



INTEGRATED PEST MANAGEMENT PACKAGE

FOR

MANGO



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 MANGO

CONTENTS

Subjects	Page No.
Foreward	i
Preface	ii
Acknowledgements	iii
I Major Pests :	
A. Pests of National Significance	1
B. Pests of Regional Significance	2
II. Pest Monitoring :	
A. Survey	2
B. Field Scouting	2
C. Pest Monitoring through Traps	3
III. Integrated Pest Management Strategies :	
A. Cultural Practices	3
B. Mechanical Control	4
C. Biological Control	5
D. Chemical Control	5
E. Weed Management	8
IV. Month-wise IPM Strategies for Mango	9-10
V. Safety Parameters	11-14
Annexure I	15-16



Government of India
Ministry of Agriculture
(Department of Agriculture & Cooperation)
DIRECTORATE OF PLANT PROTECTION, QUARANTINE & STORAGE
NH IV, FARIDABAD – 121 001 (Haryana)

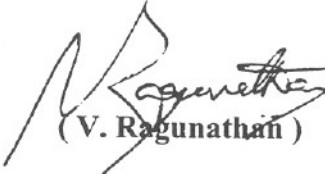
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To the Government of India

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 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 and 2002 to update and develop IPM package of practices for agricultural and horticultural crops. Presently, IPM package of practices for 51 crops have been finalised to help the extension workers and farmers to manage the pests/ diseases and to minimise 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. 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.

April 1, 2002


(V. Raguathan)

P R E F A C E

In order to minimise 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 harmonisation of Package of Practices was organized at National Plant Protection Training Institute (NPPTI), Hyderabad during June 29-30, 1992. Subsequently workshops were organized from April 15-17, 1998 and Nov. 5-6, 1998 at Directorate of Plant Protection, Quarantine & Storage, Faridabad and IPM package of practices for 20 crops were evolved 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 May 14-17, 2001 and Feb. 20-22, 2002 respectively to update 20 available IPM Packages and develop 31 new IPM Packages specially for Horticultural crops. In these workshops, 51 IPM Package of Practices for cereal crops (Rice, Wheat, Maize, Sorghum, Millets), commercial crops (Cotton, Sugarcane, Tobacco, Tea), pulse crops (Pigeonpea, Gram, Black gram/Green gram, Pea, Rajma), oilseeds (Groundnut, Soybean, Rapeseed/Mustard, Sesame, Safflower, Castor, Sunflower, Oilpalm), vegetables (Potato, Onion, Tomato, Brinjal, Okra, Chillies, Cruciferous vegetables, Leguminous vegetables, Cucurbitaceous vegetables), fruit crops (Citrus, Banana, Apple, Mango, Guava, Grapes, Pineapple, Sapota, Pomegranate, Litchi), spice and plantation crops (Small Cardamom, Large Cardamom, Black Pepper, Ginger, Coriander, Cumin, Fennel, Coconut, Cashew and Arecanut) have been finalised.

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 encompasses various management strategies for containing the pest and disease problems. Pest monitoring is also one of the important component 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 Agriculture 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 Indian Agriculture and Horticulture. These will also be useful in reducing the pesticide residues in exportable 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 packages will be useful for the researchers, extension workers and farmers alike who are engaged in the agricultural practices.

April 1, 2002



(A.D. Pawar)
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IPM PACKAGE OF PRACTICES FOR MANGO

I. MAJOR PESTS:

A. Pests of National significance

1. Insect pests

- 1.1 Mango hoppers
- 1.2 Mango mealy bug
- 1.3 Fruit fly
- 1.4 Inflorescence midge
- 1.5 Stem borer
- 1.6 Bark eating caterpillar

2. Diseases

- 2.1 Powdery mildew
- 2.2 Anthracnose
- 2.3 Dieback
- 2.4 Sooty mould

3. Weeds

- 3.1 *Cynodon dactylon*
- 3.2 *Cyperus rotundus*
- 3.3 *Bidens pilosa*
- 3.4 *Tridax procumbens*
- 3.5 *Lagascea mollis*
- 3.6 *Phyllanthus maderaspatensis*
- 3.7 *Loranthus longiflorus* (Semi-parasitic weed)

B. Pests of Regional Significance

1. Insect Pests:

- 1.1 Mango nut weevil (South India)
- 1.2 Shoot gall psyllid bug gall maker (W.Bengal)
- 1.3 Leaf Webber (North India)
- 1.4 Shoot borer (North India)
- 1.5 Coccids

2. Diseases:

- 2.1 Bacterial Canker
- 2.2 Stem end rot
- 2.3 Red rust
- 2.4 Phoma blight

II. PEST MONITORING:

A. Survey:

The objective of survey through roving surveys is to monitor the initial development of pest and disease in the endemic areas. Therefore, for field scouting farmers should be mobilized to observe the pest and disease occurrence at the intervals as stipulated under different developmental stages. The plant protection measures are required to be taken only when biocontrol potential does not show promise and pest and diseases incidences shows increasing trend.

