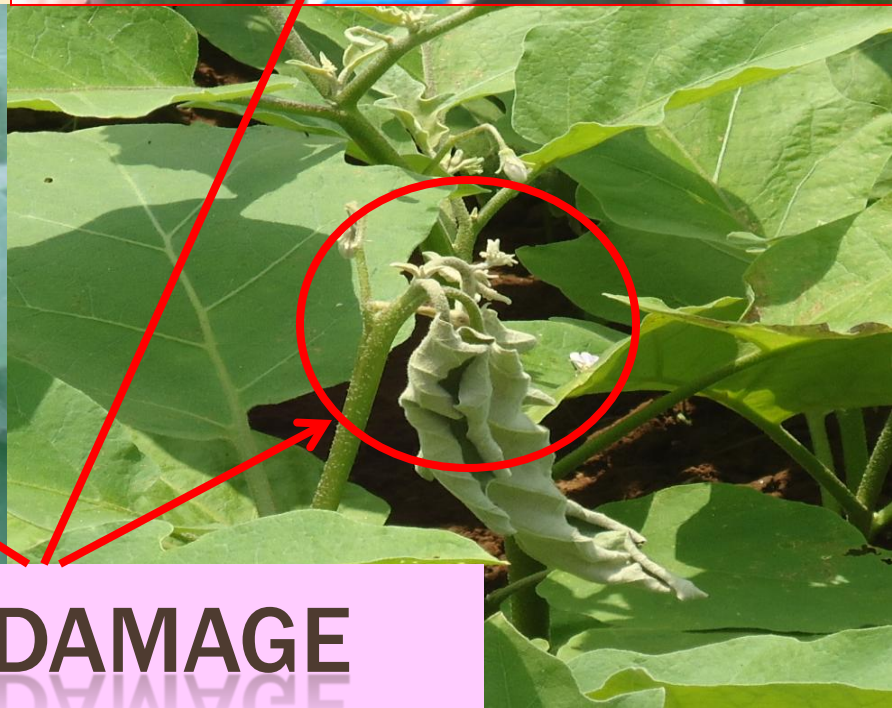
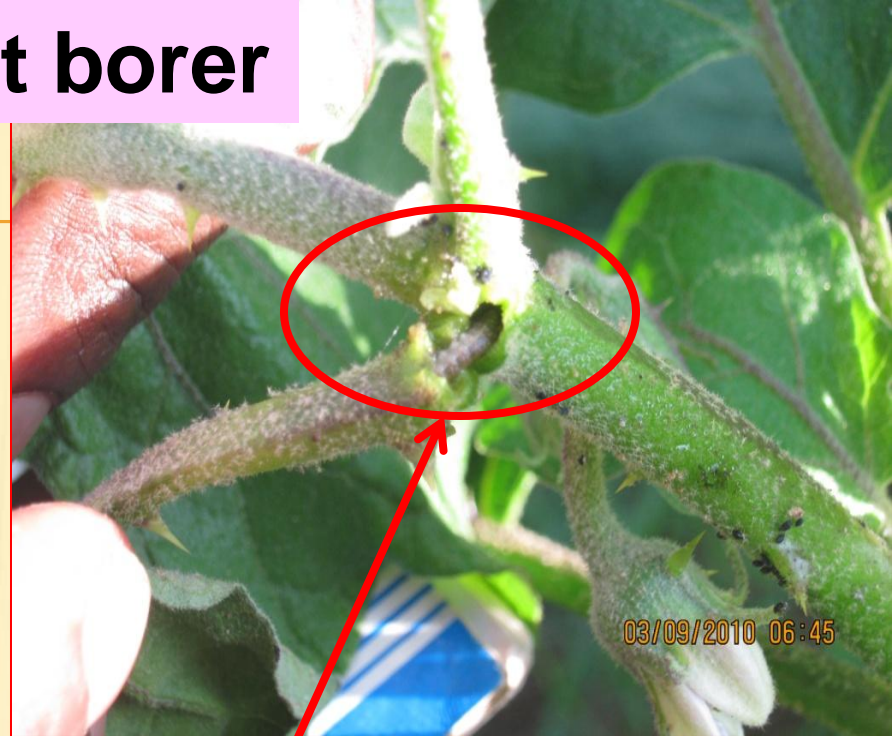


