

# IPM in Brinjal

Integrated pest management practices in Brinjal

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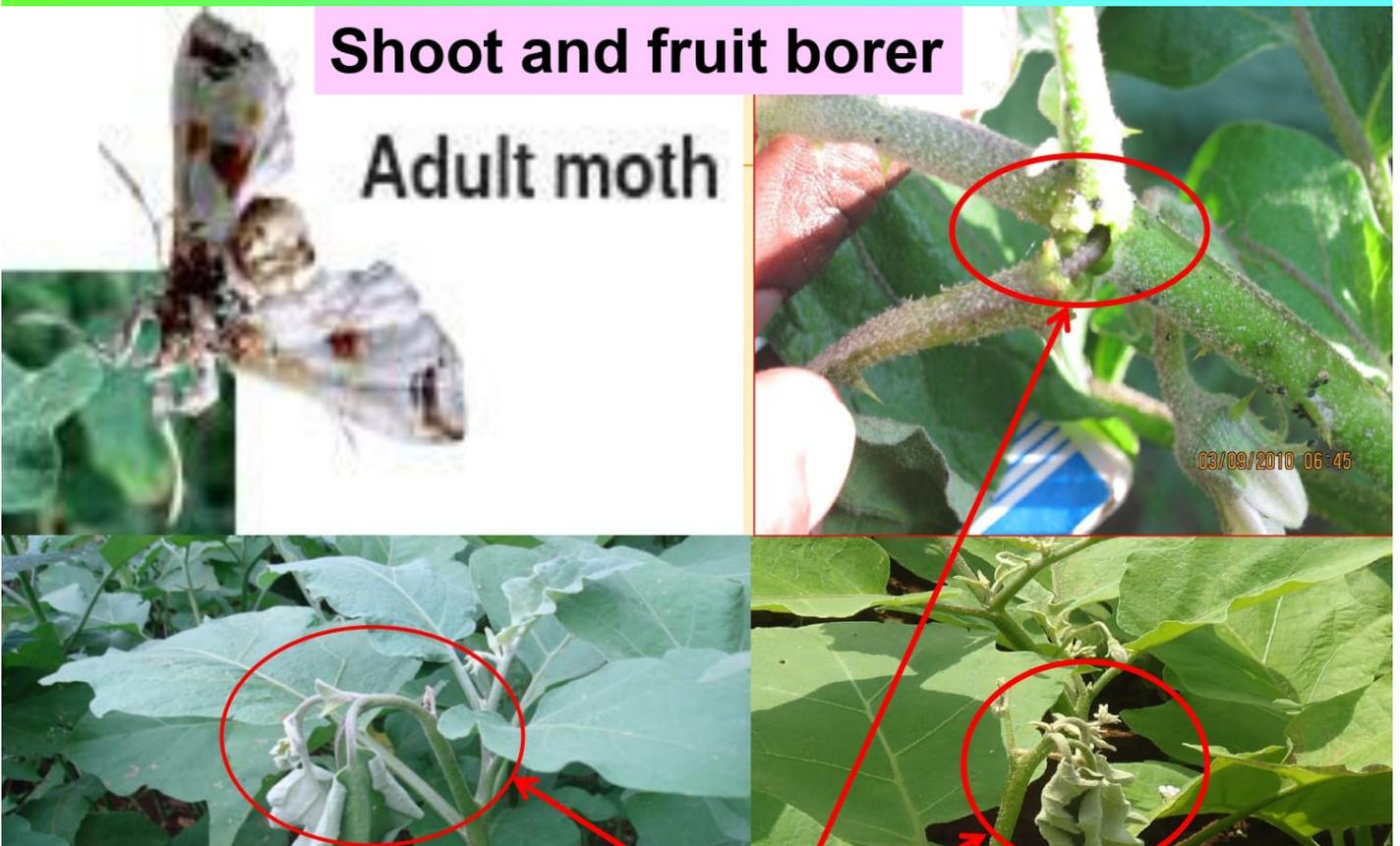
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# Read report on IPM in Brinjal

