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SeedBytes

A quarterly newsletter produced for the New Brunswick Seed Potato Industry

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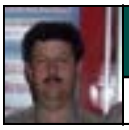

2008 Potato Variety Trials

By Jacques Lavoie and Janet McLaughlin — Potato Development Centre

This summer 120 potato varieties from several breeding programs will be trialed in plots located in Woodstock, Hartland and Grand Falls. These trials, coordinated and managed by Jacques Lavoie and Janet McLaughlin of the Potato Development Centre in Wicklow, are a result of a partnership project with Potatoes NB.

Numbered lines were received from the AAFC breeding programs in Fredericton and Lethbridge, AB, as well as breeding programs in Wisconsin, New York, Maine, and Maryland (USDA). A number of Potato Variety Management Institute (PVMI) varieties are also being trialed.

For more information on the varieties listed and for the date of the Annual DAA/PNB Field Day in August, please contact either Jacques or Janet at 1-866-778-3762.

Chipping Cultivar Evaluation			
AC Novachip	Lady Claire	Beacon Chipper	Dakota Diamond
Atlantic	Marcy	White Pearl	
Dakota Pearl	Monticello	Northstar	
Ivory Crisp	Eva	Snowden	
Russet Cultivar Evaluation			
A95109-1	Blazer Russet	Premier Russet	Shepody
Alta Crown	Gemstar Russet	Rio Grande Russet	
Alta Russet	Goldrush	Russet Burbank	
Alturas	Pacific Russet	Russet Norkotah	
Yellow Cultivar Evaluation			
Adora	Exquisa	Milva	Valor
Allians	Fabula	Piccolo	Velox
Amandine	Granola	Rochdale Gold	Yukon Gem
Ambra	Inova	Saphir	Yukon Gold
Ampera	Lady Christl	Satina	
Baby Boomer	Melody	Spunta	
Red and Blue Cultivar Evaluation			
Blue Lady	HO 2000	New Red Norland	Dakota Jewell
Cecile	Ida Rose	Red LaSoda	Peter Wilcox
Chieftain	Lady Rosetta	Red Scarlett	
Ciklamen	Laura	Rodeo	
Congo*	LaRouge	Rosara	
Round White Cultivar Evaluation			
Harmony	Katahdin	Kennebec	Kenita
Sifra	Snowbird		

Total lines/varieties per trial:

Chips—29, Russets—26, Yellows—27, Reds/Blues—27, Round Whites—11

Inside this issue

Upcoming Events:

DAA/McCain's Research Plot Tours will be held in mid-August. Call 1-866-778-3762 for exact dates.

2008 Annual Meeting and Conference of the Potato Association of America (PAA) in Buffalo, New York on August 10—14.

For more information contact Sue Thompson at *sdt1@cornell.edu.*

Electronic versions of all SeedBytes issues can be found online at www.gnb.ca, then click language preference, Departments and Agencies/Agriculture and Aquaculture/ Potatoes/SeedBytes and select the month for the issue.

The newsletter link has been emailed to all recipients. If you do not have the link, contact Andrew Sullivan at andrew.sullivan@gnb.ca or 1-866-778-3762.

2008 Potato Late Blight Recommendations

By Dr. Khalil Al-Mughrabi—Potato Development Centre—Pathology

Good management includes sanitation, cultural practices, field monitoring and an effective fungicide spray program.

Sanitation, Cultural Practices and Field Monitoring

1. Bury cull piles before crop emergence. Infected tubers in cull and rock dump piles are major sources of infections. Buried tubers may germinate and grow. Rogue or treat these plants with a herbicide. Slivers and pieces of potato remaining from cutting operations should also be buried.

2. Volunteer potato plants can be source of infection. If there are volunteer potato plants in a field an effort should be made to remove these plants by roguing or herbicide treatment. In non-seed fields where late blight is found, consider applying a sprout inhibitor to control volunteers the following year.

3. Always report any suspect case of late blight immediately. If late blight is identified, roguers and other workers should wear pants and boots which can be disinfected with a bleach solution (diluted 1:9 with water) between fields or farms. Field equipment should also be washed and disinfected before entering other fields.

Late blight lesions visible on the leaf and stem (photos courtesy Dr. Al-Mughrabi—DAA)

4. Construction of a good deep hill will help restrict spores from washing down through the soil and infecting the tubers.