IPM IN BRINJAL

Shoot and fruit borer

Adult moth



SHOOT DAMAGE

FRUIT DAMAGE



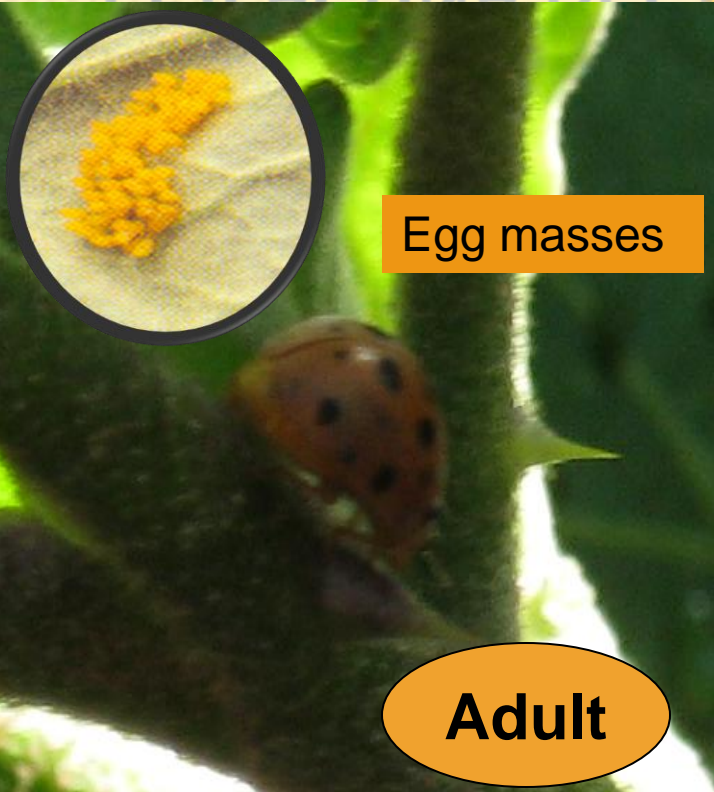
Shoot and fruit borer

- ✗ **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

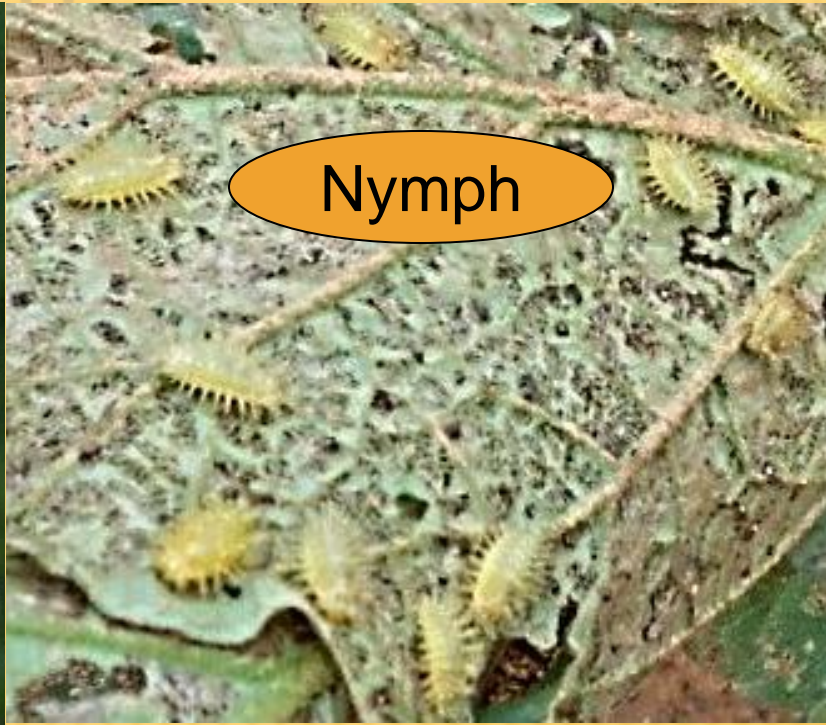
- ✗ Remove and destroy the affected tender shoots, fallen fruits and fruits with bore holes
- ✗ Avoid continuous cropping of brinjal crop
- ✗ Grow the varieties with long and narrow fruits in endemic areas
- ✗ Install pheromone trap@12/ha
- ✗ *Bacillus thuriangiensis* var *kurstaki* @ 1500 ml/ ha (750 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



