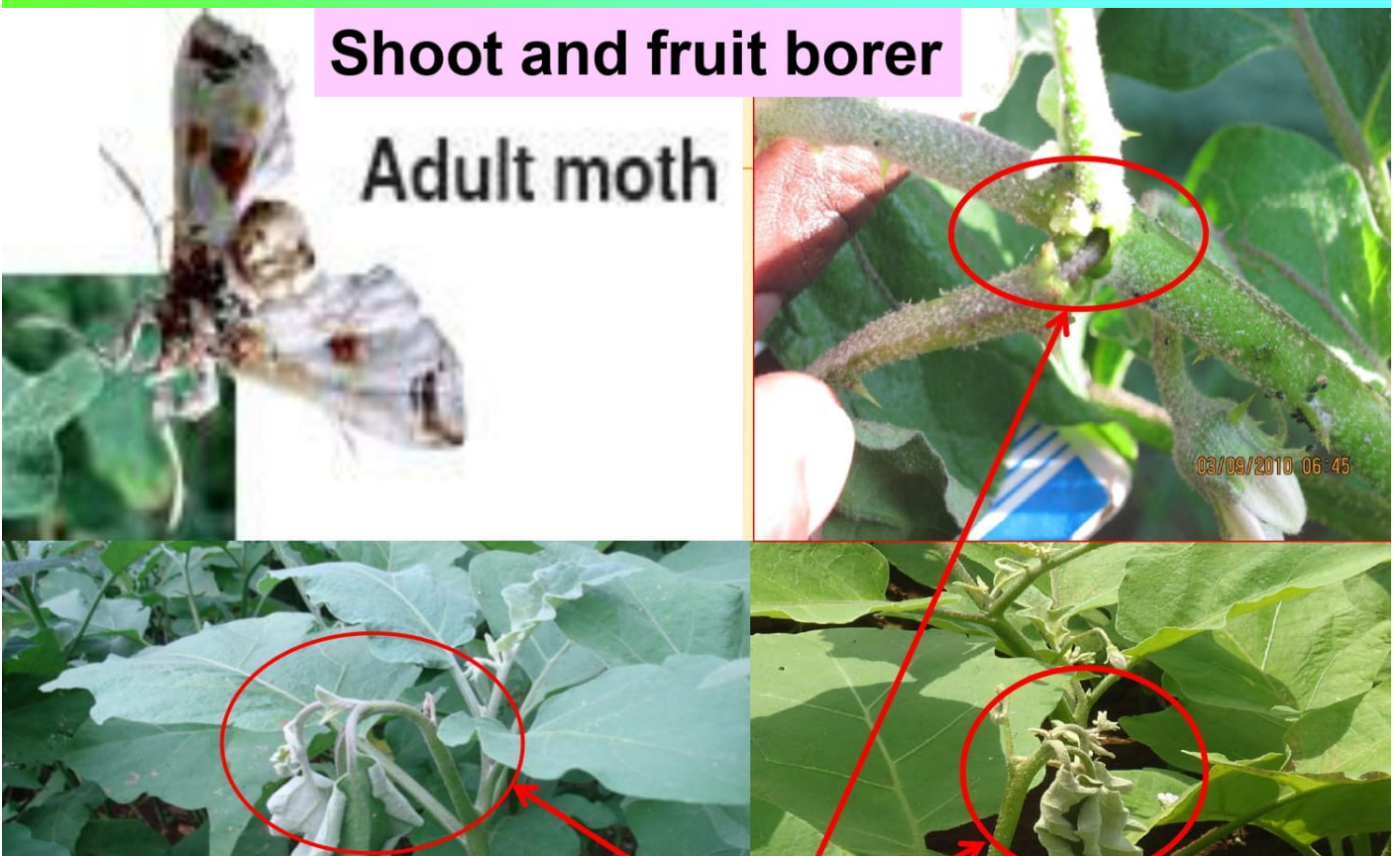


# Read report on IPM in Brinjal

## 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

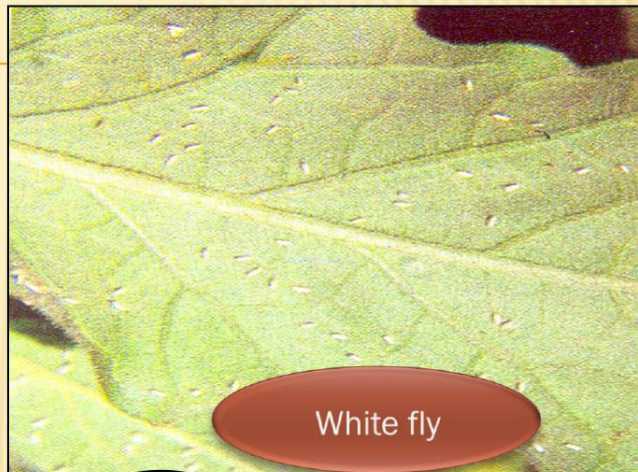




# BRINJAL LEAF ROLLER



## SUCKING PEST





## 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

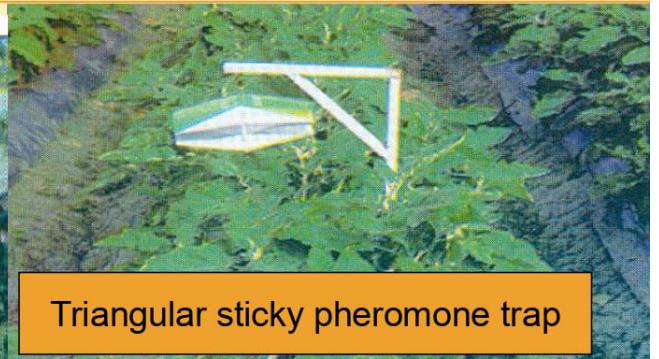


# PHEROMONE TRAPS

Pheromone trap  
Sleeve type



Triangular sticky pheromone trap



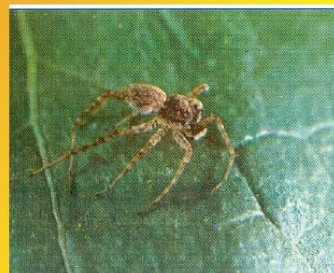