B. Field Scouting:

Field scouting for pests/diseases and biocontrol fauna/flora by extension agencies and farmers once in a fortnight should be undertaken to assess increasing/decreasing

trend in the pest/disease incidence and availability of biocontrol potential. This should be done soon after the appearance of new flush after the fall of old leaves as such stage of the crop having succulent tissues is vulnerable to attack by pests and diseases. The state Departments of Horticulture should make all possible efforts by using different media, mode and publicity to inform the farmers for field scouting in the specific crop area having indication of pest and disease build up.

C. Pest Monitoring through Traps:

1. Through yellow sticky traps: Setup yellow fast coloured sticky traps for monitoring sucking pests one trap/ 5 trees. Locally available empty yellow palmolive-tins coated with grease / vaseline / castor oil on outer surface may also be used.

2. Sex pheromone traps:

These traps are very useful tool in monitoring and control of population of fruitfly. Hanging of bottle traps containing 100ml of water emulsion of methyl eugenol (0.1%) + malathion (0.1%) during fruiting season (April – July) is very effective for control of fruitfly. Ten traps per hectare of orchard gives satisfactory control. Traps can be fixed during morning hours.

III. IPM STRATEGIES:

A. Cultural practices:

1. Deep ploughing of orchard immediately after harvest to expose eggs and pupae of mealy bug, inflorescence midge and fruitfly.
2. Heavy irrigation of orchard in October also helps in destruction of eggs of mealy bug, diapause pupae of midge and fruitfly.

3. Avoid dense planting , keep orchard clean by regular ploughing, removal of weeds and prune the over crowded and overlapping branches in December for control of hoppers.
4. Raking of soil around the tree trunks and mixing with methyl parathion 2% dust @250g per tree for controlling early instar nymphs of mealy bug in the month of November – December.
5. Collection and destruction of stone weevil infested fallen fruits and stones helps in reduction and carry over of infestation.

B. Mechanical Control

1. After mud plastering 25cm wide, 400 gauge alkathene (polythene) sheet should be fastened to the tree trunk with the help of sutli, about 30 cm above the ground level to prevent migration of freshly hatched first instar nymphs of mealy bugs in the month of November – December.
2. Early harvesting of mature fruits to avoid fruitfly infestation, collection and destruction of fruitfly infested fruits.
3. Removal of webs made by leaf webber by leaf removing device and burning them in August to September to control leaf webber.
4. Pruning of overcrowded and overlapping branches for control of leaf webber September – October. Pruning of infested and dried branch 10 cm below the dried portion and pasting of copper oxychloride for control of dieback disease.
5. Diseased foliage /twig infected with anthracnose disease should also be pruned during these months.

6. Removal of powdery mildew infected leaves and malformed panicles in April.

Biological control:

A large number of parasites, predators and pathogens are very active against pests of mango in the fields. These are *Rodolia fumida*, *Suminus renardi*, *Coccinellids*, *Beauveria bassiana*, *Verticillium lacani*, *Mallada boninensis*, *Chrysopa spp.*, *Tertrastichus spp.*, *Trichoderma spp.*, *Gonatocerus spp.*, *Podynema spp.*, *Platygaster sp.*, *Eupulmus sp.*, *Systasis dasyneaurae*, *Micronimus timidis*, *Baccha pulchrifrons*, etc. which play a significant role in population suppression of various insect pests and diseases. These should be conserved in the fields.

D. Chemical control:

i. Insect pests:

1. Three sprays of carbaryl (0.15%) or monocrotophos (0.04%) or *phosphamidon (0.05%) have been recommended for control of hoppers. First spray has to be given at early stage of panicle formation. Second at full length stage of panicles but before full bloom and third after the fruit set at pea stage.
2. Application of 250 g per tree of * methyl parathion (2%) dust in soil around tree trunk is very effective in killing the newly hatched nymphs of mealy bugs. If the nymphs have already ascended on the tree, spraying of monocrotophos (0.05%) or carbaryl (0.2%) is effective. If the alkathene band is applied on the tree trunk and soil application done in time (at the time of emergence of nymphs), there will not be any need to go for spraying of orchard.

