

# SeedBytes

A quarterly newsletter produced for the New Brunswick Seed Potato Industry



## 2009 Potato Crop, Weather and Pest Information

By Suzanne Young and Dave Wattie —Potato Development Centre



New Brunswick's potato producers require detailed and timely information to make crop management decisions. Working with producers, the Potato Development Centre will again monitor crop, pest and weather information for the 2009 season.

Twenty five weather stations, located primarily in the upper Saint John River Valley as well as throughout other areas of the province where potatoes are also cultivated, provide regular updates of localized conditions. Further expansion of this network will extend comprehensive coverage over a wide area of the province.

In 2009, improvements to the system have been implemented including a new dial-up friendly provincial map, weather summary of all updated parishes, and tables of data from the last 24 hours from stations that are updated in that time frame. These tables include Severity Values, Degree Days, Rainfall and Temperatures.

The website consists of three sections: 1) *Weather and late blight data*, 2) *Pan trap aphid data*, and 3) *Regional reports*.

The weather section can be accessed in different ways. Parishes can be selected from a drop down list as well as from the provincial map. Information found in the weather section includes daily maximum and minimum temperatures, rainfall amounts, growing degree days, corn heat units, P-Days and late blight severity values. The daily soil temperature can also be found on several weather stations. 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. There are four categories of aphids: green peach, buckthorn, potato, and other. The current report will be displayed, with historical reports also available.

The regional reports are collated from data collected from the field monitoring program. These reports contain such information as emergence, weekly growth, disease and insect levels and yield estimates. This will be updated on a weekly basis, with both the current and previous week being displayed.

The website is accessible from the Department of Agriculture and Aquaculture's main page at [www.gnb.ca](http://www.gnb.ca); keyword agriculture and then click on the

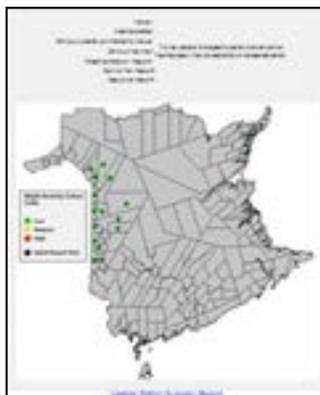


Figure 1. Provincial Map showing locations of individual weather stations

Info link or:

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

Figure 2. New tables show daily severity values, degree days, rainfall and temperature values

Daily Update Summaries			
Severity Values Degree Days Rainfall Temperature			
Temperature as of: May 19, 2009			
Parish	Daily Maximum (°C)	Daily Minimum (°C)	Average Soil Temperature (°C)
Godon	43.8	36	
Perth	43.0	31.1	
Woodstock	46.2	35.9	
Saint-Andre	45.4	32.1	
Windsor	47.1	34.1	
St-James	47.00	38.84	
Wicklow	46.4	32.7	
Wicklow	47.9	31.5	50.6
Saint-Leonard	44.6	31.7	48.8

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### Upcoming Events:

The 93rd Annual Potato Association of America (PAA) meeting will take place in Fredericton, NB from August 9-13, 2009. For more information visit [www.paa2009.org](http://www.paa2009.org)



### Open House at AAFC Benton Ridge Sub-station: July 15, 3 - 8 pm

See and hear about potato breeding research in the field.

Wagon tours, potato breeding and gene resources displays.

Light refreshments provided.

Growers and industry from 3-5 pm; general public 5-8 pm.

Location : 559 Benton Road

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



# Bacterial Ring Rot Management Guidelines



By Dr. Khalil Al-Mughrabi and Jacques Lavoie—Potato Development Centre

Bacterial ring rot (caused by *Clavibacter michiganensis* subsp. *sepedonicus*) is one of the most serious diseases of potatoes in Canada. It is highly infectious and is readily spread by potato cutters, planters, harvesters and even containers. There is a zero tolerance for this disease in seed potatoes.

The bacteria overwinter in slight to moderately infected tubers which may not exhibit symptoms. In Atlantic Canada, the bacteria do not overwinter in field soil but may survive in volunteers. Bacteria can persist for years in dried slime on potato bags, bins, machinery, storage walls and floors. Ring rot symptoms may first appear 60-70 days after planting but disease expression is dependent on climate and potato cultivar. Under warm growing conditions all of the plant symptoms may be detected while under cooler conditions, few or none of the symptoms may be seen. The first symptoms appear as a pale yellow mottling in the lower leaves which usually show signs of wilting. This may be limited to a single stem at first but affected leaf margins often curl upward, roll inward and eventually, dead brown areas develop. These symptoms usually begin in the lower leaves and proceed upward as the disease progresses. Leaf yellowing may intensify, producing a bar of bright yellow tissue between the veins. With severe infection, the whole plant may wilt and die. Tuber symptoms may be visible at harvest or during storage, but for some cultivars and growing conditions, infected tubers may not show symptoms and serological detection methods are needed to find the disease. Tuber infections usually begin at the stem end and when cut, creamy yellow to tan areas of infection are found in the vascular tissue. Often when the cut tuber is squeezed a sticky, cheesy bacterial ooze can be forced from the vascular ring causing tissue separation. As the disease progresses, the tissue surrounding the ring becomes infected and often the entire center of the tuber disintegrates, leaving the outer shell of the potato. Externally, the tubers from diseased plants may appear normal. If badly affected, the skin

