

Tobacco Rattle Virus – it is spreading...

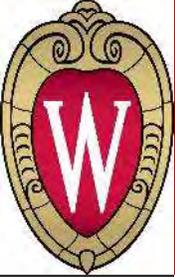
1. More isolated from other potato regions
2. Commercial farmers use locally-produced seed potatoes



All growers need to work together to solve your PVY problem.
Buy seed from local growers.

<http://www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1162.pdf>





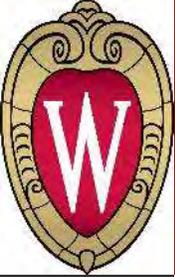
What else could farmers do to reduce PVY?

1. More isolated from other potato regions
2. Commercial farmers use locally-produced seed potatoes
3. Year-out rule allows commercial farmers to replant for 1 year

If commercial farmers plant back high incidence PVY lots, it becomes difficult for seed farmers to reduce PVY incidence in seed.

Can commercial farmers use the new local testing lab to determine whether to plant back their own potatoes?





Possible PVY Scenario...

Farmer purchased and planted a seed lot with 4% PVY.

Under ideal disease spread conditions, a virologist would expect this lot to reach at least 40% PVY incidence by the end of the season.

Can the farmer determine if planting back the seed would be a wise choice for his or her bottom line?





Possible PVY Scenario...

If the farmer used PCR-testing on 50 randomly chosen tubers

4% PVY incidence = 2 tubers of 50 are positive

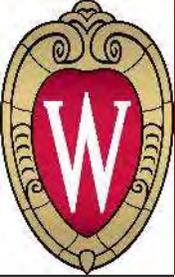
40% PVY incidence = 20 tubers of 50 are positive

At 40% incidence, the best you can hope for is a 40 cwt/acre reduction compared to certified seed potatoes.

Also, serves as inoculum source and increases the PVY problem.

**We need to test larger samples (400 tubers) for certified seed because seed lot destiny may change if PVY incidence is 1% compared to 3%, for example.





Possible PVY Scenario...

If the farmer used PCR-testing on 50 randomly chosen tubers

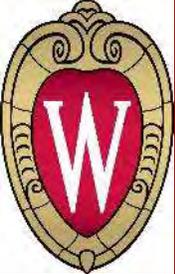
4% PVY incidence = 2 tubers of 50 are positive

40% PVY incidence = 20 tubers of 50 are positive

If commercial farmers test their lots and choose not to plant back high incidence PVY lots, overall PVY incidence in the valley may fall.

If PVY levels fall, farmers will have more options for planting back lots in the future.





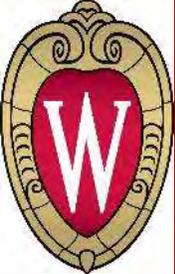
How do changes in virus strains affect PVY management?

More acreage of highly susceptible potato varieties?



Changes in virus strains caused increased incidence?





PVY⁰ is controlled by partial resistance in some varieties, PVY^{N:0} is not

PVY⁰

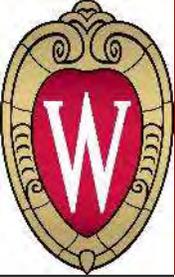


PVY^{N:0}



Yukon Gold





PVY strains will continue to change

RNA viruses, like PVY, have high mutation rates, so new strains occur every year.

Most new strains are less fit than parent strains.

New strains emerge if:

1. They overcome resistance
2. They are spread more efficiently by tubers or aphids
3. High incidence lots are harder to certify or rogue due to mild foliar symptoms



Solve this by keeping overall PVY levels low.





Post-harvest testing is crucial for keeping PVY levels low



PVY in Silverton Russet grown in Wisconsin

Inspectors can see PVY in summer inspections and in post-harvest inspections if plants are at proper growth stage.

Why are post-harvest PVY levels sometimes so high compared to summer readings?



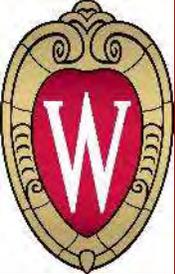


PVY surprises in the post-harvest test

Why is PVY incidence in seed lots sometimes so much higher in post-harvest tests than in the summer inspections?

1. Most spread occurs late in the growing season.
2. The virus goes to the fastest growing part of the potato – the tubers, and not the leaves.
3. Foliar PVY symptoms do not develop on mature plants.





PVY spread occurs late in the growing season

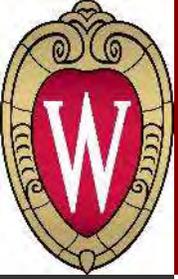


Sept 2, 2014

Farmer A – early generation seed, still green.

Farmer B – commercial field of Silverton Russet, vine killed.





Viruses, including PVY, replicate and accumulate in the growing part of the plant





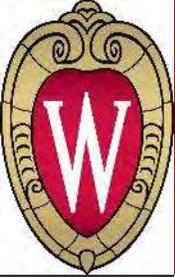
What else can growers do to manage PVY?

Plant resistant varieties

Teton Russet?
Fortress Russet?

Encourage breeders to only release PVY-resistant varieties





PVY management in Central Sands of Wisconsin



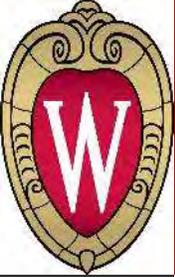
Methods trialed:

1. Silver plastic mulch – poor quality tubers
2. Netting - too difficult
3. UV-absorbent row cover – reduced yield

PVY incidence was too low to evaluate if methods had an effect on PVY spread.

Did small amounts of silver mulch repel aphids from plots?





Disease, weed, and water management in organic seed potato



Benefits of straw mulch

1. Lower PVY levels
2. Increased insect predators
3. Better yield and quality in drought years
4. Builds soil organic matter

Works well for small plots, not feasible for large acreage





- Thank you -



A. M. PENNEY.
President of A. M. Penney Co., Wau-
paca, Wis.



PROFESSOR J. G. MOORE
Wisconsin Experiment Station



J. W. HICKS
President Wisconsin Potato Growers'
Assn.



J. W. BRANN
Wisconsin Experiment Station