Egg masses

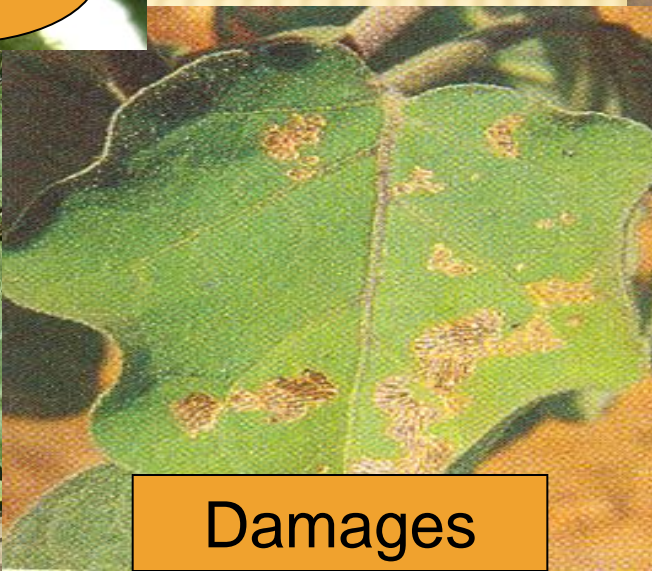
Adult



Nymph



Adults—
14 spots on
each elytra



Damages



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

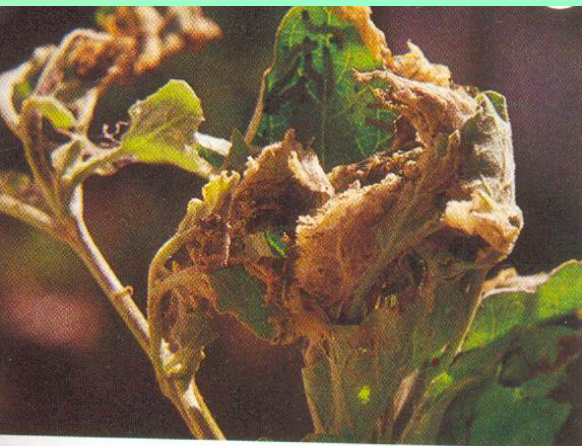
Symptoms of damage

- ✗ 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



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BRINJAL LEAF ROLLER

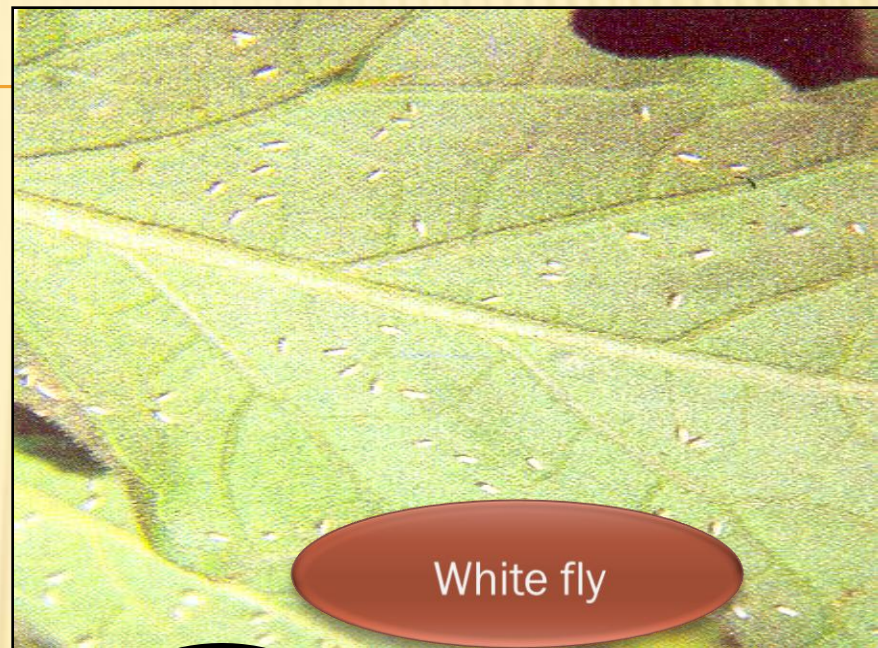


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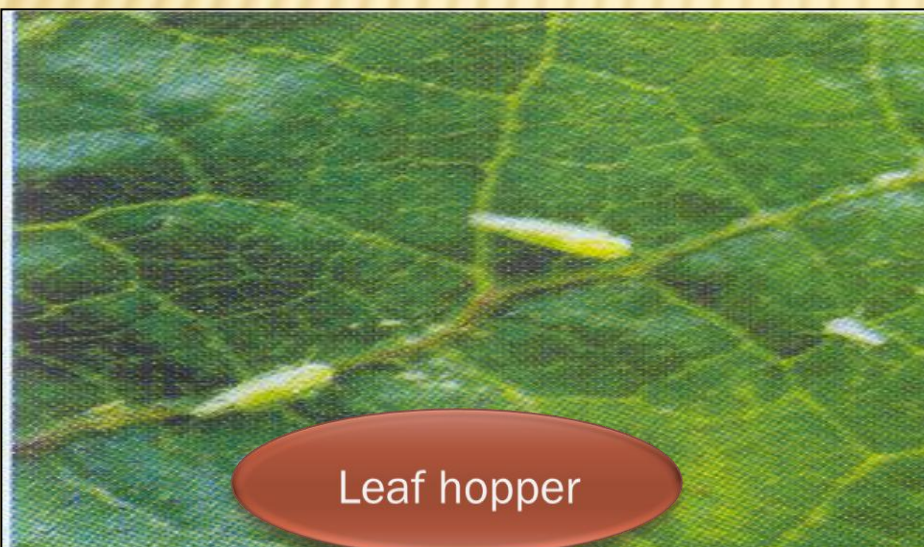