3. (i) Soil application of heptachlor or *methyl parathion @ 25 to 30 kg per hectare which kills pupating as well as diapausing larvae in the soil. The insecticide in the soil should be applied after monitoring larval population on white paper sheet below the tree.
- (ii) Spraying of *fenitrothion (0.05%) or dimethoate (0.045%) at the bud burst stage of the inflorescence for controlling inflorescence midge.
4. The adult fruitflies can be controlled by bait sprays of Carbaryl (0.2%) + protein hydrolysate (0.1%) or molasses starting at pre-ovi position stage (first week of April), repeated once after 21 days.
5. Spraying of carbaryl (0.2%) or quinalphos (0.05%) or monocrotophos(0.04%) at fortnightly intervals from the commencement of new flush for controlling shoot borer. A total of 2 to 3 sprays may be done depending on the intensity of infestation.
6. Remove the webs from tree trunks and put emulsion of monocrotophos (0.05%) or *DDVP (0.05%) in each hole and plug them with mud for control of stem borer and bark eating caterpillars.
7. Spraying of monocrotophos(0.05%) or quinalphos (0.05%) at 2 week intervals starting from the middle of August for control of shoot gall psylla. The use of same chemical for every spray should be avoided.
8. Three sprays starting from the last week of July at 15 days interval with carybaryl (0.2%) or monocrotophos (0.05%) or quinalphos (0.05%) for controlling leaf webber.
9. Spray of fenthion 50 EC at the rate of 2ml/litre of water during late March and up to mid April has been control of adult weevils of stone weevil.

10. Padding with monocrotophos 36 WSC 10 ml per tree soaked in absorbent cotton when the trees are not in bearing stage to control stem borer in South India.

ii. Diseases:

1. Spray sulphur 80% @3.13kg/ha (750-1000 lit of water) or tridemorph 300-375 ml/ha or dinocap 48% EC @5ml/10 lit of water. At 15 days interval for control of powdery mildew.
These fungicides can be used alternatively and the first spray is to be given at panicle emergence stage.
2. Sprays carbendazim 50%WP @350g/750 lit of water/ha at 15 days interval during flowering to control blossom infection of anthracnose.
3. Spray of *copper oxychloride (0.3%) just after the appearance of the disease and subsequent sprays at 20 day intervals for control phoma blight and dieback.
4. Three sprays of *Streptocycline(0.01%) or *Agrimycin- 100 (0.01%) after first visual symptom at 10 day intervals and (iii) monthly sprays of *carbendazim (0.1%) or *copper oxychloride (0.3%) are also found effective for control of Mango bacterial canker.
5. Two to three sprays of *copper oxychloride (0.3%) for controlling phoma blight disease.
6. Spraying of 2 % starch and sprays of * Wettasyk+Methyl Parathion +gumacasea (0.2%+0.1%+0.3%) for control of sooty mould.
7. Three pre-harvest spray of benomyl @3g/tree/10 lit of water or hexaconazole 5% EC or 5% SC @0.01% at 15 days interval should be done in such a way that the last

spray falls 15 days prior to harvest and post-harvest dip of fruits in *carbendazim (0.1%) in hot water at $52+1^0$ C for 15 minutes for controlling all post-harvest diseases.

E. Weed Management:

1. Before setting up of an orchard, the weeds should be destroyed by deep-ploughing, harrowing and weeding.
2. Perennial summer ploughing.
3. Drip irrigation should be preferred over flood irrigation to conserve water and to reduce weed problems.
4. Inter-cropping of short duration shallow root crops like onion, tomato, raddish, carrot, beans, cauliflower, palak, should be practiced to reduce the weed infestation.
5. Cover crop like sun hemp in light and sesbenia in heavy soil may be raised.

