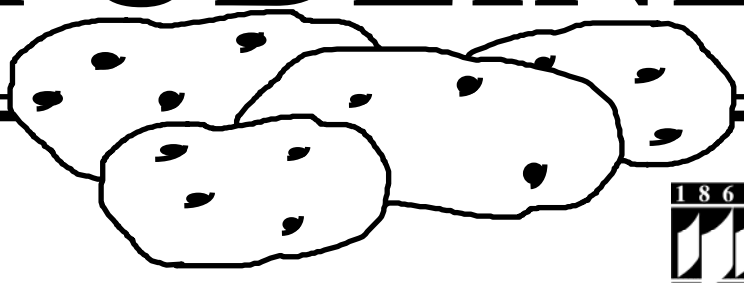
SPUDLINES



MARCH 2007 **SEED ISSUE**
VOL. 45 NO. 1

Dear Potato Grower,

This is the first issue of SPUDLINES for 2007 with another issue scheduled in April. In this issue, articles are presented on the seed and seed handling. I want to put in a push for Maine seed. The virus levels are in the range of that of last year's crop. This and the risk of importing late blight or worse, should make buying Maine seed an easy choice. Peter Sexton reports on corn possibilities and nitrogen management and Bob Batteese reports on Maine's 2006 Post Harvest test results.

Sincerely,

Steven B. Johnson, Ph.D.
Crops Specialist

This publication is in part supported by a grant from the Educational Committee of the Maine Potato Board. The potato growers, processors and brokers of Maine pay assessments. Portions of these assessments were approved for the educational purpose of keeping Maine potato growers and related Maine industry people informed.

http://www.umaine.edu/umext/potatoprogram/

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DIP TANKS AT SEED STORAGES

Steven B. Johnson
Extension Crops Specialist

In a separate article in this issue, Bob Batteese writes that bacterial ring rot has increased from 28 acres in 2005 to 285 acres in 2006. This is a ten-fold increase in one year. It takes little imagination to envision what a ten-fold increase a second consecutive year would mean for the Maine potato industry. Obviously, due diligence for bacterial ring rot control is warranted.

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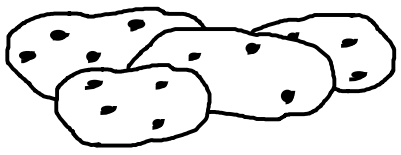
Have you visited our NEW website?

Dip tank maintenance is not a seasonal, part-time or part-year issue—it is an all-the-time issue. Dip tanks need to be kept full of solution, and the concentration of quaternary ammonium in the solution needs to be kept at near 400 parts per million (ppm). Two ounces of 10 percent quaternary ammonium product added to water to make up a total of four gallons produces four gallons of solution with 392 ppm of quaternary ammonium.

I have taken several trips, visiting seed storages and sampling dip tanks. Some growers are doing a great job. Their dip tanks are located by the door and are filled with plenty of solution containing high levels of quaternary ammonium.

However, not everyone is doing as well. In fact overall, what I found is troubling. I visited one seed storage that did not have a dip tank. I visited two seed storages that had dip tanks but the tanks were dry to the point that they could not wet the bottom of shoes. I visited one seed storage that had very concentrated solution in the dip tank by the door, but the volume of liquid in the tank was not above the level of the burlap bag in the tank. The solution was concentrated but it would cover nothing but the soles of shoes. I visited one seed storage that had a dip tank with plenty of solution, but the solution was at zero ppm of quaternary ammonium. Clearly this is not the way to keep the bacterial ring rot pathogen from spreading from storage to storage and seed lot to seed lot.

Dip tanks are not hard or complex to keep full with the correct solution, and they are the easiest part of a bacterial ring rot control program. Poor attention to this detail would be a very poor reason for an increase in the acres affected by bacterial ring rot. Wouldn't you like to keep the imagination of a second consecutive ten-fold increase in bacterial ring rot to just that, imagination? Every seed grower needs to do their part to control the spread of bacterial ring rot.



CORN CONJECTURES

Peter Sexton
Extension Crops Specialist

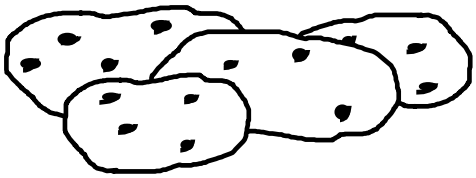
The market value of corn has taken a big jump over the last several months. The spot price for corn in northern Illinois was reported at less than $1.98 per bushel in mid-September, and is currently near $3.80 a bushel. At this writing (2/21/07), corn futures on the Chicago Board of Trade were near $4.15 per bushel for December 2007 delivery. This means that corn farmers in the Midwest can sell their 2007 crops today at very profitable prices.

