BULLETIN

Potato

Aphids and virus transmission

The two most prominent virus diseases in potatoes are Potato Virus Y (PVY) and Potato Leaf Roll Virus (PLRV). Potato viruses are associated with various aphid species, also known as vectors of which Potato aphid (*Macrosiphum euphorbiae*) and Green peach aphid (*Myzus persicae*) are the most prevalent. PVY can however be transmitted by 18 different aphid species while PLRV can be transmitted by 9 different species. The results of the aphid infestations are significant and include production losses. For the seed potato multiplier this also results in a downgrade of seed potato quality to higher generations with a significant financial impact to the grower.

VIRUS TRANSMISSION

Viruses are transmitted in various ways:

Mechanical:

The virus is transmitted on contact. This can be transmitted by equipment as example. Tomato Spotted Wilt is transmitted in this method.

Non-persistent viruses:

The virus is retained by the vector for a short period, usually only a few hours.

The aphid stylet is infested with the virus and the insect vector infects the plant during feeding. PVY is transmitted in this way.

Semi-persistent viruses:

The virus is taken up partially into the insect vector during feeding. Infested insects can cause infection for a short period only.

Persistent (circulative) non-propagative viruses:

The virus is retained for long periods, often weeks or months.

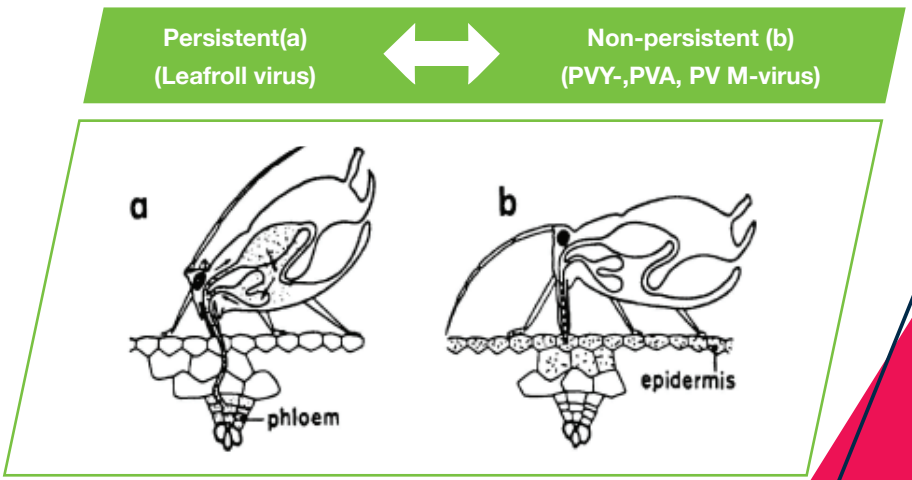
They are taken up by the insect and transmitted internally in the vector like PLRV.

These viruses are not transmitted to next insect vector generation. This insect vector needs to feed for a period before virus infection can occur.

Persistent (circulative) propagative viruses:

Which are transmitted internally and can be transmitted to next generations.

Figure 1: Difference between persistent and non-persitent virus transmission



Virus Characteristics

Transmission characteristic	Non-persistent	Persistent non-propagative	Persistent propagative
Vector Feeding Time to acquire the virus	Seconds	Hours to days	Hours to days
Types	PVY	PLRV	
Ability to infect	Within Minutes	Days to weeks	Lifelong infection and can transmit the virus to offspring
Latent period before infection can occur	None	**Typically 8-24 h**	Weeks (incubation)
Multiplies in aphid	**No**	**No**	Yes

Symptoms

Symptoms of PVY and PLRV

Control

Confidor®

Cause

Potato viruses are transmitted by sucking insects with piercing sucking mouthparts that extract plant sap from the phloem or food-conducting vascular tissue. The biggest culprits are the Potato aphid (*Macrosiphum euphorbiae*) and Green peach aphid (*Myzus persicae*) which can rapidly multiply and can complete between 11 - 35 generations per year. Aphids do not need to mate and their various life stages are as follows:

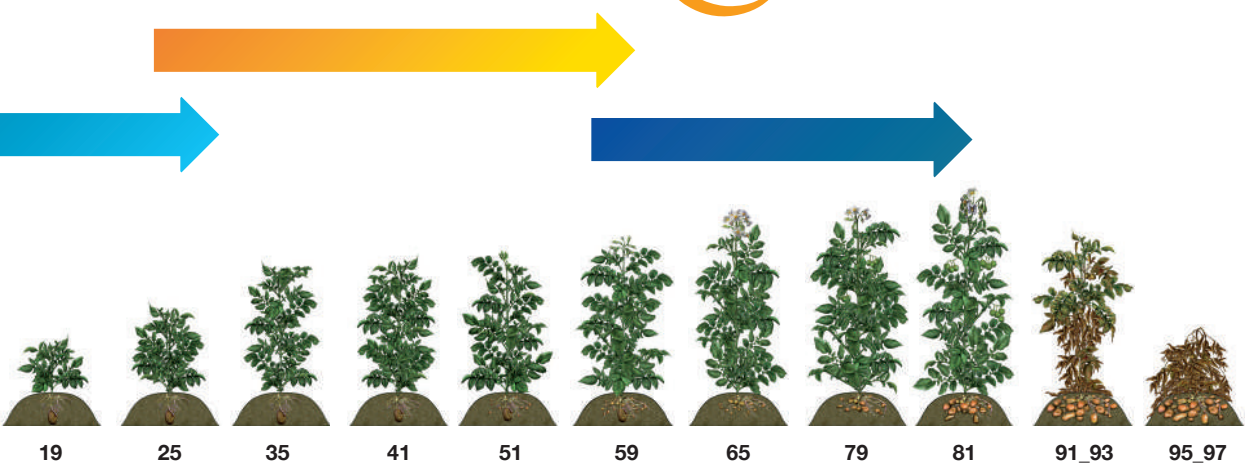
- Nymphal stage = 5 - 10 days
- Adult stage = 20 - 40 days

One female aphid can produce 50 - 100 offspring. Female aphids can mother and produce daughters every 2 - 5 days. Aphids can survive in a wide temperature range (4 - 37°C) and produce eggs which can survive cold winters on woody perennial plants like peaches.

Potato Aphid (Left) and Green Peach Aphid (right) Photo University of California

MOVENTO®

BISCAYA®



Management
Practices

1. Monitor Aphid flight patterns with aphid traps or Yellow bucket traps. Adjust planting dates to low pressure windows.
2. Adapt cultivar choice to tolerant varieties. Avoid long season varieties in high pressure areas.
3. Scout, remove and destroy infested plants.
4. Consider Haulm killing and control regrowth.
5. Control volunteer plants and avoid areas with Solanacious crops like tomatoes and peppers. The following plant groups can act as volunteers; Amaranthaceae, Asteraceae, Brassicaceae, Cucurbitaceae, Malvaceae, Solanaceae and Portulacraceae.
6. Ensure good crop coverage and avoid application under extreme conditions like windy and hot days.

Sources : Thomas & Hassan, Plant Disease, 2002, Volume 86(5): 561. Prof K Kruger. Presentation 2017, Fernhill. Visser D. 2005. Guide to potato Pests and their natural enemies in South Africa.

Bayer (Pty) Ltd. Reg. No. 1968/011192/07
27 Wrench Road, Isando, 1601
PO Box 143, Isando, 1600,
Tel: +27 11 921 5002

www.cropscience.bayer.co.za
www.bayer.co.za

Facebook: Bayer Crop Science Division Southern Africa ///// **Twitter:** @bayer4cropssa

11/2018