

# SeedBytes

A quarterly newsletter produced for the New Brunswick Seed Potato Industry

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## Variety Evaluation Research at DAA

By Jacques Lavoie —Potato Development Specialist—Seed Potatoes

This summer a number of new potato varieties with potential for production in New Brunswick were grown and evaluated by the provincial Department of Agriculture and Aquaculture in various locations in the province.

Variety trials such as this one perform two important functions: 1) To exhibit to local producers how varieties bred both in Canada and abroad fare under our growing conditions and how they compare to varieties which are industry standards, and 2) To provide New Brunswick customers with on-going evaluations of new varieties that will meet their marketing needs.

Trials are also coordinated annually in offshore markets such as Cuba to further determine which varieties are best suited to their market requirements. Trials such as these strengthen the long term trading partnership that Cuba and New Brunswick have established over the years.

New Brunswick has also undertaken trials in other countries that have shown an interest in New Brunswick seed potatoes. Customers are encouraged to, and often do, visit our province to see first-hand New Brunswick's high quality seed potato production system.

I would encourage anyone who is aware of a new potato variety with potential for production in New Brunswick or with export potential to contact me.

For more information on any of these varieties listed here, please contact Jacques at 1-866-778-3762 or by e-mail at [jacques.lavoie@gnb.ca](mailto:jacques.lavoie@gnb.ca).

\*\*\*Unnamed numbered seedlings from Agriculture and Agri-Food Canada, Wisconsin and German breeding programs were included in the variety trials.

The following varieties were trialed in DAA plots in 2007:

\*\* Standard varieties

### FRENCH FRY CLONES & VARIETIES

Shepody **	Gemstar
Goldrush **	Russet Burbank **

### CHIPPING CULTIVAR EVALUATION

Andover **	Monticello
Atlantic**	Marcy
Snowden **	Northstar
AC Novachip **	Eva

### TABLESTOCK VARIETIES

Red & Blue	Yellows	Round Whites
Chieftain**	Yukon Gold**	Kennebec**
LaRouge **	Spunta	Kenita
Red LaSoda **	Granola	Snowbird
Laura	Rochdale Gold	Valor
New Red Norland	Lady Christi	Sifra
Red Scarlett	Fabula	Rodeo
Rosara	Piccolo	H0 2000
Chérie	Allians	
Blue Lady	Amandine	
Congo	Ambra	
	Adora	
	Ampera	
	Baby Boomer	

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## Upcoming Events:

26th Annual National Potato Council Seed Seminar/Industry Outlook Summit in Branson, Missouri December 6-8, 2007. For more information, visit [www.nationalpotatocouncil.org](http://www.nationalpotatocouncil.org)

Potatoes New Brunswick Annual General Meeting will be held on Friday, November 30th at 9:00 AM at the Perth-Andover Legion.



Electronic versions of all Seed-Bytes issues can be found online at [www.gnb.ca](http://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](mailto:andrew.sullivan@gnb.ca) or 1-866-778-3762.



# Potato Storage Management for Disease Control

Dr. Khalil Al-Mughrabi — Potato Development Specialist — Pathology

Careful and wise storage management decisions are your best defences against crop losses due to potato storage diseases. It is essential to know that you cannot cure tubers of diseases, but you can minimize storage losses from tuber infections. Throughout the storage season, in order to minimize storage loss due to disease, the following points are recommended:

## TEMPERATURE

### **Wound Healing and Curing Period:**

#### **Healthy Potatoes:**

- (1) Cool, or warm, the pile to 13-15.5°C and maintain for 10-14 days along with a humidity of 92-97% RH;
- (2) Processing potatoes may need to be extended to 4-5 weeks to improve color. Color samples should be taken weekly during curing of processing potatoes;
- (3) Ventilate for 1-2 hours per day.

**Problem Potatoes:** Potatoes brought in very warm (greater than 20.0°C) or very cold (less than 7°C) should be cooled or warmed at a rate of 2-3°C per day until the curing temperature is reached.

**Seed:** Cool gradually at the rate of 1°C every 1-2 days to a holding temperature of 3-4°C.

**Table Stock:** Cool at a rate of 1°C every 3-4 days to a holding temperature of 4.5-5.5°C.

#### **Processing Stock:**

- (1) Cool slowly at approximately 1°C per week;
- (2) For short to intermediate holding of processing potatoes, the holding temperature should not be below 7.2°C;
- (3) Potatoes to be processed into French fries before Christmas can be held at 10°C;
- (4) Chip stock can be held at slightly higher temperatures, 10-12°C;
- (5) Storage after Christmas, and up until the early part of May, both chip and French fry stock can be held at 8-10°C. If a loss of color is experienced, a 4-6 week reconditioning period at 13-15.5°C will help restore color;
- (6) Summer processing (May-July) should not be stored at temperatures above 10°C. To maintain tubers in the best possible condition, it may be beneficial to cool to 4-5°C, hold at that temperature until early May and then allow the bins to warm gradually to 13.0-15.5°C, 4-6 weeks prior to shipping.