The increase in corn price is a function of higher gasoline prices coupled with government subsidies for ethanol. This has spurred construction of ethanol plants in the Midwest, which has increased the demand for corn. In my opinion, this is a harbinger of a new period in feed grains. I think we have moved from a chronically oversupplied market to one that is going to be limited by raw material. Current ethanol production capability is not even at 10 percent of gasoline usage. Even if more ethanol plants are built, there simply are not enough feed grains to meet the potential demand for ethanol fuel. At the same time, the problems that caused the government to promote ethanol, which include overdependence on oil from the Middle East, global warming, and problems with the use of MTBE as a fuel additive, are not going away. As I see it, it is not possible to oversupply the energy market with feed grains: the forces that drive the process are not going to be relaxed. So I suspect that high corn prices are here to stay.

This raises the question of how far north we can grow corn in Maine. University of Maine Cooperative Extension, with the support of the Maine Potato Board, is planning to run some trials across the county this season to evaluate this question. The data from these trials will be used to develop a simple model for predicting how well corn will perform and how risky it will be to grow over a number of seasons. The current conventional wisdom is that corn would be a risky venture north of Bridgewater—but this is something that will be put to the test.

The USDA Agricultural Research Service (ARS) conducted trials during 2006 that showed some favorable results. However, the season was warmer than most and even so, the grain didn't have a long enough season to dry down: it ended up very high in moisture (over 40 percent). For farmers who are near a livestock operation, bagging or ensiling high-moisture corn may be an option, and would obviate drying costs.

In the end, I suspect that for Aroostook County the chief benefit of high corn prices will be indirect. High corn prices will encourage buyers of corn to look for alternatives. Also, corn will compete with other crops for acreage, so fewer acres of wheat and soybeans will be grown in the Midwest. Sooner or later, if demand for ethanol remains high, ethanol processors will figure out they can use barley to make ethanol as well. All of this should contribute to strong prices for crops such as oats, barley, soybeans, and canola that we can reliably grow throughout "the County." This, in turn, will make it easier for people here and elsewhere in North America to lengthen rotations, which is always good for potatoes and other crops.



MAINE'S 2006 POST HARVEST TEST RESULTS: GOOD NEWS AND BAD NEWS

Robert I. Batteese, Jr. Acting Director
Division of Plant Industry
Maine Department of Agriculture,
Food and Rural Resources

The Post-Harvest Test results are in, and once again they show that Maine's seed potato producers have, for the most part, done an excellent job controlling virus disease in their seed crop. However, a few problems were identified and the industry must remain vigilant to prevent the buildup of virus levels in future years.

In looking at the overall results of this year's Post-Harvest Test, approximately 84 percent of all the acreage represented by the samples evaluated in Florida had 0.55 percent total virus or less. Compare this to the approximately 77 percent figure from the 2006 Post-Harvest Test—and of course many seed lots again had no virus at all! This is great news with respect to the initial level of inoculum in Maine seed as we approach the 2007 growing season.

Figure 1 summarizes the percentage of acres that met Foundation Seed Class tolerance over the past few years. It shows that the percentage of acreage meeting the 0.55 percent cutoff for Foundation tolerance is higher this year than at any point during previous five years. It also shows the cyclical nature of virus levels over time. You can see that Maine has experienced three cycles of virus buildup over the last sixteen years, with a low percentage of the acreage meeting Foundation tolerance points in 1991, 1995, and 1997. Fortunately, each of the low percentages below 70 percent has been less severe than the previous one, so it is safe to say that the level of virus disease in Maine seed has not been increasing in recent years.

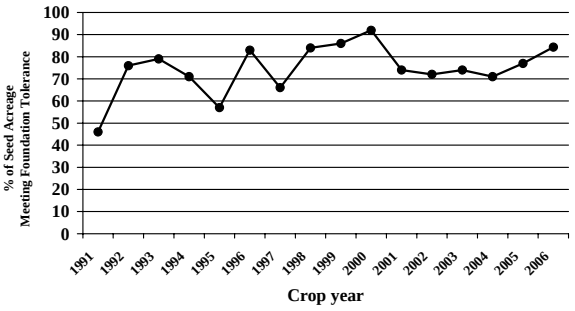
Another measure of success is that this year's Post-Harvest Test resulted in fewer varieties having acreage rejected due to virus disease. In 2006, seven varieties had acreage rejected, while only one five-acre lot of Goldrush and two four-acre lots of Reeves Kingpin were rejected this year.

