

BACTERIA AND VIRUS TESTING

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Bacterial ring rot (BRR)
(Clavibacter michiganensis
subsp. sepedonicus)



Courtesy Wishart Lab

Variety Trials 2014- Potato BRR

- ▣ 6 Varieties X 10 hills each: 'Bake King', 'CalWhite', 'Cherry Red', 'Shepody', 'Russet Norkotah', and 'Yukon Gold' at UAF Farm
- ▣ Tubers inoculated with bacteria at rose-end under single eye (40,000 bacteria/tuber)
- ▣ Foliar symptoms: very few by August 18
- ▣ Stems & tubers tested from each hill

Variety Trials- Potato BRR



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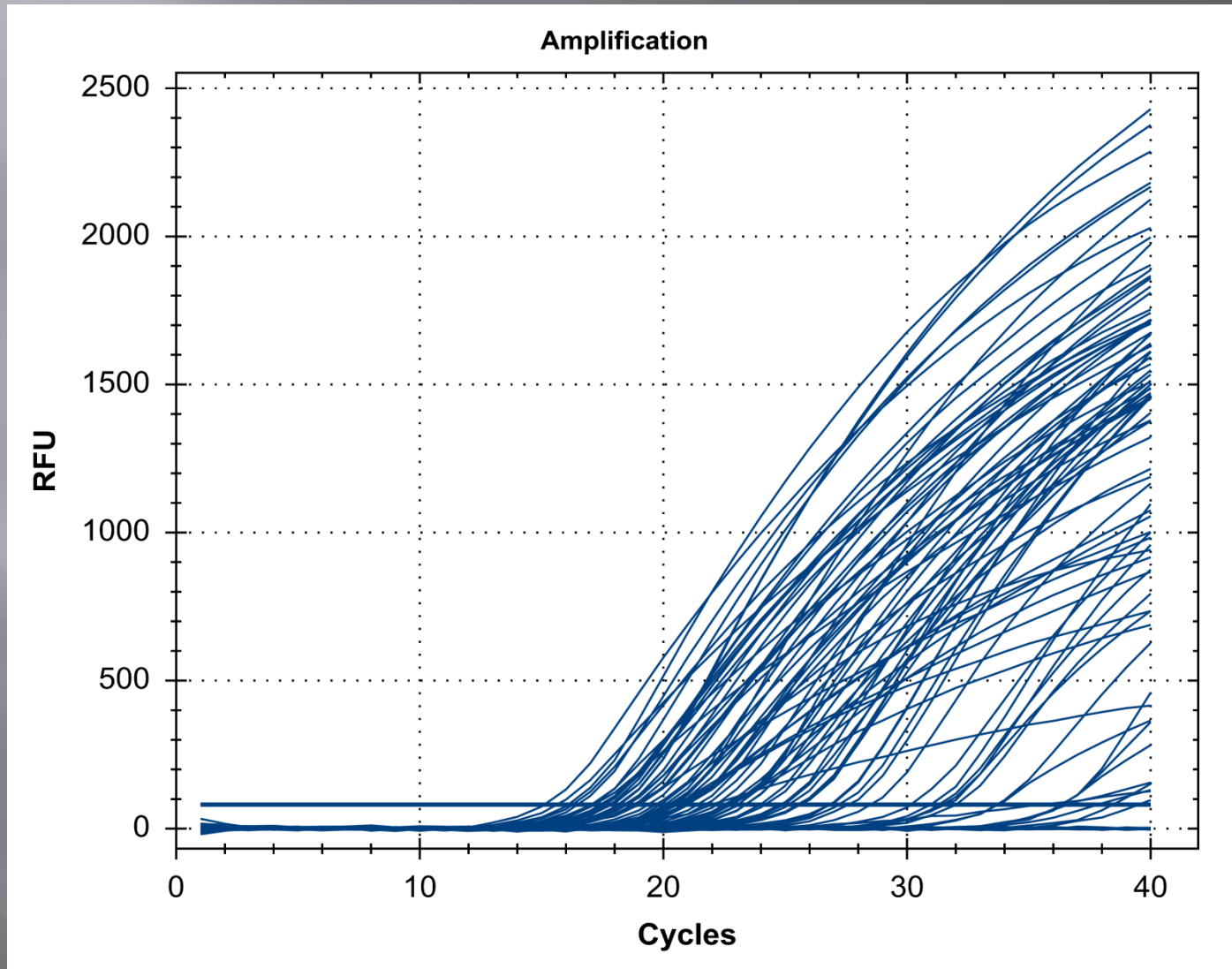
Variety Trials- Potato BRR



