

POTATO VIRUSES AND OTHER ISSUES

Todd Steinlage
Alaska Division of Agriculture
Plant Materials Center
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Viruses

Virus	Mechanical Transmission	Aphid Transmission	Insecticide
PLRV	N/A	persistent	Colonizers
PVX	mechanical	N/A	N/A
PVY	some mech	non-persistent	Less effective

PLRV (*Potato leafroll virus*)



PLRV (*Potato leafroll virus*)

- ▣ “Running out” or “degeneration”
- ▣ Net necrosis in tubers
- ▣ Aphid-transmitted, persistent (life-long)
 - Slowly acquired and transmitted (minutes to hours)
 - Many common aphid species
- ▣ Aphid host plants
 - Shepherd’s purse, tumble mustard, tansy mustard, nightshades, chickweed, horseweed, pennycress
- ▣ Virus host plants (45 known)
 - Shepherd’s purse, tumble mustard, nightshades, spinach, lettuce, pumpkin

PLRV Management

- ▣ Plant certified seed
- ▣ Rotate fields, destroy volunteers & weeds
- ▣ Destroy cull piles
- ▣ Rogue early and throughout season
- ▣ Bedding plants & home gardens
- ▣ Scout for aphid vectors- **colonizers most imp.**
 - 3-4 day interval
 - Threshold: 5 aphids/100 leaves
- ▣ Aphid management

Green peach aphid (colonizer)



USDA

Potato aphid (colonizer)



Whitney Cranshaw, Colorado State University, Bugwood.org



Joseph Berger, Bugwood.org

PLRV Management

- **At-planting** (soil/seed piece) 60-80 days protection:
 - Clothianidin (Belay®) (4A, neonicotinoid)
 - Imidacloprid (Admire Pro®) (4A, neonicotinoid)
- **Foliar: Avoid neonicotinoids if used at planting**
 - Clothianidin (Belay®) (4A, neonicotinoid): minimum 7 days between apps, max depends on rate applied
 - Imidacloprid (Admire Pro®) (4A, neonicotinoid): minimum 7 days between apps, 4 app max
 - Spirotetramat (Movento®) (23, lipid biosynthesis inhibitor): 10-14 day consecutive, 2 app max, use penetrating oil
 - Dimethoate (Dimethoate 4E)(1B, organophosphate): 7 day interval, use higher rate, 2 app max, not strong residual

PLRV Management

- ▣ **Contact & ingestion insecticide**
 - Flonicamid (Beleaf®) (9C, feeding blocker)- 7-14 day interval, 3 app max, use organosilicone surfactant
- ▣ **Rotate chemistries and observe maximum limits per year**
- ▣ **The Label is the Law**

PVX (*Potato virus X*)



PVX (*Potato virus X*)

- ▣ Mild mosaic, often symptomless
- ▣ Yield loss 15-20% (high disease pressure)
- ▣ Synergistic with PVY, causing higher losses
- ▣ Spreads easily by mechanical contact
- ▣ Host range (over 62 species)
 - Chenopodium, pigweed, turnip, purple clover

PVX Management

- ▣ Plant certified seed
- ▣ Rotate fields, destroy volunteers and weeds
- ▣ Rogue
- ▣ Clean and sanitize equipment (especially cutting)

PVY (*Potato virus Y*)



PVY (*Potato virus Y*)

- ▣ Mild mosaic to severe necrosis and death
- ▣ Yield losses 10-80%
- ▣ Tuber necrosis (internal and external)
- ▣ PVY-o/PVY-c & PVY-n strains found in 2014
- ▣ Mechanically transmissible
- ▣ Aphid-transmitted, non-persistent
 - Gained & lost quickly (few probes)
 - Many common aphid species
- ▣ Large host range (over 495 species)
 - Pigweed, shepherd's purse, nightshades, chenopodium, dahlia, petunia

PVY Management

- ▣ Plant certified seed
- ▣ Rotate fields, destroy volunteers
- ▣ Rogue, destroy cull piles
- ▣ Border crops (12-15 feet wide): wheat, rye, mustard, alfalfa
 - Fallow outside border? Conflicting evidence
 - Can spray with insecticide and/or crop oil

PVY Management

- ▣ Pesticides can't stop introduction, but can reduce spread within field
- ▣ Crop oils – high volume, high pressure, every 5-7 days (coverage important)
- ▣ Systemic insecticides (as for PLRV)
 - Clothianidin (4A, neonicotinoid)
 - Imidacloprid (4A, neonicotinoid)
 - Spirotetramat (23, lipid biosynthesis inhibitor)

Pythium

- ▣ Symptoms in tubers: tissue spongy; dark line separating the healthy and diseased tissue; leak a dark, watery liquid
- ▣ *Pythium* spp. found in most soils
- ▣ Enters only through wounds
- ▣ Favored in wet, organic soils and higher temperatures

Pythium



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© Sutton Bridge CSR

Pythium

▣ Management

- Avoid areas with previous *Pythium* problems
- Avoid planting in wet areas; organic soils can harbor *Pythium* on decomposing matter
- Rotate crops on 4 year cycle
- Plant certified seed potatoes
- Avoid planting below 45 F, or above 70 F
- Mefenoxam (ex. Ridomil) in-furrow application

Pythium

▣ Management

- Phosphorus acid (ex. Fosphite) irrigation (variable)
- Stop water before harvest, don't harvest if soil wet
- Allow skins to set before harvest
- Avoid harvest below 45 F, or above 65 F
- *Pythium* **only enters through wounds**. Avoid bruising, skinning, shattering (watch drop height)
- Avoid laying harvested potatoes on warm, moist soil. *Pythium* can infect them quickly

Pythium

▣ Management

- Enhance suberization and wound periderm formation: hold tubers at 60 F, RH greater than 90% (noncondensing), with plenty of air movement for about 2 weeks, then reduce storage temperature slowly to final temp
- If you find leak in storage, increase air movement, reduce temperature, and reduce RH to dry the tubers; they may rot quickly when brought above 50 F

BRR Core Sampling

- ▣ Accepting samples all spring

PMC Pathology

Todd Steinlage

Alaska Plant Materials Center

5310 S. Bodenbug Spur

Palmer, AK 99645

Phone: (907) 745-8138

Email: todd.steinlage@alaska.gov

Thanks!