SUCKING PEST



Aphids



White fly



Leaf hopper



Red spider
mites

IPM PRACTICES IN BRINJAL

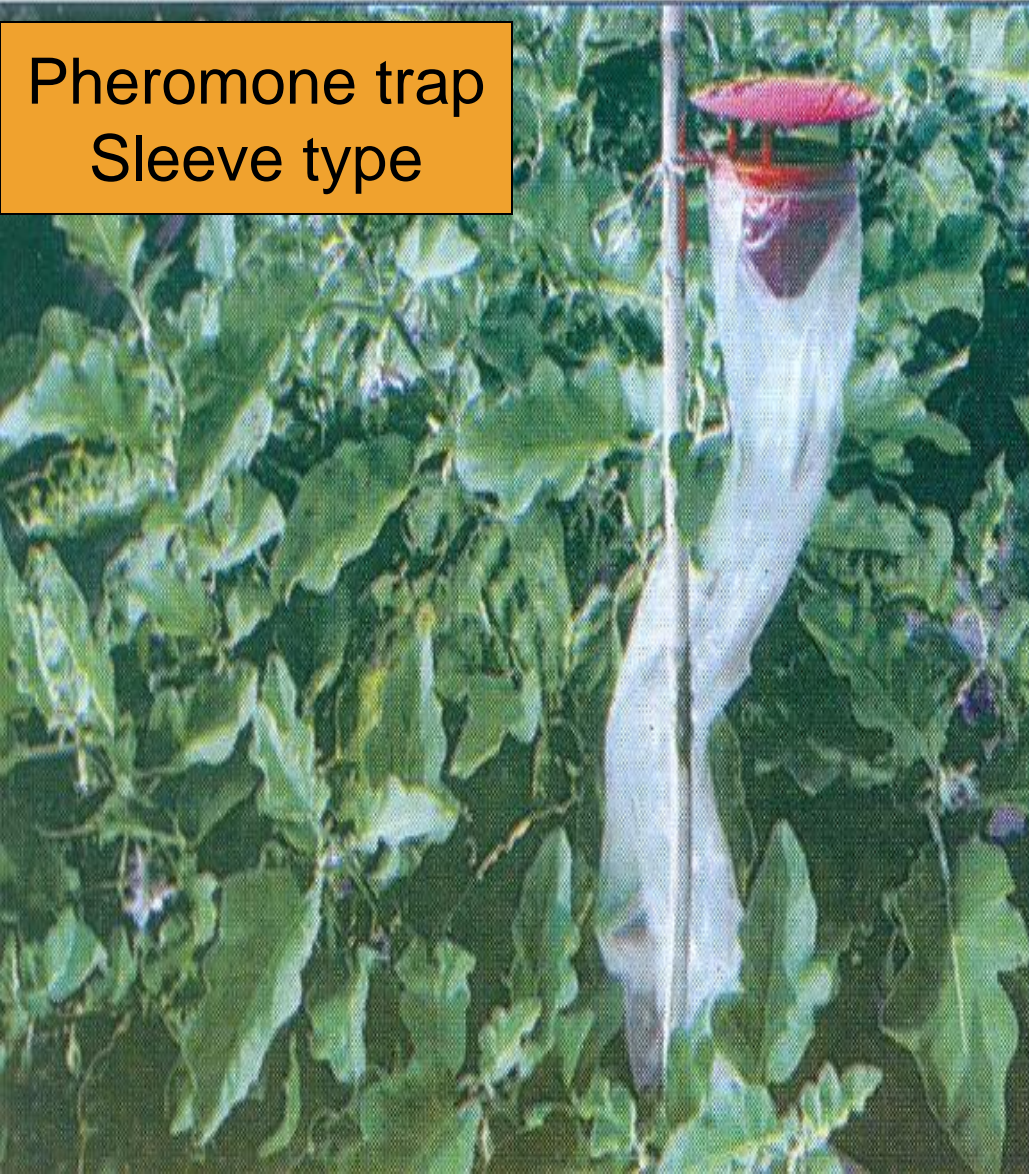
- ✗ Destruction of previous brinjal crop residues
- ✗ Seed treatment with imidacloprid/thiamethoxam 70WS @5g/Kg
- ✗ Application of neem cake @ 100Kg/ac at final land preparation
- ✗ Application of carbofuran 3G @ 10-12Kg/ac at first earthing
- ✗ Removal and destruction of withered and dried shoots and 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