On a different note, the Department was disturbed to find that the number of acres where bacterial ring rot (BRR) was detected during summer field inspections jumped dramatically from 27.9 acres in 2005 to 285.13 acres in 2006. The Department therefore initiated rule-making to require the testing of all seed lots on a farm where one lot is found positive, before the rest may be sold or planted as seed. We did not encounter any opposition and are hopeful that this change will soon be in effect for 2007.

The Department would also like to congratulate all potato growers on their efforts to control other diseases such as late blight, and hope you will take into consideration whether it is better to import seed with lower virus levels from areas that may have

had other problems, than to plant seed from Maine with higher virus levels. We know that the actions taken during the next few months will play an important role in the disease status (virus and other diseases) of Maine's potato industry. We wish you the best of luck and look forward to working with you as we prepare for the 2007 planting season.

Figure 1. Percentage of Seed Acreage Meeting Foundation Seed Class Tolerance 1991–2006 Crops



POTATO DORMANCY

Steven B. Johnson, Ph.D.
Extension Crops Specialist

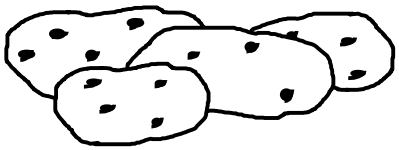
Most potatoes undergo a dormant or resting period. The dormancy length of potato tubers is consistent neither between varieties nor from year to year within varieties. Growing-season stress, storage temperature, and time can all affect the physiological age of seed and therefore have an impact on dormancy. Growing-season stress can have a marked influence on the physiological age of seed the following planting season.

Dormancy is gradually lost during storage, and potato tubers sprout. Piping is the breaking of dormancy followed by sprout elongation. Once sprouting has begun, it will continue. The longer the tuber has been sprouting, the more advanced its physiological age.

A portion of the research conducted in Greg Porter's program at the University of Maine includes potato dormancy. The table below includes some information from the Maine Agricultural and Forest Experiment Station bulletin, *2006 Maine Potato Variety Trials, NE1014 Regional Trials and Advanced Breeding Lines, Exeter, Presque Isle, and St. Agatha, Maine*, which is published annually.

Crop Season	Storage Season	Days to Pip	
		Superior	Russet Burbank
2005	2005-2006	142	188
2004	2004-2005	97	195
2003	2003-2004	120	190
2002	2002-2003	133	171
2001	2001-2002	125	167
2000	2000-2001	154	177
1999	1999-2000	128	167
1998	1998-1999	128	170
1997	1997-1998	68	53
1996	1996-1997	99	84
1995	1995-1996	114	65
1994	1994-1995	104	83
1993	1993-1994	114	119
1992	1992-1993	106	112
1991	1991-1992	126	130

I have attempted to correlate long or short dormancy with heat unit accumulation and rainfall, but no clear-cut patterns have appeared. Generally, the more growing-season stress tubers experience, the more physiologically aged the harvested tubers are, and the shorter the dormancy is. Drought stress appears to have more influence than heat unit accumulation, but quantification of the relationship is elusive.



GOOD AGRICULTURAL PRACTICES (GAP): NEW DEVELOPMENTS THAT WILL AFFECT YOUR BUSINESS

Steven B. Johnson
Extension Crops Specialist

Many people are familiar with Gap, an American clothing and accessories retailer founded in 1969 and based in San Francisco, with approximately 150,000 employees and 3,000 stores worldwide. While my daughter may still buy her jeans at a Gap

store, Gap will take on new meaning for potato producers, processors, and packers.

Good Agricultural Practices, more commonly known by the initials GAP, are not new guidelines. The New Jersey Department of Agriculture initially requested development of a GAP & GHP Audit Verification Program after New Jersey growers and packers were asked by retailers to demonstrate their adherence with GAPs & GHPs. USDA's Agricultural Marketing Service (AMS) responded favorably to this request and to a similar request from the Association of Fruit and Vegetable Inspection and Standardization Agencies (AFVISA), a group of state program managers who represent the interests of inspection programs at the state level.

More recently, on May 31, 2006 David Tuckwiller, chief of the USDA Fruit and Vegetable Programs' Commodity Procurement Branch, issued a memo stating that verification adherence to FDA GAP guidelines will be required for all fresh products supplied to their program.

As of July 1, 2007, passing a GAP certification audit with an 80 percent or higher score will be required for potatoes and other fresh products purchased under USDA feeding and nutrition programs. Some grocery chains are also proposing requirement of this certification. McCain Foods is proposing this requirement in the upcoming contract negotiations. Lacking this certification could have a major impact on your potato business.