## IPM IN BRINJAL

**Shoot and fruit borer**

**Adult moth**





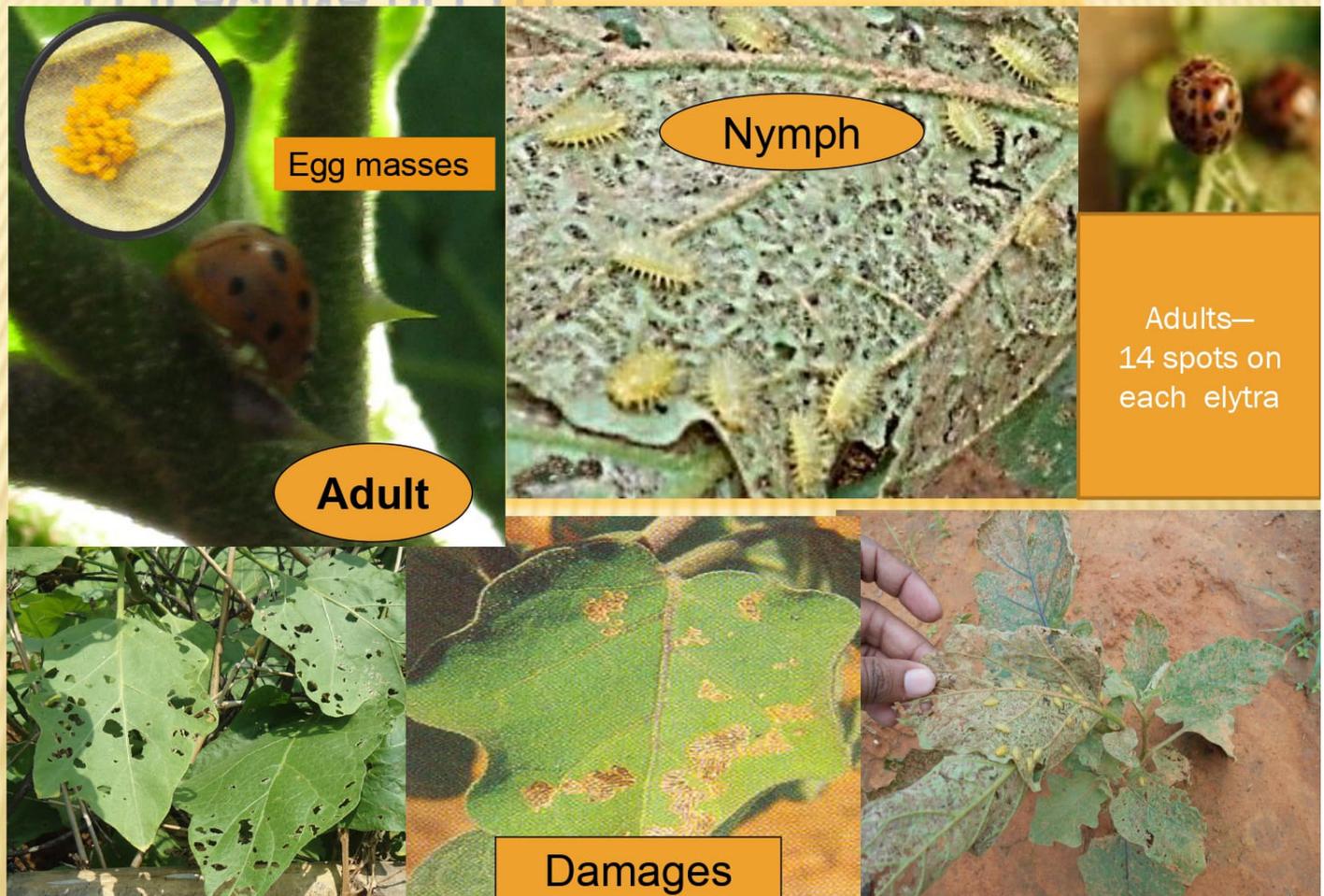
## Shoot and fruit borer

- ✘ Identification of the pest
- ✘ Eggs - Creamy white eggs
- ✘ Larva - pink in colour
- ✘ Pupa- greyish boat shaped cocoon
- ✘ Adult- a medium sized moth
- ✘ Forewings- having black and brown patches and dots on white colour
- ✘ Hind wings – opalescent with black dots
- ✘ **Symptoms of the pest attack, Nature of damage**
- ✘ pale yellow, disc-like eggs on underside of leaves
- ✘ young pale green larvae feeding on the surface of tender leaves
- ✘ older larvae are enclosed within the case and feed by scraping leaf tissues or biting through leaf sheaths
- ✘ Withering of terminal shoots/ dead hearts
- ✘ Bore holes on shoots and fruits plugged with excreta
- ✘ Shedding of flower buds
- ✘ Withering and drying of leaves

# MANAGEMENT

- ✗ Remove and destroy the affected tender shoots, fallen fruits and fruits with bore holes
- ✗ Avoid continuous cropping of brinjal crop
- ✗ Grow the varieties with long and narrow fruits in endemic areas
- ✗ Install pheromone trap@12/ha
- ✗ *Bacillus thuriangiensis* var *kurstaki* @ 1500 ml/ ha (750 lit of spray fluid)
- ✗ Encourage the activity of larval parasitoids:
  - ✗ *Pristomerus testaceus*
  - ✗ *Cremastus flavoorbitalis*
- ✗ Release egg parasitoid: *Trichogramma chilonis* @ 50,000/ ha, four times from 30 DAT