Assassin 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 bolting 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.*)

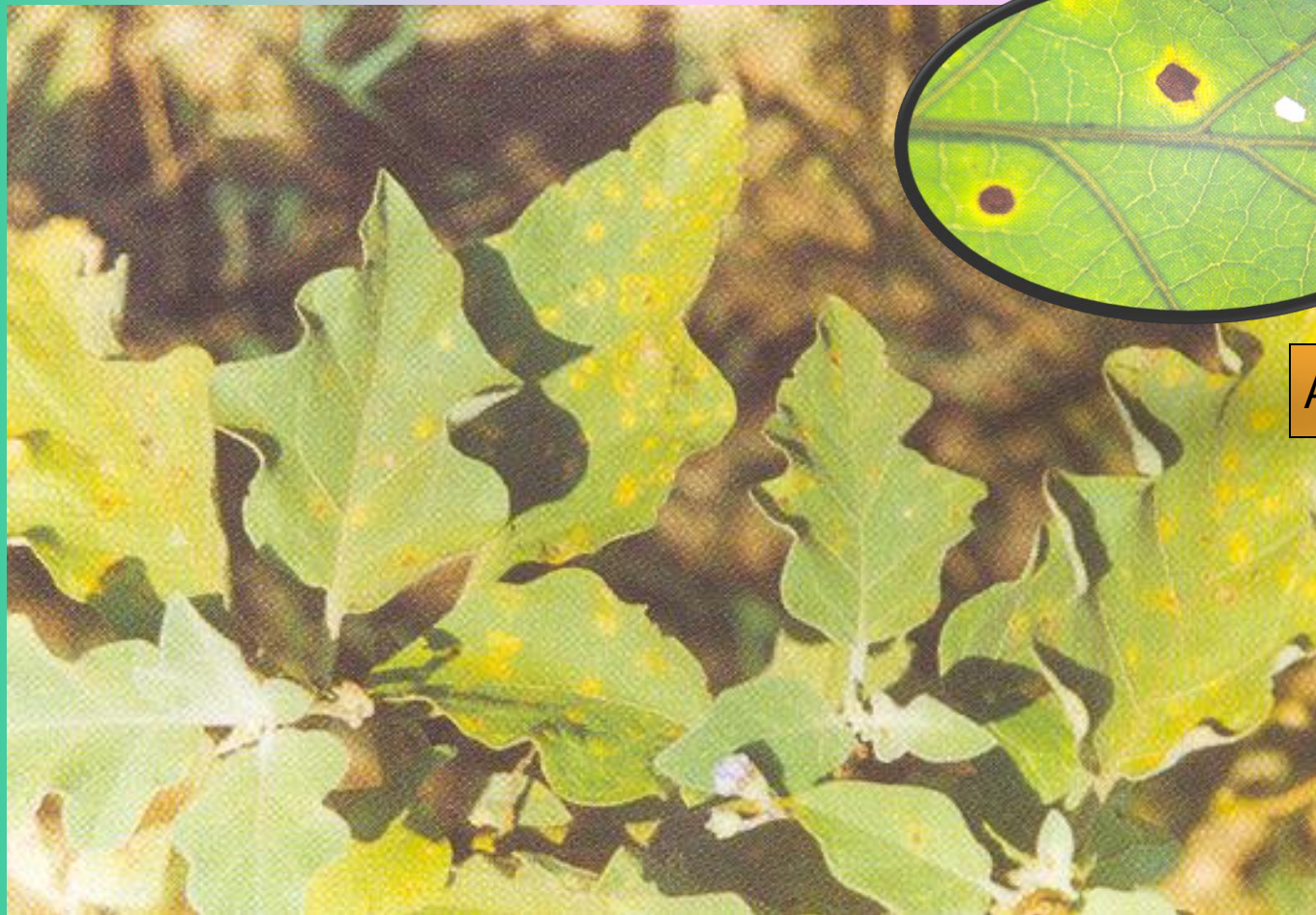
Symptoms

- ✗ 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