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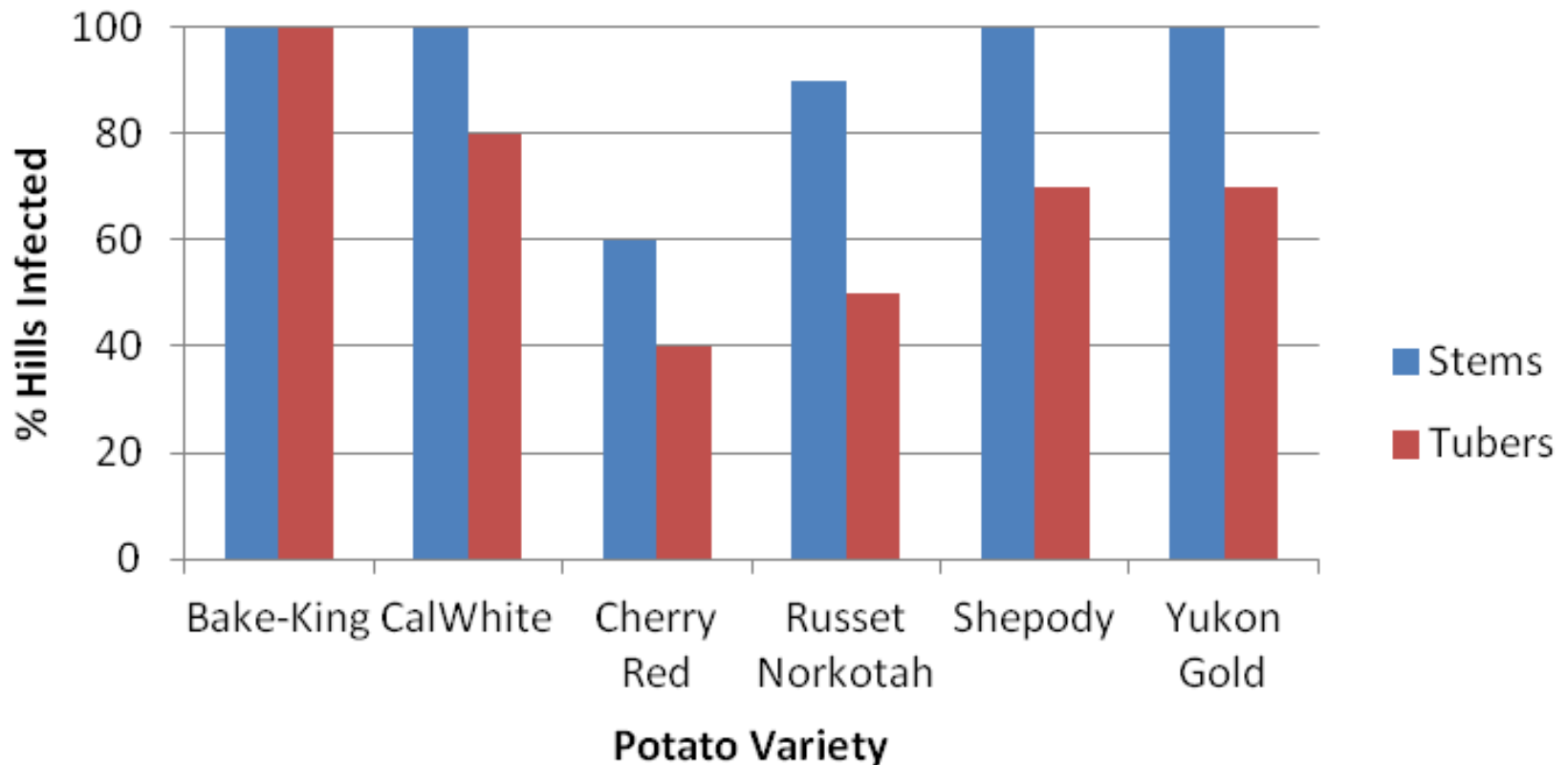


BRR- Real-time PCR testing



Variety Trials- Potato BRR

2014 Bacterial Ring Rot Inoculations



Grower Tuber Core Testing, Spring & Fall 2014- BRR

- ▣ Growers: 7 (Seed and Commercial)
- ▣ Lots: 31
- ▣ 3 commercial lots infected
 - All symptomless in storage
 - All confirmed by multiple tests
 - One variety symptomatic after warming for several days (while performing additional testing)

BRR Management

- ▣ Plant certified seed
- ▣ Rotate fields, destroy volunteers
- ▣ Sanitation: Cleaning (bio-films)
 - All equipment, storages, trucks
 - Soap and water or power-wash
- ▣ Sanitation: Disinfecting (at least 10 min contact)
 - Quaternary ammonium
 - Hypochlorite
 - Kelly system (registered in Alaska)
<http://www.kellysolutions.com/ak/pesticideindex.htm>

BRR Management

Infected Commercial Lots Only:

- ▣ Harvest last or leave in field
- ▣ Cull during loading
- ▣ Storage: low temperature, good ventilation
- ▣ Sell as early as possible
- ▣ Thoroughly clean and disinfect

PLRV (*Potato leaf roll virus*)



5360715

Courtesy Bugwood.org

PLRV (*Potato leaf roll 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
- ▣ Rogue, destroy cull piles
- ▣ Bedding plants & home gardens
- ▣ Scout for aphid vectors
 - 3-4 day interval
 - 5 aphids/100 leaves, or 5 aphids/plant threshold

PLRV Management

- ▣ Contact & ingestion insecticide
 - Flonicamid (Beleaf®) (9C, feeding blocker)- 7-14 day interval, 3 app max, use organosilicone surfactant
- ▣ Systemic insecticides
 - At-planting: none currently registered
 - Foliar:
 - ▣ Clothianidin (Belay®) (4A, neonicotinoid): 14 day interval, 3 app max
 - ▣ Imidacloprid (Malice®) (4A, neonicotinoid): 7-14 day interval, 4 app max
 - ▣ Spirotetramat (Movento®) (23, lipid biosynthesis inhibitor): 10-14 day consecutive, 2 app max, use penetrating oil

PVX (*Potato virus X*)



PVX (*Potato virus X*)

- ▣ Mild mosaic, often symptomless
- ▣ Yield loss 15-20% (high disease pressure)
- ▣ Synergistic with PVY, 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*)



Courtesy potatovirus.com

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

PVY Management

- ▣ Pesticides can't stop introduction, can reduce spread within field
- ▣ Crop oils (coverage)
- ▣ Systemic insecticides (as for PLRV)
 - Clothianidin (4A, neonicotinoid)
 - Imidacloprid (4A, neonicotinoid)
 - Spirotetramat (23, lipid biosynthesis inhibitor)

PMC Pathology

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Thanks!