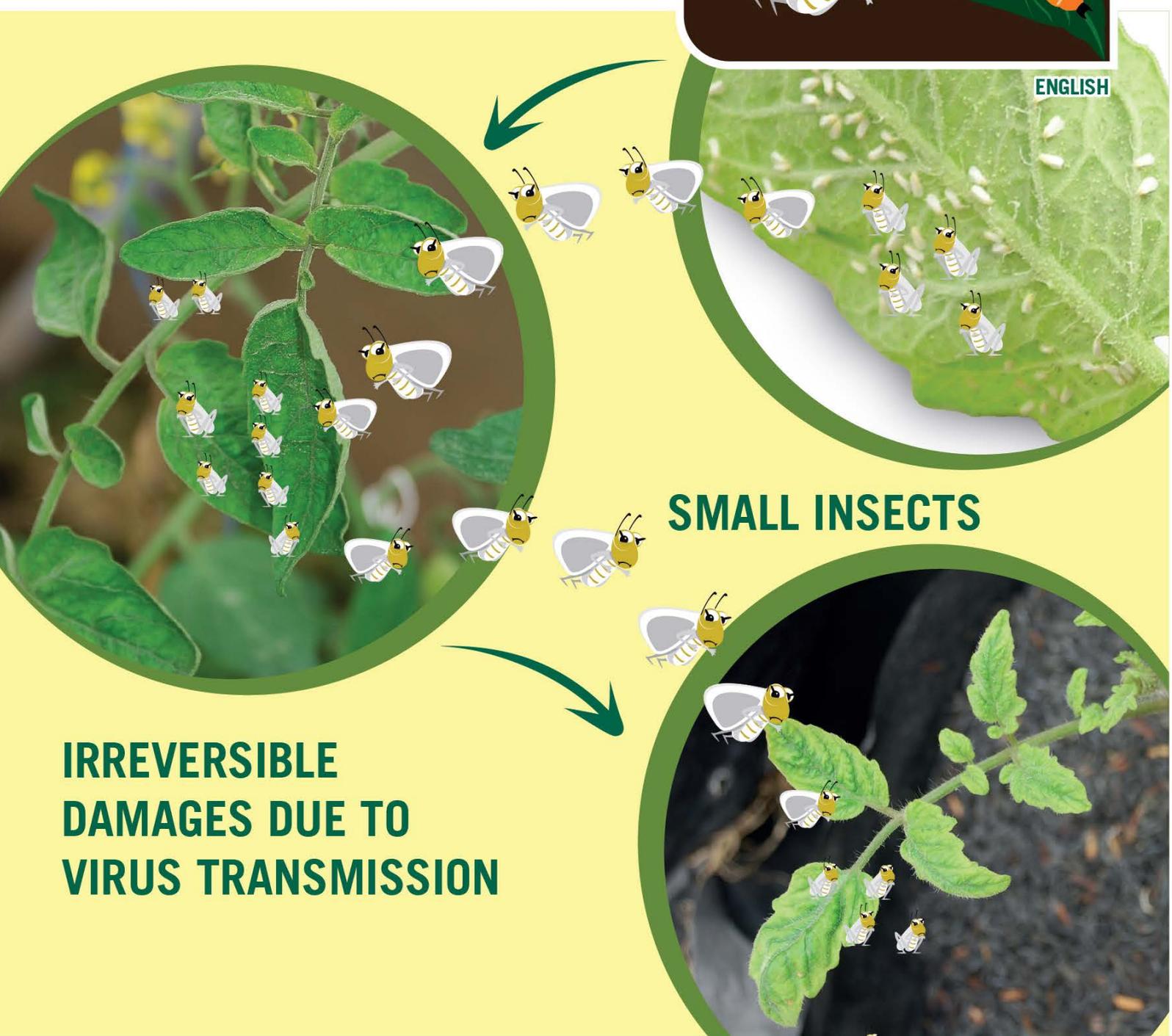




# BIG 3 Insect Vectors of Plant Viruses

## Technical Guide

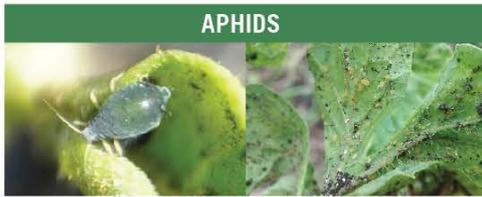
- Why important to know?



# • What are the BIG 3 insect vectors of plant viruses?

**Insect vectors** = insects that can carry and transmit viral diseases from one host to another.

**Plant virus** = microorganism that causes systemic/whole plant infection



## • Common symptoms of feeding damage



Curling of leaves due to sucking of plant sap.