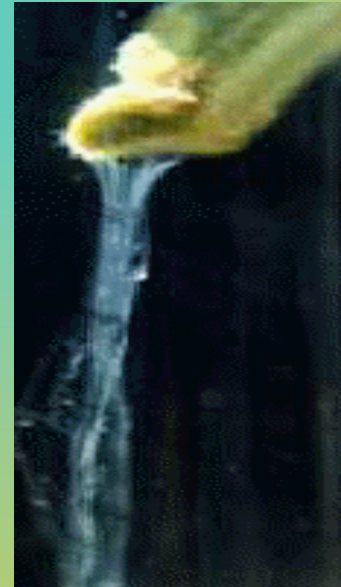


PHOMOPSIS BLIGHT AND FRUIT ROT

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

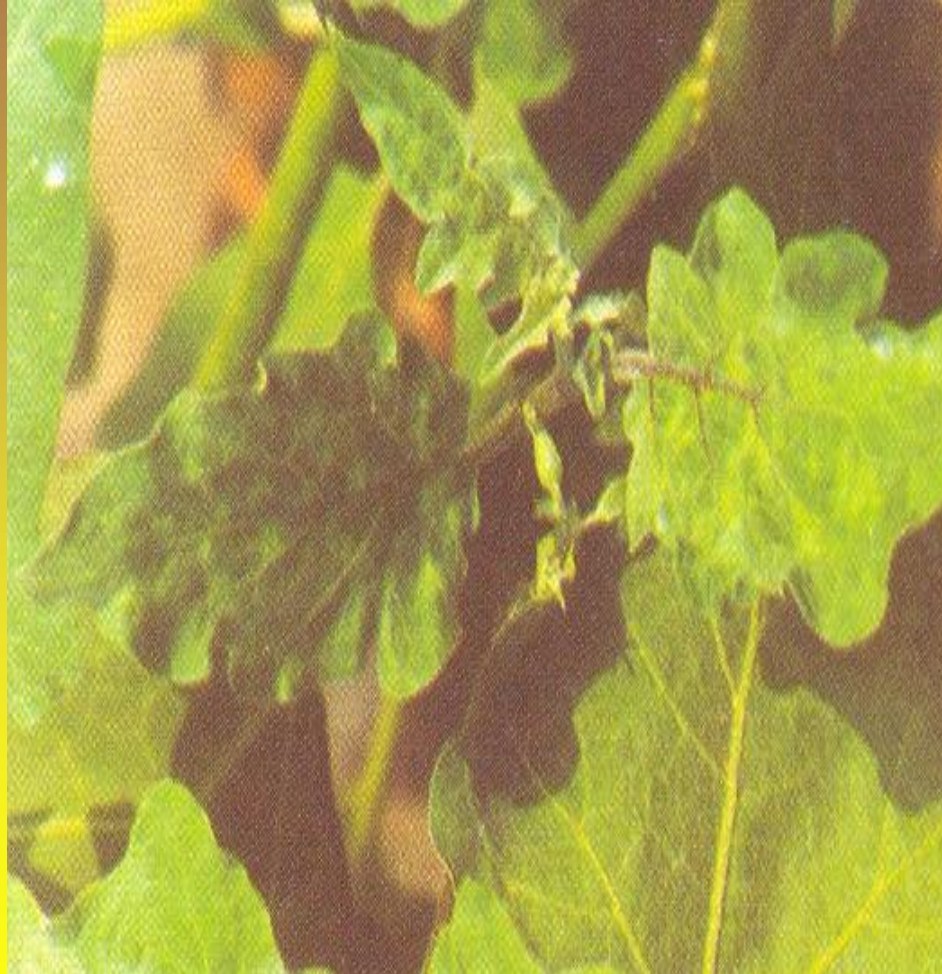
LITTLE LEAF OF BRINJAL



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