- ✗ Spray endosulfan 35 EC @ 2 ml/lit + neem oil 2ml/lit
- ✗ Quinalphos 25 EC @ 1ml/lit + neem oil 2ml/lit
- ✗ Neem seed kernel extract (NSKE) 5 %
- ✗ Avoid use of synthetic pyrethroids
- ✗ Avoid using insecticides at the time of fruit maturation and harvest

## EPILACHNA BEETLE



## EPILACHNA BEETLE.....

- × Identification of the pest
- × Eggs- Cigar shaped, yellow in colour
- × Grub: Yellowish bearing six rows of longitudinal spines.
- × Pupa: Yellowish with spines on posterior part and anterior portion being devoid of spines.
- × Symptoms of damage
- × Scrapping of chlorophyll
- × Skeletonization and drying of leaves
- × Management
- × Spray endosulfan 35 EC @ 2ml/lit , neem oil 2ml/lit

## BRINJAL STEM BORER



Basal portion of the stem is affected

# BRINJAL STEM BORER.....

## Identification of the pest

- ✘ Egg- Cream, scale-like
- ✘ Larva - Fully grown larva is creamy white
- ✘ Adult - Greyish brown,
- ✘ Forewings- with transverse line and
- ✘ Hind wings - white in colour

## Symptoms of damage

- ✘ Top shoots of young plants droop and wither.
- ✘ Older plants become stunted.
- ✘ Fruit bearing is affected

## Management

- ✘ Collect and destroy the damaged and dead plants
- ✘ Light trap @ 1/ha to attract and kill adults
- ✘ Spray endosulfan 35 EC @ 2ml/lit , neem oil 2ml/lit
- ✘ Avoid using synthetic pyrethroids causing resurgence