**Grading and Handling Period:** Potatoes should be warmed to at least 7.2°C before handling.

## VENTILATION

**Air Movement:** This includes both through-the-pile ventilation and over-the-pile ventilation (=recirculation). Through-the-pile ventilation is necessary to dry and cool the potatoes, supply fresh air, and remove carbon dioxide, volatiles and excess heat and moisture from the storage. Recirculation aids in maintaining uniform temperature conditions throughout the storage and sweeps moisture from the walls and ceiling.

**Relative Humidity (RH):** RH in storage should be high to aid in prevention of shrinkage losses and pressure bruising. In general, a RH of 92-97% for *dry, healthy potatoes* and 85-90% for *wet, leaky potatoes* is recommended. A humidifier is an absolute must for ventilated storages, especially those with automatic systems. Moving air is required for this to take place. Storages with inadequate insulation or poor air circulation may experience excess moisture buildup. This can lead to water dripping on the pile which must be avoided at all costs in order to minimize the danger of rot. Adding extra insulation and placing fans above or on top of the potato pile will improve air circulation and help eliminate condensation.



**Storage Monitoring:** A good storage management program should include:

- (1) Check storage daily;
- (2) Place a thermometer or temperature probe located 50-100 cm below top of surface of the pile to measure temperature in storage;
- (3) Check relative humidity a humidity gauge or psychrometer;
- (4) Detect soft rot early using infra-red thermometer. Areas of breakdown will show up as *hot spots* as often as 3 weeks before other symptoms are noticeable;
- (5) Keep a detailed daily record of all storage conditions so that if problems arise there is some way of determining the cause.

For more information, contact Dr. Khalil Al-Mughrabi at 1-866-778-3762 or [khalil.al-mughrabi@gnb.ca](mailto:khalil.al-mughrabi@gnb.ca).

# The Importance of Proper Skin Set

Dr. Loretta Mikitzel—Potato Development Specialist—Physiology



The skin or periderm of a potato protects it from water loss and invasion by diseases, insects and pests. Therefore, it is important that the skin be “set” before harvest. What is “skin set” and what factors affect it? We’ll begin with the process of periderm formation.

Potato periderm is made up of three zones (Fig.1). The outermost zone is the phellem or cork. It is a layer of 6-10 flattened cells.

The brick-like cells are stacked on top of each other, contain suberin and are waterproof. This layer is much like the bark of a tree. In coloured potato varieties, this is where the skin pigment is located.

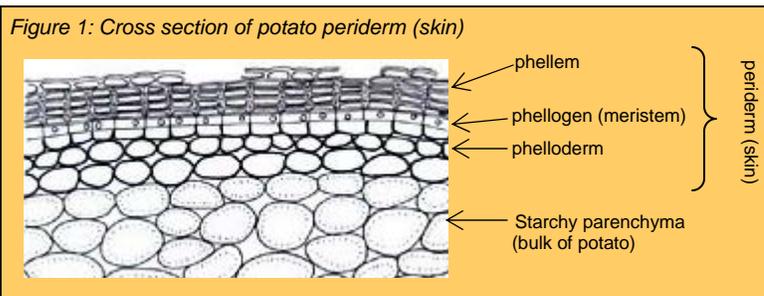
The center zone is the meristematic region called the phellogen. This is a single layer of cells that is actively dividing to produce new cells. The phellogen produces the cells of the phellem.

The innermost zone of the periderm is the phellogen. These cells supply the energy and biochemical materials needed for the growth process. Phellogen cells lack starch granules because the granules have been sacrificed to provide energy for periderm formation.

As a potato grows, the periderm grows too, covering the enlarging tuber and providing protection. In order to cover the expanding tuber, the periderm is under a state of constant growth, continually adding new cells. The actively dividing phellogen cells are slippery and not tightly bound to the underlying tissues of the potato. When the skin of an immature tuber “slips” due to mechanical pressure, it is because the phellogen cells are very soft and easily damaged. The same characteristic that allows the periderm to continue expanding as the tuber grows also makes it vulnerable to

slip or scuff damage.

Only when the tuber stops growing does “skin set” or maturation of the periderm begin. The tuber stops growing when the canopy dies, either naturally or after chemical or mechanical top killing. When the canopy dies, water and sugars are no longer supplied to the tuber, and the tuber cells no longer enlarge. At this time, the phellogen cells stop dividing and no new phellem is produced.



The non-dividing cells harden, become heavily suberized and “stick” to the potato. The skin is now set, and is resistant to mechanical damage.

The skin set process generally takes about 14-21 days. Factors that affect final skin set or periderm maturation include:

**Cultivar:** Rate of skin set varies with cultivar. This is primarily a function of genetics. Smooth-skinned cultivars, such as red potatoes, set their skin slower than Russet Burbank. The skin at the bud end of a potato is thinner than at the stem end.

**Soil type/environmental conditions:** Cool and wet soil conditions delay periderm maturation, while warm soil temperatures increase the number of cell layers and periderm thickness. Warm soil temperatures also diminish

red skin colour and contribute to russetting of red potatoes. Warm soil temperatures can occur during our harvest season.