Audits are performed by Federal-State Inspection Service (FSIS) staff. Auditors are licensed fresh fruit and vegetable inspectors, and are trained in the technical specifications of the GAP/GHP Audit Verification Program.

Passing a GAP audit does not guarantee safe food. GAP certification is verification that practices are conducted on the farm to minimize microbial contamination in the production of harvested produce. GAP certification verifies the farm's adherence to the Food and Drug Administration's "*Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*." (Copies are available at http://www.cfsan.fda.gov/~dms/prodguid.html).

The USDA GAP audit is voluntary and consists of verifying compliance with the *General Questions* and some or all of parts 1 through 7. Most potato growers will be involved with the *General Questions*, *Farm Review* (part 1), *Field Harvest and Field Packing* (part 2), and *Storage and Transportation* (part 4). Many of the audit questions involve practices already being done, but lacking documentation. For most potato growers, passing the audit should not involve a lot of changes, only increased documentation.

The FDA guidance document identifies the following areas that participants should demonstrate control of in their operations to minimize microbial hazards in fresh fruits and vegetables: water, manure and municipal bio-solids, worker health and hygiene, sanitary facilities, field sanitation, and transportation, among others.

The *General Questions* confirm the implementation of a basic food safety program. The *Farm Review* questions confirm mitigation of hazards associated with land use and water. The *Field Harvest and Field Packing* questions verify the implementation of precautions and practices that mitigate microbial contamination during harvest and field packing. The audit for part 4, *Storage and Transportation*, needs to be conducted during harvest when harvest crews are operating.

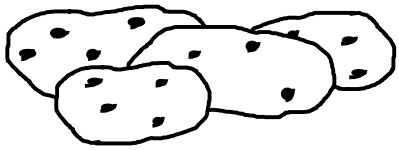
Operations with passing results are acknowledged with an official USDA certificate verifying that the operation has passed the applicable elements of the audit. The certification is valid for one year. With the participant's permission, passing audit results are posted on USDA's Web site and are accessible to growers as well as customers. A list of potato operations currently GAP-certified can be viewed at http://www.ams.usda.gov/fv/fsis/Potatoes.pdf.

A list of all Maine operations currently GAP certified can be viewed at http://www.ams.usda.gov/fv/fsis/Maine.pdf.

Expect that dealing with GAP will be a forever thing. Again, most of what is required is already being done. What is not being done is documenting what is being done. Granted, there will have to be some changes made. Some of these will be very

minor; some might be a little more involved. With proper documentation, I don't expect that potato growers will have a problem passing the audit.

University of Maine Cooperative Extension is developing training materials and programs to help potato growers fulfill this USDA requirement. These will available in PDF format for downloading at the University of Maine Cooperative Extension Potato Program Web site, under *GAP self audits and documentation files and Related Publications*, at http://www.umaine.edu/umext/potatoprogram/.



BRIEF REVIEW OF NITROGEN RECOMMENDATIONS FOR RUSSET BURBANK POTATOES IN MAINE

Peter Sexton
Extension Crops Specialist

and

Gregory Porter,
Professor of Agronomy
Department of Plant, Soil & Environmental Sciences

Nitrogen is a dynamic element to deal with in managing soil fertility. It can be lost from heavy rainfall due to leaching, and it can be lost to the atmosphere to denitrification. On the other hand, decomposition of soil organic matter can make significant amounts of N available to a growing crop over the course of the season.

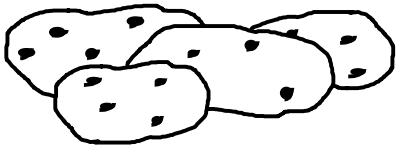
Experimental work by Porter and others in Maine, and by Bernie Zebarth and colleagues in New Brunswick, has shown from 35 to more than 120 lb per acre of N released (mineralized) from unfertilized check plots. Obviously, soil conditions, previous crops, and the amount and kind of organic materials added to the soil have large influences on how much N is released during the growing season. Because N mineralization and leaching of N are difficult to predict, it is useful to track petiole nitrate-N over the season to help guide N management decisions.