may have pale reddish brown patches which gradually darken and become slightly sunken. Often irregular shaped cracks appear in these areas. At this stage the tuber may become infected with the common soft rot bacteria and become slimy and give off an offensive odor.

Currently there are no effective methods available to control BRR. In addition, none of the potato cultivars currently available are immune or resistant to the disease. A single tuber can therefore lead to significant economic loss in a number of ways which include:

- Direct crop loss during growth and storage.
- Rejection of infected seed lots.
- Loss of export markets and restrictions to new markets.
- Destruction of infected crops and restricted marketing of associated crops.
- Extra cost for safe disposal and disinfection.
- Restriction on further cropping, etc.

## Best Management Practices of BRR

1. Use only certified seed produced under a system with zero tolerance for BRR. All certified seed potatoes produced in Canada must have been derived from material found free from the disease. Although this does not guarantee complete total freedom from BRR, it is the best assurance that growers can have.
2. Limited field generation production system (flush-through).
3. The bacterium causing BRR may be latent in a seed lot without exhibiting symptoms for up to two years which may result in remaining undetected during visual inspections. Laboratory testing of seed tuber samples for latent infection is an essential component of the management of the disease. However, it is important to remember that potatoes cannot be guaranteed freedom from BRR on the basis of visual inspections or laboratory testing.
4. BRR testing results of seed stocks are only as accurate as the sampling procedure. Low incidence may not be detected if inaccurate sampling occurs. This could lead to infected tubers bringing bacteria onto a clean seed farm, resulting in cross contamination during seed cutting operation. Dollars spent on testing are wasted unless a representative sample is provided.
5. Regularly clean and disinfect all machinery, equipment, containers, vehicles and storage facilities used.
6. Thorough washing of all soil and debris should precede disinfection of machinery and equipment, because disinfectants are rapidly absorbed or neutralized by soil particles and organic material which can significantly reduce the effectiveness of the disinfectants.
7. A minimum temperature of 82°C maintained for 5 minutes is required for complete inactivation of the bacterium.
8. Uphold at least a 10 minute contact between disinfectant and the treated surface.
9. Sanitation of all agricultural equipment including boots, leggings, knives, etc. is important to maintain.
10. Disinfect all equipment between varieties or certification numbers when cutting seed, planting, working in the field, harvesting, and storage.
11. Disinfectants must be mixed in the proper strength. They must come in contact with all surfaces which must remain moist for one half hour or more after treatment. (Refer to publication #1300 A for a list of recommended disinfectants).
12. Change your solution often to ensure and maintain the proper strength to effectively kill the bacteria.
13. Used potato bags for handling seed is a primary way for ring rot to spread. It is very difficult to kill ring rot bacteria in contaminated bags. Contaminated bags must be burned, and therefore they must be properly disposed of.

