Technical Bulletin #90:

# Integrated Pest Management – Management of Non-persistent Viruses

A virus is a plant disease that cannot be cured. The earlier a virus infects a plant the higher the crop loss will be because virotic plants produce few fruit. A non-persistent virus can only be transmitted by a vector for a short period of time. Aphids carry non-persistent viruses externally on their beak or sucking mouthparts. These viruses can be acquired and lost or "cleaned" from the vector in a very short time, seconds or minutes. Aphids acquire viruses, infect plants and lose a non-persistent virus simply by probing plants.

## How does an aphid get infected with a non-persistent virus?

An aphid has two ways of being infected with a non-persistent virus: either it is born on an infected plant, or it is born on a healthy plant and acquires the virus while probing an infected plant on its way to the crop.

Aphids, in contrast with many other insects, find their hosts by sight, not by smell. They fly out of a plant, land on another plant and probe the plant. They repeat the same action until they find an appropriate host.

Winged aphids are dangerous vectors to have around production sites, especially for highly susceptible crops like cucurbits and solanaceous crops. Wingless aphids are not as dangerous because they only move around by walking between touching plants Winged aphids normally move short distances, but can also be carried long distances by wind.

Winged aphids are produced only under three plant growing conditions: hot weather conditions, overcrowding of plants, and poor plant food source quality.

## How can I prevent viruses in my crops?

**Measures to be taken before planting:**

1. Check your surroundings and dispose of old infected crops, crop remains, infected weeds and alternate hosts of aphids. Pay close attention to volunteer plants around curcurbit crops.
2. Always consider the wind direction when planting. First plant against the wind and move windward so that pests and diseases do not move from older to younger crops.
3. Plant live barriers 3 to 4 weeks before crop setting.
4. Use silver colored plastic mulch to repel vectors or straw mulch to "hide" virus susceptible plants from the incoming aphid vectors.
5. Place at least one yellow sticky trap on each side of the crop plot at the same time the live barriers are established to monitor vector density and take control action if needed.
6. Avoid direct planting of the crop, use transplant instead to guarantee late exposure of plants to vectors.

7. Dispose properly of any seedling rejects to avoid volunteer plants in the surroundings.
8. Use virus resistant varieties whenever possible.
9. Produce healthy plants. Protect nurseries and seed trays with insect netting to prevent virus infection.
10. Consider having similar planting days for neighboring crops from the same botanical families.

**At planting:**

11. Treat seedlings with a systemic, long lasting insecticide one day before transplant to protect the plants during the following 8 to 10 days.
12. Use higher plant density to pull early infected plants without affecting final crop density, or plant extra seedlings to replace any plants showing virus symptoms on the first two weeks.

**During the crop cycle:**

13. Maintain crop and crop surroundings clean of aphid and virus alternate hosts at all times.
14. Scout plants twice a week and make virus and management decisions based on findings.
15. Use systemic and botanical insecticides when aphid populations rise. Constantly maintain a low aphid population in the crop and its surroundings.
16. Use a detergent and vegetable oil solution to kill aphids and other soft bodied insects during the harvest period.
17. Pull up early infected plants before fruit setting.

**At the end of the crop cycle:**

18. Destroy old crops as soon as you finish harvesting in order to avoid reproduction and virus infection of winged aphids.
19. Collect and destroy any fruit left from the old crop than may give rise to volunteer plants, or destroy volunteer plants as soon as they appear.
20. Rotate the crop with a non-persistent virus free alternative, like corn.

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