*Not as per approved usage under Insecticide Act, 1968

IV. MONTH-WISE IPM STRATEGIES FOR MANGO

Month	IPM Practices to be adopted
July	Deep ploughing of orchard immediately after harvest to expose eggs and pupae of mealy bug and inflorescence midge.
August-September	<p>Removal of webs (made by leaf webber) by leaf web removing device and burning them.</p> <p>If infestation still continues spray carbaryl (0.2%) or monocrotophos (0.04%).</p> <p>Pruning of over crowded and overlapping branches for control of leaf webber.</p>
October	<p>Flooding of orchards to control eggs of mealy bug, diapausing pupae of midge and fruit fly.</p> <p>Pruning of infected and dried branches, 10 cm below the dried portion and pasting of copper oxychloride for control of die back.</p> <p>Spraying 0.3 per cent copper oxychloride (3g/l) after pruning for the control of die back, phoma blight, anthracnose and red rust diseases.</p> <p>Removal of diseased foliage/twig infected with anthracnose (Twig blight phase).</p> <p>Removal of weeds.</p>
November	<p>Deep ploughing of the orchards for exposing eggs and pupae of insects and removal of weeds in mango orchard which harbour pests and diseases.</p> <p>Second spraying of copper oxychloride (3g/l) for control of dieback and foliar diseases.</p> <p>Collection of dropped diseased leaves and burning them.</p>
December	<p>Fastening of alkathene sheet of 400 gauge thickness 25 cm. wide around the base of tree for control of mealy bug.</p> <p>Raking of soil around the trunk and mixing with neem cake for management of mealy bug nymphs or apply 2% dust of *methyl parathion @ 250 g/tree or *chlorpyrifos 2% dust. Application of <i>Beauveria bassiana</i> around tree trunk to manage nymphs of mealy bug.</p>

<p>January</p>	<p>Alkathene bands should be cleaned at regular intervals.</p> <p>Spraying of *fenitrothion (0.05%) or dimethoate (0.045%) at the bud burst stage for control of inflorescence midge.</p> <p>Removal of weeds and infected young leaves of mango for control of powdery mildew.</p>
<p>February</p>	<p>First spraying with 5% Neem Seed Kernel Extract (NSKE) or Nimbicidine (2%) at bud burst stage for control of hoppers. Spraying of <i>Verticilium lacani</i> (10^6) at bud burst stage for control of hopper and should be repeated during July (Second appearance) for controlling next generation hoppers.</p>
<p>March</p>	<p>Second spray with 5% Neem Seed Kernel Extract (NSKE) or Nimbicidine (2%) when fruits are of pea size stage.</p> <p>First spray of sulphur (2g/l) for powdery mildew.</p>
<p>April</p>	<p>Third spray with endosulfan (0.07%) if required after 5 days of second spray.</p> <p>Second spraying of Sulphur (2g/l) after fruit setting against powdery mildew.</p> <p>Removal of powdery mildew infected leaves and malformed panicles.</p>
<p>May</p>	<p>Hanging of *methyl euginol traps (0.1%) + malathion (0.01%) for control of fruit fly.</p>
<p>June</p>	<p>Methyl euginol traps will be continued.</p> <p>Early harvesting of mature fruits to avoid fruit fly infestation.</p> <p>Collection and destruction of fruit fly infested fruits.</p>

*Not as per approved usage under Insecticide Act, 1968

SAFETY PARAMETERS IN PESTICIDES USAGE

S. No	Name of pesticide	Classification as per Insecticides Rules, 1971	Colour of Toxicity Triangle	WHO classification by hazard	First aid measures	Symptoms of poisoning	Treatment of poisoning	Waiting period (No. of days)
INSECTICIDES								
ORGANOCHLORINE PESTICIDES								
1.	Endosulfan	Highly toxic	Yellow	Class II – Moderately Hazardous	<p>Remove the person from the contaminated environment.</p> <p>In case of (a) Skin contact – Remove all contaminated clothings and immediately wash with lot of water and soap; (b) Eye contamination – Wash the eyes with plenty of cool and clean water; (c) Inhalation – Carry the person to the open fresh air, loosen the clothings around neck and chest, and (d) Ingestion – If the victim is fully conscious, induce vomiting by tickling back of the throat. Do not administer milk, alcohol and fatty substances. In case the person is unconscious make sure the breathing passage is kept clear without any obstruction. Victim's head should be little lowered and face should be turned to one side in the lying down position. In case of breathing difficulty, give mouth to mouth or mouth to nose breathing.</p> <p>Medical aid: Take the patient to the doctor/Primary Health Centre immediately along with the</p>	<p>Nausea, vomiting, restlessness, tremor, apprehension, convulsions, coma, respiratory failure and death</p>	<ul style="list-style-type: none"> - Gastric lavage with 2-4 L. tap water – Catharsis with 30 gm. (10 oz) sodium sulphate in one cup of water - Barbiturates in appropriate dosages repeated as necessary for restlessness or convulsions - Watch breathing closely, aspirate, oxygen and/or artificial respiration, if needed. - Avoid oils, oil laxatives and epinephrine (Adrenalin) – do not give stimulants. - Give calcium gluconate (10% in 10 ml. Ampules) intravenously every four hours. 	