Removal of affected parts



# 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 bolting and toppling 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

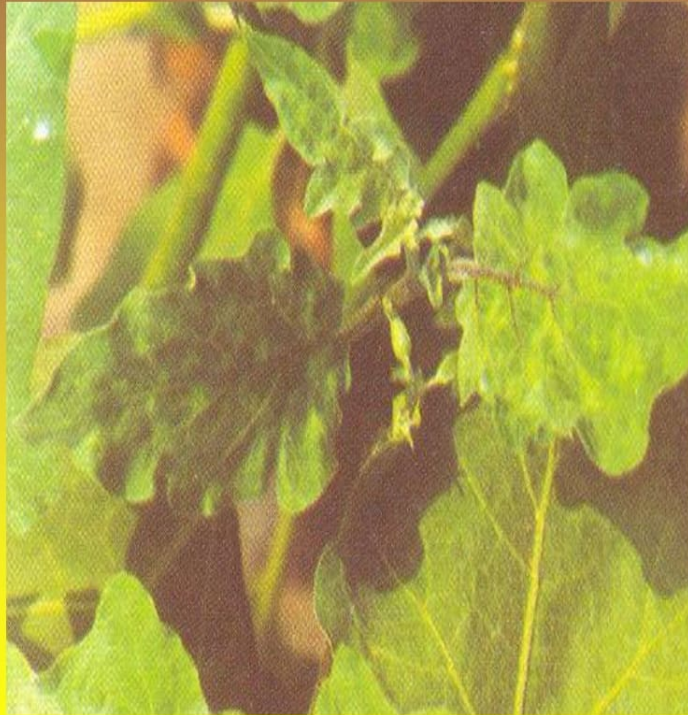


## MANAGEMENT OF LITTLE LEAF

- ✖ 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



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Revision #2

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