# BRINJAL LEAF WEBBER

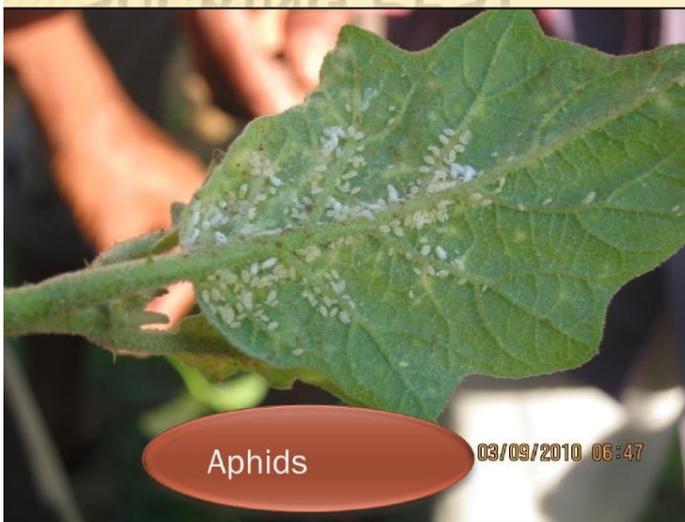


# BRINJAL LEAF ROLLER



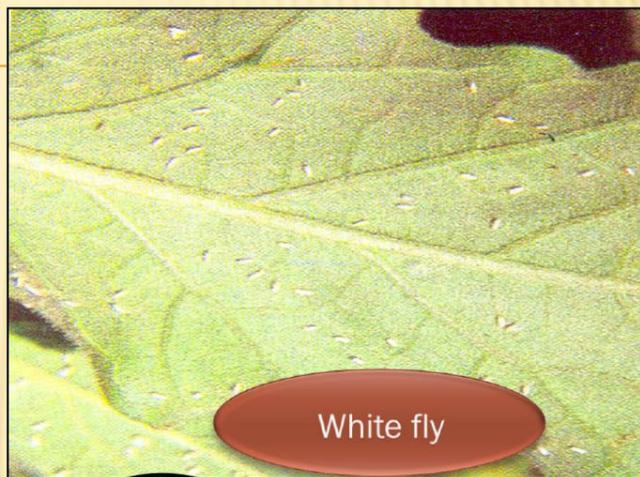
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# SUCKING PEST