5. Monitor your crop. Scout fields where moisture persists after rains or dews such as low areas and along treed edges. Have a good look at stems and leaves for symptoms of late blight. Stem infections do not die during dry periods and will easily re-activate in humid weather.

6. When late blight is first identified, remove and destroy infected plants. When infected plants are rogued they should be placed in plastic bags, and then taken out of the field. Top kill or rogue an area twice the size of the area with infected plants.

7. Rolling or rotobeating a crop before top killing exposes the soil and lower canopy to drying. Rolling also seals cracks in the soil and may reduce tuber infections.

8. Top kill at least 2 weeks prior to harvest to allow time for infected tubers to rot and to promote tuber maturity and thicker skins at harvest. Vines should be completely dead at harvest.

9. Spores survive longer in wet soils. Harvest when the soil surface is dry or windrow the potatoes and allow the surface of tubers to dry before harvest.

10. Dig sprayer rows and low areas last and store these potatoes where they can be easily moved in case of problems.

11. Wet or bruised tubers are more likely to get infected with late blight. Skinning, cuts, and bruises provide direct entry points for late blight, as well as other diseases.

12. Grade potatoes before they are put into storage.

13. If late blight is seen on plants, there will likely be tuber infections. When stored, these should be ventilated with a high volume of air at low humidity until the potatoes are dry. This may lead to higher shrinkage than normal, but losses due to storage rots will be reduced.

14. Potatoes with 5% or more tuber infections are very difficult to store. These potatoes should be stored in the front of the storage or in separate bins so they can be easily removed.

PVY transmission by aphids - views from both sides of the Atlantic

By Dr. Yvan Pelletier—Potato Research Centre—AAFC and Dr. Philippe Giordanengo, Université Picardie Jules Vernes, Amiens, France.

Potato Virus Y (PVY) has an important economic impact on seed potato production around the world. PVY requires a vector, usually an aphid, to move from plant to plant in the field. The virus is labelled as non-persistent because, unlike PLRV, it does not multiply inside the aphid and the ability of an aphid carrying the virus to transmit it decreases rapidly with time. Understanding the transmission process increases our ability to evaluate the risks of virus transmission by aphid species present around the potato crop.

Aphids eat sap contained in specialized cells, the sieve tubes, located in the middle of plant leaves and stems. To get to the sieve tubes, aphid stylets often travel through plant cell walls but will occasionally penetrate an infected cell and acquire PVY. A small quantity of the cell's contents is ingested during cell puncture allowing virus particles to enter the food canal of the aphid's stylet. For virus transmission, the virus particles must be retained inside the stylet until the aphid probes another potato plant. It was recently demonstrated that virus particles are retained when a protein from the virus binds with a protein that is present in the cuticle at the tip of the aphid's stylet. This bond is weak and affected by the aphid's saliva . In fact, the infection of a healthy plant is done when the aphid penetrates a cell and produces a small quantity of saliva before ingesting some of the cell contents. Cell punctures start a few seconds after probing is initiated, are frequent before the aphid reaches the sieve tubes, and are observed in aphid species that do not use potato as a host plant. Generally, aphids will probe a plant to determine if it is an acceptable host and as a consequence, puncture cells and become a potential vector of viruses, like PVY.

Some 350 species of aphids have been found in New Brunswick. Of those, around 150 species have been found in yellow traps in potato fields. Recent work in France demonstrated that for the most part, aphids captured in yellow pan traps originated from neighbouring crops or weeds. Technically, each aphid species is a potential PVY vector. However, their ability to retain the virus and their behaviour on potato make some aphid species better vectors. A study done at the Potato Research Centre, Fredericton, showed that the Green Peach Aphid, the best known PVY vector, has a 30% transmission rate if forced to leave an infected plant after 5 minutes. If this acquisition time is increased to one hour, the transmission rate is reduced to 8%, probably because the aphid loses the virus while feeding or before initiating a probe on a clean plant. Another aphid, the Grain Aphid, refuses to initiate probing when placed on a potato plant and is an extremely poor vector of PVY. By studying the behaviour of aphids on potato, some species can be taken off the list of potential PVY vectors and a more accurate estimate of transmission efficiency be obtained.