14. Potato cultivars vary in the degree of symptom expression. Norchip and Red Pontiac have distinct symptoms, while Russet Burbank has moderately visible symptoms. Desiree and Belrus have less distinct symptoms, such as tuber rotting. Cultivars such as Teton and Urgenta rarely exhibit any symptoms of BRR when infected; however, the bacteria can readily be recovered from such infected symptomless tubers using laboratory or field techniques. Depending on the growing conditions, many cultivars have the potential to remain symptomless. Symptomless cultivars have the potential to carry BRR for several generations despite a healthy appearance and lack of a positive laboratory test. Increased sampling and testing of these varieties is recommended before they are brought to a seed farm to ensure that the BRR bacterium is no longer present.
15. Seed growers should plant their seed fields first.
16. Whole or single drop seed will prevent or greatly reduce the spread of BRR.
17. Cross contamination during cutting can be eliminated by thorough disinfection of cutting equipment between seed lots.
18. Open cell foam rubber rollers can carry inoculum and therefore should be replaced with closed cell rollers.
19. Cross infection from stock to stock can occur most commonly via superficial damage of tubers through direct contact with infected tubers or through contact with contaminated machinery or wash water. Ensure careful handling and grading to minimize damage.
20. The movement of machinery through a crop with infection in the haulm could potentially spread infection via ooze of infected sap entering wounded stems.
21. Spray, hoe and cultivate the seed fields first and disinfect all equipment before using them. Harvest seed fields first.
22. Ensure adequate supply of seed needed for next year in order to avoid temptation to buy seed from another source.
23. Keep all seed lots separated.
24. Supply clean gloves for all workers.
25. Be aware of employees who may work for someone else part-time such as another grower or processing facilities.
26. Do not plant potatoes in the same field two years in a row. BRR-free seed planted in a field that had ring rot the previous season may become infected.
27. Destroy volunteers that grow the following year in an infected field. Infected volunteer potatoes can remain infectious over several generations. Spreading is most likely to occur through contact of infected volunteers during harvesting and handling of a subsequent crop.
28. Colorado potato beetle (CPB) adults and larvae feed on foliage and will consume nearly all the leaves in heavy infestation. This pest also spreads several potato diseases including brown rot, spindle tuber and bacterial ring rot. Control insects, especially CPB, plant bugs, aphids, and leafhoppers that may transmit the bacterium.
29. Equipment should not be shared between commercial and seed farms.
30. Keep visitors out of fields and storage areas. Disinfect foot wear of anyone who may enter your seed storage. Keep your storage locked at all times and keep a log book of who enters your storage facilities.
31. Access to seed storage and equipment by commercial growers and their trucks should be limited and controlled.
32. Equipment used to haul potatoes to starch factories, processing facilities or commercial packing plants should be suspected of carrying BRR and treated accordingly.
33. Trucks from commercial potato farms should be cleaned and disinfected prior to entering seed storage or seed handling areas.
34. For commercial growers, potatoes from any field in which BRR was detected should not be put into storage. Immediately process or dispose of the crop. Good seed trace back on BRR occurrences in commercial potato production is a must and a thorough clean up must be undertaken.
35. Once BRR is confirmed on a commercial farm, a thorough clean-up of storages and equipment must be carried out to reduce the chance of any bacteria remaining and causing contamination of incoming certified seed lots and consequently next year's potato crop.
36. Growers should make the processors and packers aware of their BRR situation in order to take proper measures to address the possibility of spreading the disease. Discard all potatoes that have been handled by anyone other than you or your regular employees.
37. Detection of low levels of BRR on a commercial seed farm, as well as good record keeping and segregation of crops from different seed sources, can help in identifying the source of infected seed.
38. Discarded potatoes, and waste from potato processing, could harbor the disease and should not be dumped back onto fields.
39. Limit your visits to other potato operations to a strict minimum and always disinfect yourself when finished.
40. Trailers can also be a major source of contamination and spread of the disease. Only load seed on a clean and disinfected trailer.
41. Always carry disinfecting bottles with you.
42. Educate your staff about BRR and the proper precautions to be taken to avoid the spread of the disease.
43. Never allow seed potatoes that have left your operation to be returned back.
44. Be aware of the symptoms of BRR and check thoroughly for typical symptoms or stunting (particularly late in the season). Check harvested tubers for signs of the disease shortly after harvest.
45. Frequently inspect tubers at shipping point.

*Continued page 4*

46. There is clear evidence that contaminated wash water from infected tuber lots can transmit the pathogen to subsequent lots washed in the same water during packing (up to 48 hours after). Disinfect and change the water between lots from different origins.
47. Cull piles and surplus stock must be disposed of properly and should be monitored frequently for plant growth. Plants growing from cull piles should be killed with herbicides as a safeguard against possible inoculum source.

**93rd Potato Association Annual (PAA) Meeting August 9—13, 2009**

Fredericton plays host to the upcoming 93<sup>rd</sup> Annual Potato Association of America (PAA) Meeting from August 9 – 13, 2009. The PAA is comprised of individuals passionate about the potato industry who work in research, sales, marketing, primary production among other areas. This annual event brings North American and International researchers together to present their latest research. Below are other PAA events occurring that week:



**International PVY Symposium**

Speakers from Canada, China, Poland and United States of America will discuss Potato Virus Y topics of interest to an international audience. This half-day symposium will include presentations on PVY nomenclature, recombinant isolate research, strain diversity in North America and Asia, breeding for PVY resistance, resistance through transgenic manipulation and seed certification schemes to control PVY.



**Agriculture Tour**

The agricultural tour will travel upriver from Fredericton into the heart of New Brunswick's potato growing region.

Stops on the agricultural tour include Jolly Farmer, the world's longest covered bridge in Hartland, POTATO WORLD, a museum dedicated to the potato, McCain Research Farm in Florenceville and the Covered Bridge Potato Chip Company.



**Alternative methods of controlling pests and diseases Symposium**

Alternative methods of controlling pests and diseases are on everyone's radar screen these days, as issues of economic and environmental sustainability draw increasing attention, and consumer demand for organic produce rises. Speakers will provide overviews of currently used alternative pest controls, and information on how widely used and effective they are. Pathogens, nematodes, weeds, insects and integrated control will be discussed.

WWW.PAA2009.ORG

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