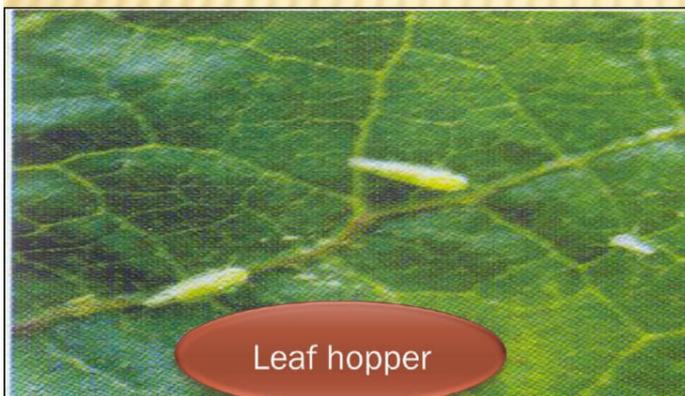


Aphids

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White fly



Leaf hopper



Red spider mites

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## IPM PRACTICES IN BRINJAL

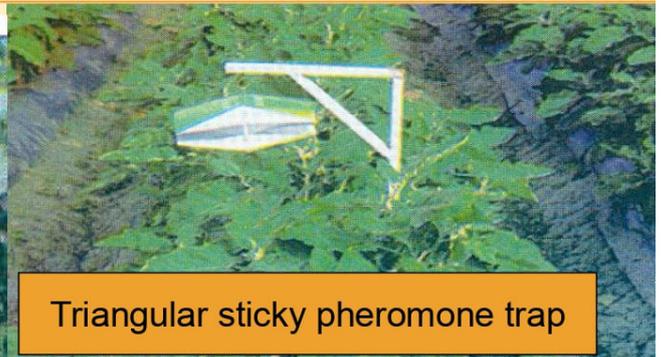
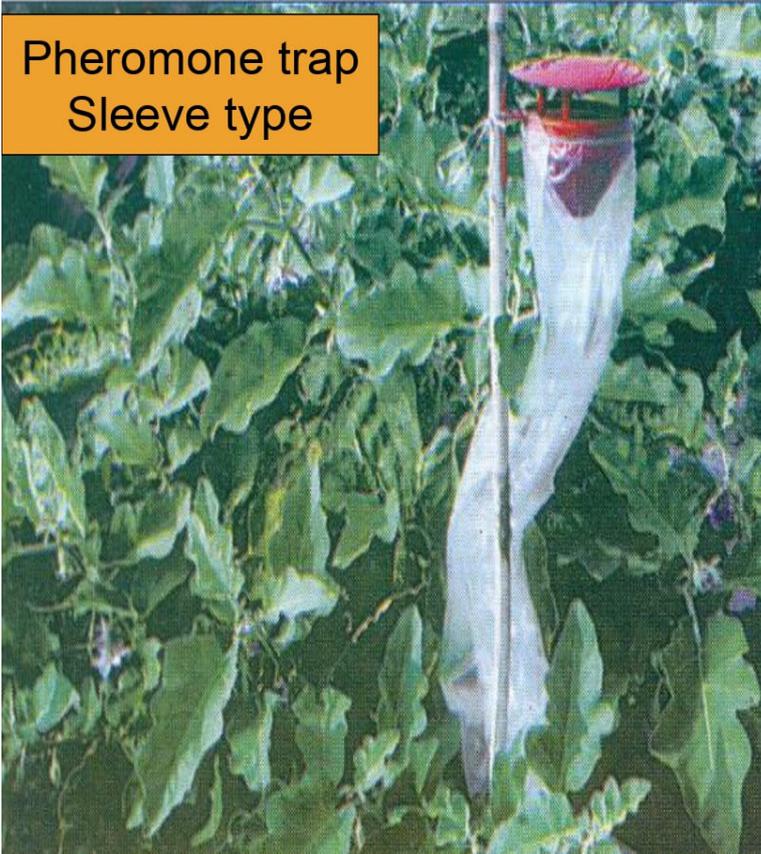
- ✘ Destruction of previous brinjal crop residues
- ✘ Seed treatment with imidacloprid/thiamethoxam 70WS @5g/Kg
- ✘ Application of neem cake @ 100Kg/ac at final land preparation
- ✘ Application of carbofuran 3G @ 10-12Kg/ac at first earthing
- ✘ Removal and destruction of withered and dried shoots and bored fruits
- ✘ Avoidance of ratooning to check stem borer attack
- ✘ Removal and destruction of webbed leaves due to leaf webber and roller
- ✘ Collection and destruction of egg masses, skeletonized leaves with grubs, pupae and adults of epilachna beetle

## IPM PRACTICES IN BRINJAL

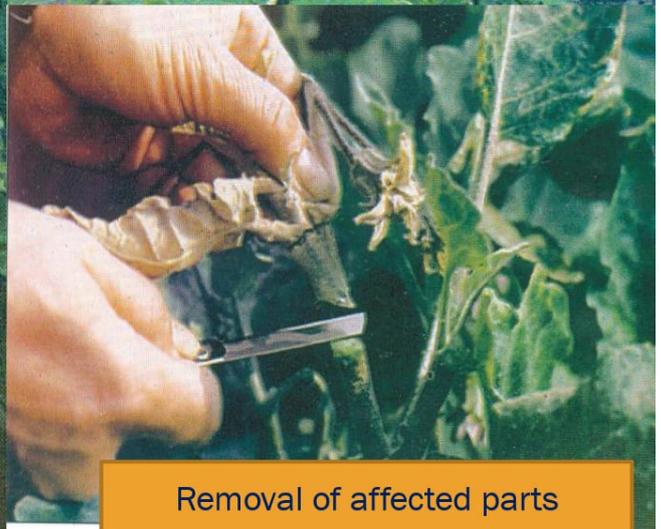
- ✘ Setting yellow sticky traps to attract whiteflies
- ✘ Setting pheromone traps @ 25/acre
- ✘ Release of *Bracon brevicornis* for S&FB
- ✘ Spraying neem based pesticides @ 4-5ml/lit at 7-10days intervals
- ✘ Spraying *Bacillus thuringiensis* (Bt) formulations @ 1kg/ha
- ✘ Spraying spinosad 45SC @ 50ml/ac
- ✘ Spraying biorationals like diflubenuron/ Novaluron@ 500ml/ha