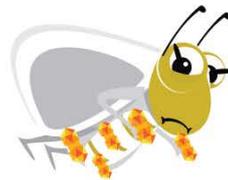


Sooty molds due to excretion of honey dew by aphids and whiteflies.



Silvery scars on the leaves by thrips.

## • How insect vectors transmit viruses?



### Acquisition:

Vector feeds on infected plant with the virus.

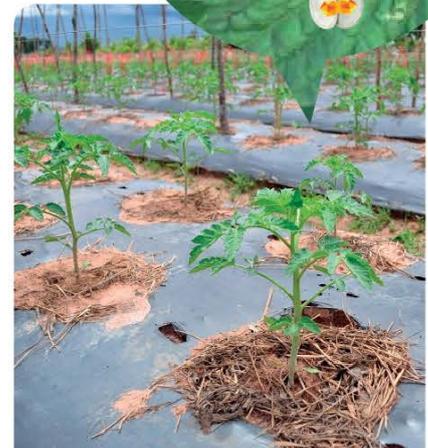
### Transmission:

Virus travels with the vector to a new host plant. (healthy/non-infected)



### Inoculation:

Symptoms may show 1-2 weeks after transmission.



**Note:** Younger plants (seedling stage) are more susceptible than older plants to virus infection.

# • Common symptoms of viral diseases



Stunting

Curling

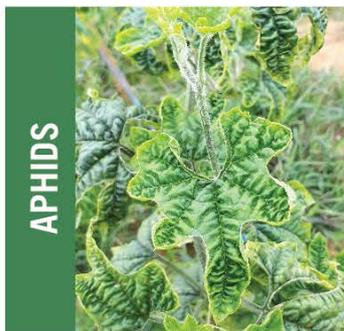
Yellowing

Mosaic

Mottling

Narrowing

# • Most important viral diseases transmitted by insect vectors



APHIDS

Cucurbit Aphid-Borne Yellows



Papaya Ringspot



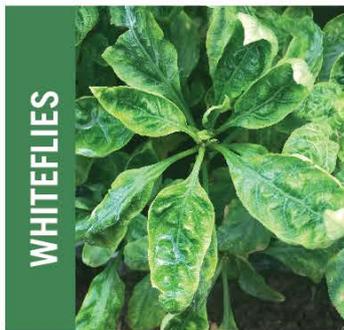
Zucchini Yellow Mosaic



Chili Veinal Mottle



Cucumber Mosaic



WHITEFLIES

Pepper Leaf Curl



Tomato Leaf Curl



Squash Leaf Curl



Okra Enation Leaf Curl



Okra Yellow Vein Mosaic



THRIPS

Tomato Spotted Wilt



Watermelon Silver Mottle



Melon Yellow Spot

Symptoms cannot be used alone to identify specific viral disease as one symptom can be caused by different viruses.

Ask local experts, if in doubt.

# • How to manage insect vectors and the virus they transmit?

## Prevention: How to avoid?



Check crop field and pest history



Crop rotation



Use virus-resistant varieties



Net nursery for seedlings



Use reflective mulches



Attract beneficial insects by planting flowering plants.



Weed free/clean area to avoid alternate hosts.

## Monitoring: How to check presence of insect vectors?



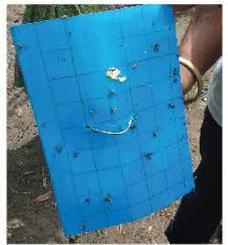
Daily monitoring of the field.



Look underside of the leaves.



Check distorted or curled leaves, sooty molds and silvery scars.



Use sticky traps, yellow (whitefly and aphids) and/or blue (thrips).

## Intervention: What to do when insect vectors are present?



Uproot all infected plants and destroy (burn).

| Active Ingredient    | MoA Group | APHIDS | WHITEFLIES | THRIPS |
|----------------------|-----------|--------|------------|--------|
| Azadirachtin (Neem)  | Unknown   | ✓      | ✓          | ✓      |
| Dinotefuran*         | 4A        | ✓      | ✓          | ✓      |
| Acetamiprid*         | 4A        | ✓      | ✓          | ✓      |
| Spinosad             | 5         | ✓      | ✓          | ✓      |
| Emamectin benzoate   | 6         | ✓      | ✓          | ✓      |
| Pymetrozine          | 9B        | ✓      | ✓          | ✓      |
| Thiocyclam oxalate   | 14        | ✓      | ✓          | ✓      |
| Cartap hydrochloride | 14        | ✓      | ✓          | ✓      |

\* Do not apply during flowering

- Alternate MoA groups to prevent build up of resistance
- Ensure good coverage of spray on the underside of the leaves
- Use Personal Protective Equipment (PPE) when spraying
- Wash after spraying