Excessive N delays tuber bulking and delays maturity of the crop. This is associated with poorer skin set, more tuber defects, and increased susceptibility to diseases. It also decreases specific gravity (Figure 1). On the other hand, the size profile of the crop tends to increase at higher levels of N (Figure 2), and inadequate N effectively shortens the time that the crop is bulking, directly decreasing yield. Putting these factors together with four seasons of N response data from trials conducted at the University of Maine's Aroostook Research Farm, we estimated the average optimum N rate for Russet Burbank to be 185 lb of N per acre, assuming an N cost of $0.40 per lb (Figure 3). Based on this, the current recommendation is 170 to 190 lb of N for Russet Burbank grown for processing after a small grain crop (oats or barley). For seed crops, decrease the N rate by 10 percent. Nitrogen credits for the previous crop are assigned as follows:

- heavy clover or alfalfa: 60 lb N credit (+/- 20 lb depending on stand; if pH is less than 5.5 assume 40 lb N)
- underseeded grains, broccoli, old sod, or non-legume green manures: 10 lb N credit
- grain (no underseeding): no N credit

For processing potatoes, N rates should be reduced by 10 lbs per acre for every week the crop is planted after May 24th.
Work on the timing of N application has failed to show a consistent benefit for split application of N in our environment; therefore it is not recommended. However, there is always some uncertainty regarding the effects of weather on both N leaching and on N mineralization. For this reason, some growers follow a strategy of shorting their intended N application 10 or 15 lb and then petiole testing to see if this should be applied in season. If the climate works to promote extra N availability, this practice helps to save some N costs

and to avoid the negative consequences of excess N. On the other hand, if the field needs the extra 10 or 15 lb of N, growers can still make it up with foliar applications guided by their petiole tests.



SAFE, RESPONSIBLE, AND FREE DISPOSAL OF BANNED PESTICIDES

Steven B. Johnson
Extension Crops Specialist

Many farms and old buildings still have old, unusable, or "obsolete" pesticides. Once again in May this year, there will be an opportunity to dispose of them in a safe, responsible, legal, and free manner. Only banned pesticides and pesticides that have become caked, frozen, or otherwise rendered unusable can be accepted. Pesticides that can be used legally are not eligible for collection.

Pesticides such as DDT, dioxin-laced 2,4,5-T and compounds of arsenic, mercury or lead—all considered marvels in their day—are banned today because of their hazards to human health, wildlife, or to the environment. This responsible, free disposal solution is available for these and other obsolete pesticides thanks to the combined efforts of the Maine Board of Pesticides Control (MBPC) and the Maine Department of Environmental Protection (DEP). This program is available to homeowners as well as family farms and greenhouse operations.

Obsolete pesticides cannot be transported or disposed of without expensive permits and unless a federally licensed disposal facility is willing to accept them. This program does that. Disposing of obsolete pesticides in trash, sewers, or by burial is illegal and threatens ground water.

To begin, download an Obsolete Pesticide Inventory Form from http://www.maine.gov/agriculture/pesticides/pdf/obsoleteform.pdf

Alternatively, contact the MBPC (207-287-2731) and request an Obsolete Pesticide Inventory Form.

On this form, identify the pesticide active ingredients shown on each product's label. Unidentified products without labels or markings should also be described in as much detail as possible. Send the completed form to this address:

Maine Board of Pesticides Control
Obsolete Pesticide Inventory
28 State House Station
Augusta, Maine 04333-0028

After your inventory form is received, the MBPC will send you a map with directions to your local collection site and the date of the collection. This should arrive 10 days to several weeks before your collection date. The collection sites have traditionally been the four Maine DEP field offices.

Until you are able to take advantage of the collection program, follow these sound storage practices, which remain the best—and only—way to prevent an environmental or health crisis from occurring as a result of contamination with an obsolete pesticide:

- Keep pesticides high, dry, and locked up away from children and pets.
- Make sure that dry materials remain free of moisture and wrapped in heavy-duty plastic bags.
- Store liquid materials in glass bottles beyond the reach of children. These materials require no other special attention, provided they are in good condition.

- Wrap rusting metal cans in plastic bags and place into rubber or plastic trash containers. Surround wrapped pesticides with kitty litter, newspaper, vermiculite, or similar absorbent material. Be sure secondary containers have labels identifying contents. If a bottle, bag, or other container leaks, call the Maine DEP for advice on proper cleanup.

Drive directly and carefully to the pesticide collection site when transporting obsolete pesticide inventory to the collection site, as you will be responsible for any spills and their subsequent clean up and restoration costs. Never transport pesticides in the cab or interior of your vehicle. Use the truck's bed or the car's trunk, but not space reserved for passengers.

When transporting obsolete pesticide inventory, please observe the following:

- Wrap dry materials in plastic bags and place them in cardboard cartons or plastic buckets. Put liquids into plastic containers with newspaper.
- Be sure to attach labels to containers. Unlabeled materials will not be accepted at the collection site.
- Brace items in your vehicle's bed or trunk to prevent shifting while en route.
- Cover loads in open-bed trucks in case of rain.

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