# PHEROMONE TRAPS

Pheromone trap  
Sleeve type



Triangular sticky pheromone trap



Removal of affected parts

# NATURAL ENEMIES



*Trathala flavo-orbitalis*



Spider



Preying mantis



Assasin bug

## IPM PRACTICES IN BRINJAL

- ✘ If shoot infestation >4% and fruit infestation >14% then spray any chemicals alternated with each other
- ✘ Endosulfan/triazophos/cartap hydrochloride/profenophos/fipronil @ 400ml/ha or carbaryl @ 600g/ac or deltamethrin+ buprofezin @ 400ml /ac
- ✘ These insecticides also take care of epilachna beetle, leaf webber, leaf roller and lace wing bug
- ✘ One spraying with synthetic pyrethroids may be done. Regular use causes whitefly resurgence
- ✘ Before spraying all fruits should be harvested
- ✘ Observe waiting period recommended for different insecticides

## IPM PRACTICES IN BRINJAL

- ✘ Safe waiting period for carbaryl is 3-10d
- ✘ Malathion 4days
- ✘ Cypermethrin/deltamethrin/permethrin 2days
- ✘ Endosulfan 1-5days
- ✘ Triazophos 7days
- ✘ Fenvalerate 1day
- ✘ If mite incidence is more then spray wettable sulphur @ 5g/lit or ethion @ 200ml/ac ordicofol @ 1lit/ac or propargite @ 500-600ml/ac

# Damping off (pythium spp, Phytophthora spp)



## DAMPING OFF.....

### Symptoms

- ✘ Both the Pre-emergence and Post-emergence damping-off symptoms are seen in diseased state.
- ✘ The germinating seeds are infected by fungi at the initial stages.
- ✘ The infection later spreads to hypocotyls basal stem and developing roots.
- ✘ The Post-emergence damping off phase is characterized by infection of the young, juvenile tissues of the collar at the ground level.
- ✘ The affected seedlings become pale green and brownish lesions are found at the collar region, resulting in botting and topple over of seedlings.

### Management

- ✘ After 10-12 days Spray blue copper 3-gm or Ridomil 2-gm or Ektara – 1gm with 3 ltrs of water

## ALTERNARIA BLIGHT (*ALTERNARIA SPP.*)



## ALTERNARIA BLIGHT (*ALTERNARIA SPP.*)

### Symtoms

- ✘ Causes characteristic spot on the leaf with concentric rings.
- ✘ Affected leaves may drop off.
- ✘ It may also infect fruits that turn yellow and may drop off prematurely.

### Management

- ✘ Spraying of Handikhata /Neem oil weekly
- ✘ Growing tolerant variety Pant Samrat
- ✘ Spraying of 1% Bordeaux mixture OR copper oxychloride @ 2g OR Zineb @ 2.5g per litre of water

## CERCOSPORA LEAF SPOT



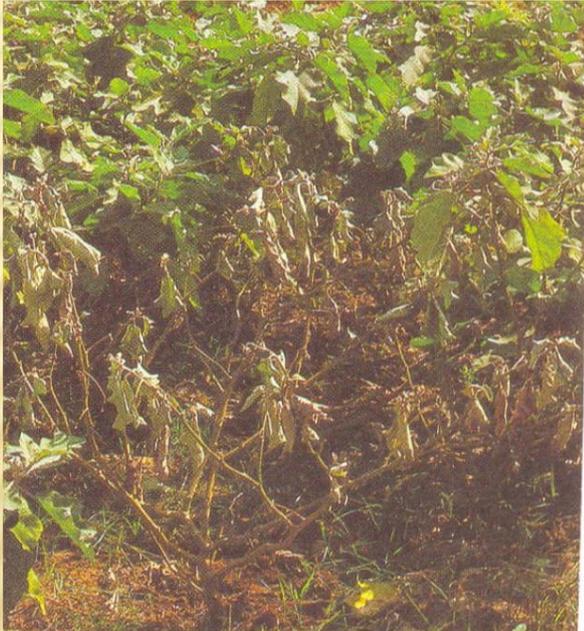
Advanced symptom

Early symptom

## CERCOSPORA LEAF SPOT

- ✘ Management of leaf spot disease
- ✘ Growing tolerant variety Pant Samrat
- ✘ Spraying of 1% Bordeaux mixture OR copper oxychloride @ 2g OR Zineb @ 2.5g per litre of water