Successful seed production necessitates preventing PVY transmission. Planting clean seed remains the best preventive method since transmission is from nearby infected plants because aphids carry the virus for a short time only. Monitoring aphid activity in the potato field has a limited impact since several species of aphids, each having different transmission efficiency, can be present. The flight pattern during the summer varies between species and can be predicted only if the population is monitored on their host plants. The use of mineral oil is a good preventive measure. Aphids are attracted by the visual contrast between plants and bare ground and preferentially land on plants at the field border. Dr. Boiteau, at the Potato Research Centre, has demonstrated that treating the border of fields with mineral oil significantly reduces PVY transmission. The current hypothesis on why mineral oil prevents PVY transmission is that it protects the plant by "cleaning" the virus from the stylet of the aphid. However, studies at the Université de Picardie in Amiens, France, showed that, on oil-treated plants, some steps of the probing behaviour involved in virus transmission are altered. This could be due to the plant reacting to the mineral oil. If this hypothesis is correct, it may be possible to isolate a biopesticide from potato or breed for a potato cultivar that is always in defensive response mode and resistant to PVY.

Key Points

- *PVY is a non-persistent virus*
- *350 species of aphids have been found in New Brunswick*
- *Aphids are attracted by the visual contrast between the plants and bare ground*
- *Treating field borders with mineral oil significantly reduces PVY transmission*

Further studies are required to understand how potato, aphids and PVY interact at the molecular and population levels. This long distance Canada - France collaboration on PVY transmission by aphids provides opportunities to exchange research ideas, problem-solving approaches and promising results.

Dr. Yvan Pelletier is a Research Scientist in Entomology at the Potato Research Centre in Fredericton.

Dr. Philippe Giordanengo is a professor at the Université Picardie Jules Vernes in Amiens, France specialising in Entomology.

Fungicide Spray Program

Dr. Khalil Al-Mughrabi—DAA

A preventive spray program is recommended for 2008. Systemic fungicides are used in a preventive program as part of an integrated pest management (IPM) program to control resistance. Effective control by fungicides requires good coverage of the leaves, proper rates of application and proper timing of applications.

In a preventive program, the first 3 sprays are the most important sprays of the entire season

1. Begin spraying at 80% emergence using a fungicide at label rate.

2. Let the spray booms fill and run for a minute at the edge of the field before starting to spray the crop.

3. Start spraying in the opposite direction each time a field is sprayed to provide better overall coverage of a crop. This is especially true for a variety such as Shepody that has cupped leaves and it is difficult to get even coverage over the whole leaf.

4. Application volume should be at least 233 l/ha (52 gal/ha or 21 gal/acre) applied at 690 kPa (100 psi). Select a nozzle that produces a droplet spectrum between medium and fine.

5. Consider using the shortest spray interval, especially during active growth of the plants and if 20 - 25 mm or more of rain occurs in 24 hours. The spray intervals during the season should be 5 - 7 days depending on the late blight forecast.

6. The application of fungicides should continue after top killing until the plants are completely dead.

7. Copper-based fungicides can be applied with the top killer or after top killing. Copper on the soil will kill spores that wash off the leaves and stems onto the ground. These spores can cause tuber rot late in the season.

8. If an area of a field is to be top killed because of late blight infections, spray the whole field with a fungicide mixture containing a product with sporicidal action. Spray the infected area last and exit the field. Then top kill the infected area. Spray the infected area again 2-3 days after topkilling.

Potato Crop, Weather and Pest Info

Dave Wattie and Suzanne Young—DAA

Weather and the type of growing season strongly influence decisions made during the crop year. Growers require timely and accurate information to help make these decisions. To facilitate this process, the Department of Agriculture and Aquaculture has developed a system to collect, analyze and distribute the necessary data to growers.

A website was designed to aid in the dissemination of this information. This website consists of three sections:

- *Weather and late blight data (by parish)*
- *Pan trap aphid data*
- *Regional reports*

Weather data is updated as often as the information is sent to the system and validated. A date is associated with each report and corresponds to the latest update from the weather station, with only current information being displayed.

Aphid data will be reported weekly for the number of aphids caught in yellow pan traps. These traps will be strategically distributed throughout the production region. There will be four categories of aphids; green peach, buckthorn, potato, and other. The current report will be displayed, with historical reports also available.

The website is accessible from the following link:

http://daamaaextweb.gnb.ca/010-001//index.aspx?lang=en

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SeedBytes is produced through a collaborative effort by Potato Development Centre staff.

Special thanks to Dr. Loretta Mikitzel for ongoing editing of this newsletter.

If you have ideas for future issues, please forward them to any Potato Development Centre staff member.