ORGANOPHOSPHATE PESTICIDES

2.	Monocrotophos	Extremely toxic	Bright Red	Class Ib - Highly Hazardous		Mild - anorexia, headache, dizziness, weakness, anxiety, tremors of tongue and eyelids, miosis, impairment of visual acuity.	For extreme symptoms of O.P poisoning, injection of atropine (2-4 mg., for adults, 0.5-1.0 mg for children) is recommended, repeated at 5-10 minute intervals until signs of atropinization occur.
3.	Quinalphos	Highly toxic	Yellow	Class II - Moderately hazardous			
4.	Malathion	Moderately toxic	Blue	Class III - Slightly hazardous		Moderate- nausea, salivation, lacrimation, abdominal cramp, vomiting, sweating, slow pulse, muscular tremors, miosis.	Speed is imperative
5.	Dimethoate	Highly toxic	Yellow	Class II - Moderately hazardous			- Atropine injection - 1 to 4 mg. Repeat 2 mg. when toxic symptoms begin to recur (15-16 minute intervals). Excessive salivation - good sign, more atropine needed;
6.	Chlorpyrifos	-do-	-do-	-do-		Severe - diarrhoea, pinpoint and non-reactive pupils, respiratory difficulty, pulmonary edema, cyanosis, loss of sphincter control, convulsions, coma and heart block.	- Keep airways open, Aspirate, use oxygen, insert endotracheal tube. Do tracheotomy and give artificial respiration as needed.
7.	Fenthion	-do-	-do-	-do-			- For ingestion lavage stomach with 5% sodium bicarbonate, if not vomiting. For skin contact, wash with soap and water (eyes- wash with isotonic saline). Wear rubber gloves while washing contact areas.
8.	Fenitrothion	-do-	-do-	-do-			
9.	Phosphamidon	-do-	-do-	-do-			
9.	Dichlorovos	Extremely toxic	Bright Red	Class Ia - Extremely hazardous			
10.	Methyl Parathion	-do-	-do-	-do-			
11.		-do-	-do-	-do-			
							In addition to atropine give 2-PAM (2-pyridine aldoxime methiodide). 1 g

							<p>and 0.25 g for infants intravenously at a slow rate over a period of 5 minutes and administer again periodically as indicated. More than one injection may be required.</p> <p>Avoid morphine, theophyllin, aminophyllin, barbiturates or phenothiazines.</p> <p>Do not give atropine to a cyanotic patient. Give artificial respiration first then administer atropine.</p>
CARBAMATES							
12.	Carbaryl	Highly toxic	Yellow	Class II - Moderately hazardous		<p>Constriction of pupils, salivation, profuse sweating, lassitude, muscle incoordination, nausea, vomiting, diarrhoea, epigastric pain, tightness in chest.</p>	<ul style="list-style-type: none"> - Atropine injection 1 to 4 mg. Repeat 2 mg when toxic symptoms begin to recur (15-60 minute intervals). Excessive salivation – good sign, more atropine needed. - Keep airway open. Aspirate, use oxygen, insert endotracheal tube. Do tracheotomy and give artificial respiration as needed. - For ingestion, lavage stomach with 5% sodium bicarbonate, if not vomiting. For skin contact was with soap and water (eyes – wash with isotonic saline). Wear rubber gloves

							<p>while washing contact area.</p> <ul style="list-style-type: none"> - Oxygen - Morphine, if needed. <p>Avoid theophyllin and aminophyllin or barbiturates.</p> <p>2-PAM and other oximes are not harmful and in fact contra indicated for routine usatge.</p> <p>Do not give atropine to a cyanotic patient. Give artificial respiration first then administer atropine.</p>
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FUNGICIDES

13.	Carbendazim	Slightly toxic	Green	Table 5 – Unlikely to present acute hazard in normal use		Headache, palpitation, nausea, vomiting, flushed face, irritation of nose, throat eyes and skin etc.,	No specific antidote. Treatment is essentially symptomatic.
14.	Dinocap						
15.	Copper Oxchloride						
16.	Benomyl						
17.	Thiophanate Methyl						

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 same 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 buried deep into soil away from water source.
3. Never re-use empty pesticide container for any purpose.