# COLLAR ROT



Collar rot affected plants



Mycelium and sclerotia on stem

# COLLAR ROT

## Management

- ✘ Summer ploughing
- ✘ Destruction of stubbles of the previous crop
- ✘ Spraying the crop from seedling till fruiting with Blitox/ Captan/Indofil M-45 @ 2.5g/litre of water
- ✘ Spraying Sixer/ Saaf/ Companion @ 2g/lit
- ✘ Seed treatment with *Trichoderma viridae* @ 4-5g/Kg seed Or vitavax power @ 2g/Kg seed

# PHOMOPSIS BLIGHT AND FRUIT ROT



# PHOMOPSIS BLIGHT AND FRUIT ROT

## Management

- ✘ Summer ploughing
- ✘ Destruction of stubbles of the previous crop
- ✘ Spraying the crop from seedling till fruiting with Blitox/ Captan/Indofil M-45 @ 2.5g/litre of water
- ✘ Spraying Sixer/ Saaf/ Companion @ 2g/lit

# BACTERIAL WILT



## BACTERIAL WILT

### Management

- ✘ Crop rotation with cruciferous vegetables
- ✘ Seed treatment with plantomycin/streptocycline
- ✘ Seedling root dip with plantomycin 1g/lit or streptocycline 1g/10lit for 30 minutes
- ✘ Uprooting and destruction of affected plants and soil drenching with above chemicals

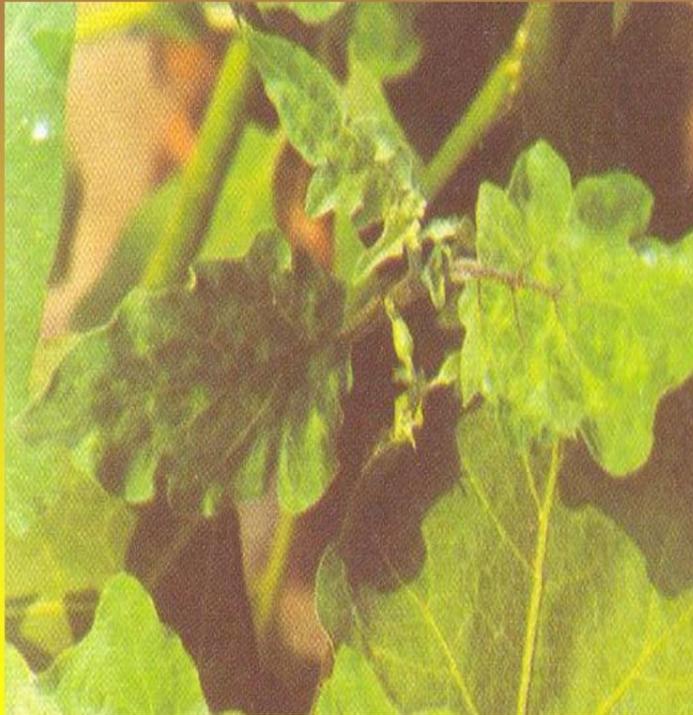
## LITTLE LEAF OF BRINJAL



## MANAGEMENT OF LITTLE LEAF

- ✘ Growing tolerant variety – Pusa Purple Round
- ✘ Collection and destruction of affected plants help check spread of the disease
- ✘ Spraying chemicals like imidacloprid 200SL @ 50ml/ac or thiamethoxam 25WG @ 50g/ac at 10-15days intervals controls the vector of the disease leafhopper

# MOSAICS



# MOSAICS

## Management

- ✘ Uprooting and destruction of affected plant and plant parts
- ✘ Spraying methyl demeton/dimethoate @400ml/ac OR imidacloprid @ 50ml/ac OR Thiamethoxam @ 50g/ac to control aphids