**Cultural conditions and vine maturity:** Excess nitrogen and lush vines late in the season reduce skin set and reduce russetting on Russet Burbank. If the plants are mature (naturally senescing) prior to top-kill, the vines will go down quickly and the skin will set more readily.

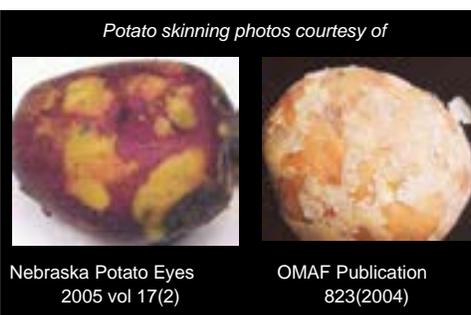
**Length of time between vine kill and harvest:** Vines should be dead 10-21 days prior to harvest. The time needed for good skin set will depend upon maturity or greenness of the vines at top kill and the cultivar. Be aware that as time increases between top kill and harvest the greater the risk for black scurf (*Rhizoctonia*) and silver scurf development. With red cultivars, deleterious russetting becomes progressively worse.

*What happens when immature tubers with poor skin set are harvested and stored?*

When the periderm or skin is not set and tubers are handled roughly, the skin scuffs off, revealing tuber tissue below (Fig. 2). This is known as skinning or feathering. When skinned tubers are exposed to sun and wind, the flesh turns dark and presents a scalded condition. Not only is this undesirable from a marketing standpoint, these tubers will not wound heal properly. When placed in storage, skinned tubers will experience 10-60 times greater weight loss compared to tubers with mature periderm under the same storage conditions. Skinning also presents pathogens with an invitation to attack the tuber. Immature tubers succumb to disease quickly.

Proper skin set or periderm maturation is important to minimize tuber weight loss (shrink) in storage, to provide a barrier to diseases and to maintain marketability of the tubers.

For more information, call Loretta at 1-866-778-3762 or [loretta.mikitzel@gnb.ca](mailto:loretta.mikitzel@gnb.ca).



## Seed Pieces

### Winter Testing—Seedlot Collection

Drop off locations for collection of seed potato lots destined for winter testing, virus testing and BRR testing will be coordinated again this year by Potatoes NB. Seedlots can be dropped at either the Potato Development Centre storage in Wicklow or the McManus warehouse in Grand Falls on Thursday, October 18th from 9:00 am to 5:00 pm and Friday, October 19th from 9:00 am to 12:00 noon.

For more information, please contact the Potatoes NB office at (506) 473-3036.

### Seed Potato Pre-certification Directory – 2007 Entered Crop List

A pre-certification directory listing seed potatoes entered for certification in 2007 is now available on the New Brunswick Department of Agriculture and Aquaculture's website. This list is limited to information regarding varieties and seed class planted supplied by growers when applying for seed potato crop inspection. As such it does not include any field certification numbers. Final certification numbers will be made available in the "New Brunswick Seed Potato Growers Certification List 2007" upon completion of the certification process. If you have any questions regarding the seed directory, please contact Dr. Khalil Al-Mughrabi - Potato Development Centre at 1-866-778-3762 or [khalil.al-mughrabi@gnb.ca](mailto:khalil.al-mughrabi@gnb.ca)

To view the pre-certification directory, please visit the following link.:

<http://www1.gnb.ca/0029/00290062-e.asp>

### 2008 Potatoes NB Potato Conference and Tradeshow

The annual New Brunswick Potato Conference and Tradeshow will be held on Thursday, February 7th and Friday, February 8th, 2008 at the Grand Falls Sportsplex. The conference will feature numerous tradeshow booths and a number of interesting speakers. Confirmed speakers to date include:

- Dr. Willie Kirk, Plant Pathologist and Associate Professor at Michigan State University who will talk about cull pile management and the ability of some piles to tolerate cold winters without spoiling;
- Dr. Jeanne Debons, Executive Director of the Potato Variety Management Institute (PVMI). PVMI is a non-profit corporation that represents the potato commissions of Washington, Colorado and Idaho. Ms. Debons will speak about how her organization deals with licensing agreements for new varieties. She will also highlight new varieties in the PVMI program;

For more information, please contact the Potatoes NB office at (506) 473-3036.

## Potatoes Can Help Fight Diseases

Potatoes, known to help bowel health, may also have a beneficial effect on the whole immune system, according to Spanish researchers.

Pigs were fed raw potato starch over 14 weeks in what is the longest study of its kind on the effect of starch on bowel health, according to study leader Jose Francisco Perez at the University Autonoma de Barcelona, Spain.

"The use of raw potato starch in this experiment is designed to simulate the effects of a diet high in resistant starch," Perez said in a statement.

Humans do not eat raw potatoes, but they do eat a lot of foods that contain resistant starch, such as cold boiled potatoes, legumes, grains, green bananas, pasta and cereals, according to Perez.

The study found that raw potato starch pigs had decreased levels of white blood cells, such as leucocytes and lymphocytes in their blood. White blood cells are produced as a result of inflammation or disease, generally when the body is challenged, according to the study published in the Journal of the Science of Food and Agriculture.



(Photo courtesy of Potatoes New Brunswick)

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