

Potato XXII – 5

Potato Aphid

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Potato aphid.

Identification (and life cycle/seasonal history)

Aphids of importance to potato winter as eggs laid near buds of woody plants. Green peach aphid eggs are laid in fall on certain *Prunus* spp. stone fruits (apricot, peach, and some plums). Potato aphid eggs are laid on wild rose (*Rosa* spp.).

In late spring after a generation on the winter host, aphids move to summer hosts. Both green peach aphid and potato aphids have a wide summer host range, including many vegetables (e.g., spinach, lettuce, cabbage, tomato) and weeds (e.g., lambsquarters, pigweed). During the summer generations, only females are produced that hatch eggs internally, giving live birth. Aphids become full-grown in 10-14 days after birth. Adult females are usually wingless and remain on the plant. Winged forms are sometimes produced, particularly when colonies become crowded and at the end of summer.

Plant Response to Damage

Aphids produce no significant impact on potato yield unless they are especially numerous. This only occurs when there has been repeated application of pesticides that devastate natural enemy populations for a prolonged period.

Aphids are very important in the transmission of several viruses. Viruses transmitted by aphids to potato include potato virus Y (PVY), potato virus A (PVA), and potato leafroll (PLRV).

Aphid Transmission of Viruses

Aphids transmit viruses by one of two general processes. *Non-persistent viruses* are concentrated in the epidermis of the plant, and aphids acquire the virus when they probe the surface of infected plants. Aphids can acquire these viruses with a single probe, within seconds, and also can subsequently transmit it to a healthy plant within seconds. However, non-persistent viruses are retained by the aphid for only a short period - usually only an hour or two. After that point the aphid no longer can transmit the virus unless it feeds on another infected plant. Because of the rapid acquisition and transmission of the non-persistent viruses, insecticides have little or no effect on reducing spread by aphids.

Examples of non-persistent viruses spread by aphids include PVY, PVA and alfalfa mosaic (calico).

(Note: Although potato aphid and green peach aphid are highly efficient vectors of non-persistent viruses, other aphid species can also transmit these viruses. English grain aphid does not survive on potato, but it can spread PVY during incidental probing on potato plants.)

Persistent viruses are concentrated in the phloem, and aphids acquire the virus only after feeding on the phloem for awhile. This process takes a minimum of 30 minutes after probing a plant and often considerably longer. Once an aphid has acquired a persistent virus, the virus moves internally in the insect and eventually migrates to the salivary glands. Completion of this circulation within the insect can take days after feeding on an infected plant. However, once the virus begins to appear in the salivary glands the aphid will transmit it for the remainder of its life. Insecticides can be somewhat more effective in reducing spread of persistent viruses than non-persistent viruses, particularly if the insecticide rapidly incapacitates the aphid vector. Examples of persistent viruses spread by aphids include potato leafroll virus and beet western yellows virus.

Aphids **do not** transmit the *mechanically transmitted viruses* PVX and PVS.

Management Approaches

Natural Controls

Aphids have a number of natural enemies. Essentially all the common general predators found in agricultural fields will feed on aphids. These include lady beetles, green lacewing larvae, damsel bugs, minute pirate bugs, and adult dance flies. Parasitic wasps are common. Fungal diseases sometimes will also kill many aphids.

High numbers of aphids in potato are only produced following applications of certain pesticides that destroy natural enemies. Outbreaks most commonly occur from products that have little, if any effect on aphids and destroy natural enemies. These include methyl parathion, permethrin, and carbaryl.

Cultural Controls

Area-wide eradication and/or treatment of overwintering host plants has been successful in reducing aphids and aphid-transmitted viruses in some potato producing regions. The overwintering hosts of the green peach aphid are certain stone fruits - apricot, peach, and certain plums. Potato aphid winters on wild and some cultivated roses. Treatment can involve dormant season applications of horticultural oils to smother overwintering eggs. Insecticides (e.g., imidacloprid) can also be applied in spring to kill aphids that have hatched but not yet begun to migrate to summer host plants.

Sampling

Winged adult green peach aphids and potato aphids are attracted to yellow and can be captured in yellow pan traps. A surfactant (e.g. soap) should be included in the water to increase capture. Locating the trap on a dark background (e.g., bare soil vs. vegetation) will also increase aphid capture. Monitoring of aphid flights is useful for seed producers who may wish to intensify aphid control when winged aphids begin to be detected in fields or traps.

Aphids can be sampled by examining leaves. Potato-infesting aphids tend to occur on the underside of leaves and are concentrated on the lower half of the plant. Sweep net sampling can pick up some winged aphids, but undersample wingless forms that may predominate.

Managing Virus Disease Transmission by Aphids

By far the most important means of limiting virus transmission by aphids is to eliminate local sources of the virus. Fundamentally this involves use of disease-free seed which alone can largely eliminate problems. Isolation of fields from virus sources and sources of overwintering aphids can also assist in limiting virus spread.

Chemical controls can provide only marginal additional reduction of aphid transmitted viruses, primarily assisting with disease spread that occurs from plant-to-plant within the field (secondary spread).

Chemical Control

Neonicotinoid insecticides (Admire/Provado, Platinum/Actara) can provide excellent aphid control. Planting time treatments of these products should provide control for at least 8 weeks. Organophosphates (e.g., Thimet, Disyston) have a shorter period of effectiveness, typically providing control for less than one month following plant emergence.

Foliar applications must provide thorough coverage down into the canopy; therefore high gallonage applications should be used. Aphids are primarily found on the underside of leaves in the lower canopy. Insecticides with some systemic activity may also result in better plant coverage and improve aphid control.

Product List for Aphids:

Insecticide	Product per Acre	Preharvest Interval, remarks
	Planting Time/Soil Treatments	
Platinum	5.8 fl. oz/A	12 hour reentry. Neonicotinoid
Platinum Gold	2.2 fl. oz./1000 row-ft	insecticide (thiamethoxam). Platinum gold includes fungicide metalxyl. Planting time treatment.
Admire 2F	0.9-1.3 fl. oz./1000 row-ft	12 hour reentry. Neonicotinoid insecticide

		(imidacloprid). Planting time treatment.
phorate (Thimet)	use labelled rates	72 hour reentry. Planting time band or in-furrow treatment. Organophosphate insecticide (phorate).
Di-Syston 15G	use labelled rates	(72 hour reentry) Planting time band or in-furrow treatment. Organophosphate insecticide (disulfoton).
Foliar Applications ¹		
Provado 1.6F	3.75 fl. oz/A	7 day PHI, 12 hour reentry. Neonicotinoid (imidacloprid) insecticide. Maximum 15 fl. oz/A per season
Leverage 2.7	3.75 fl. oz/A	7 day PHI, 12 hour reentry. Combination neonicotinoid (imidacloprid)/pyrethroid (cyfluthrin)
Actara	3.0 oz/A	14 day PHI, 12 hour reentry. <i>Special Local Need label for Colorado.</i> Neonicotinoid insecticide (thiamethoxam).
Monitor	1 1/2-2 pts/A	14 day PHI, 72 hour reentry. Organophosphate insecticide (methamidophos). Has been highly effective against green peach aphid.
Di-Syston 8	2-3 pt/A	30 day PHI, 72 hour reentry. Organophosphate insecticide (disulfoton)
endosulfan (Phaser, Thiodan, Thionex, etc.)	as labelled	1 day PHI, 24 hour reentry. Chlorinated hydrocarbon insecticide (endosulfan)

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Categories: Potato, Macrosiphum euphorbiae, Insects, Potato aphid, White grubs

Date: 04/12/2004