# SPUDLINES

**APRIL 2002**
**VOL. 40 NO. 2**

**CROP PRODUCTION ISSUE**

THE UNIVERSITY OF MAINE Cooperative Extension

**Dear Potato Grower,**

**This is the second issue of SPUDLINES for 2002. In this issue, articles are presented on soil test changes in the recent past, FRAC guidelines and some research performed at the Experimental Farm on powdery scab control. Peter Sexton provides a start to finish article on canola production. Jim Dwyer outlines some changes in the Maine Potato IPM program regarding late blight prediction and weather gathering.**

**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.**

**Sincerely,**

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

**Upcoming Programming of Interest**
**Upcoming Programming of Interest**

| | |
|---|---|
| **July** | **Rouging School**<br>Cooperative Extension Office,<br>Presque Isle |

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## HOW HAVE POTATO SOIL TEST LEVELS CHANGED OVER TIME?

John M. Jemison, Jr., Ph.D.
Water Quality and Soil Science Specialist

For many people, soil test information is a critical part of their overall planning and production scheme. For others, it is probably not. I have been interested in summarizing some trends in the soil test levels of potato fields over time. I asked Bruce Hoskins of the Maine Soil Testing Laboratory to provide me with printouts of the annual summary from 1985, 1990, 1995, and 2000. I have gone through and summarized the information on soil pH, CEC, and soil nutrients.

What I would like to do is discuss some of the findings.

Probably the most interesting trend that I found was in the changes in soil pH management over time (see Table 1).

### Table 1. Soil pH trends from 1985 to 2000

| Soil pH | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|
| | n=3022 | n=1218 | n=1042 | n=1023 |
| | **Percent of Potato Fields** | | | |
| **< 4.0** | <0.01 | 0 | 0 | <0.01 |
| **4.0 - 4.5** | ***7*** | ***3*** | ***1*** | ***1*** |
| **4.5 - 5.0** | ***30*** | ***19*** | ***14*** | ***6*** |
| **5.0 – 5.5** | 44 | 40 | 39 | 25 |
| **5.5 – 6.0** | ***17*** | ***29*** | ***33*** | ***40*** |
| **6.0 – 6.5** | 2 | 7 | 11 | 22 |
| **> 6.5** | 0.01 | 1 | 2 | 7 |

The biggest changes are in indicated in bold italics in the table. The trend toward producing potatoes at a higher soil pH is very evident. There appears to be a 24% decrease in the number of fields where potatoes are produced at a pH of less than 5.0. This is also a concurrent increase in the number of potato fields at a pH between 5.5 and 6.0. This has *significant* implications for crop rotation. Any legume-based rotation crop (particularly soybeans, clovers, alfalfa, and the like) is going to perform much better, produce much more residual N at a pH of 6.0 than at one of 5.0. Remember that the pH scale is not linear. A pH of 4.8 is about 16 times more acidic than a pH of 6.0. The impact on mineralization, nutrient availability, and occasionally herbicide effectiveness can be really significant. This is a very positive trend for the industry, because we need to create conditions for profitable rotation crops—like soybeans or canola—to be grown effectively.

Table 2 shows interesting trends in soil test phosphorus levels.

### Table 2. Trends in soil test phosphorus levels from 1985 to 2000

| Soil P | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|
| | n=3022 | n=1218 | n=1042 | n=1023 |
| | **Percent of Potato Fields** | | | |
| **Low** | 0 | 0 | 0 | 0 |
| **Medium** | 1 | 3 | 0 | 1 |
| **High** | ***96*** | ***95*** | ***95*** | ***87*** |
| **Excessive** | ***3*** | ***2*** | ***5*** | ***12*** |

A couple of things should jump right out at you when you look at these numbers. There may be a better chance of the Red Sox winning the World Series than anyone finding a phosphorus deficiency in potatoes. In many ways this is a very good thing. We never want to see potato yield to be limited by nutrient deficiency. That is why we have traditionally proposed a buildup and maintenance program for this production system. But as we begin to produce potatoes at higher soil pH values, we should keep in mind that the stored soil P is more plant available. This may explain why we are also seeing a 10 percent increase in the number of soils testing excessive in P. Keep in mind that low levels of phosphorus in Maine lakes and rivers limit the growth of algae and aquatic plants. As the P in these soils becomes more plant available, and if the soil moves off the field into the waters, algal blooms in lakes and rivers will become a problem. So keep an eye on these P levels, and let’s try to keep them in check.

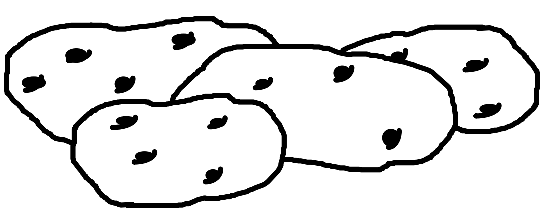
Table 3 shows the last nutrient trend that was rather interesting, which was the change in soil test K over time.

### Table 3. Trends in soil test potassium levels from 1985 to 2000

| Soil K | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|
| | n=3022 | n=1218 | n=1042 | n=1023 |
| | **Percent of Potato Fields** | | | |
| **Low** | 0 | 2 | 3 | 4 |
| **Medium** | 13 | 17 | 18 | 35 |
| **High** | 30 | 33 | 37 | 34 |
| **Excessive** | ***57*** | ***48*** | ***42*** | ***27*** |

The number of fields testing excessive in potassium has **decreased** by 30 percent since 1985. While we don’t worry about potash from an environmental perspective, it still represents a significant cost to growers. I am not sure whether the decrease is a result of growers reducing potash applications over time, or if there is another factor at work that I am unaware of. Greg Porter talked of the merits of applying potassium to potatoes at the potato conference last January. Clearly, potash is a critical element in potato yield and quality. The percentage of fields testing high in K has remained constant over time. This is good. If you fall to the lower end of medium, it is time to carefully reconsider your K management.

The last thing that I thought was interesting in these soil test data was the number of samples testing very low in CEC. Over 40 percent of the samples have a CEC of less than 7.0 meq/100g. Given the coarse-textured nature of potato soils, this is not surprising. And the numbers of samples in this range have been fairly constant over time. But, this means that soils have a very low nutrient holding capacity, and this could well explain why soil K, Ca, and Mg levels can fluctuate greatly over time. Potato growers need to continually work to increase soil organic matter. While not as low as I feared, still 14 percent of the samples tested low in organic matter (<2.5 percent) in 2000. Increasing soil organic matter will improve the capacity of the soil to hold water, and increase the soil's capacity to hold onto the nutrients (K, Ca, and Mg) that you apply. Lastly, it could help you stretch your fertilizer dollars.



## TOWARD SUSTAINABLE IRRIGATION FOR POTATO PRODUCERS

John M. Jemison, Jr., Ph.D.
Water Quality and Soil Science Specialist

Water—when it's needed, the stuff is liquid gold; when you can't turn it off, it can ruin a crop. As we look toward the not so distant future, I expect increased demand to make water one of Maine's most important economic resources. We need to work today to influence agriculture's place in line for that resource. What we need is a comprehensive water management strategy that will allow Maine potato producers to have enough water when they need it, while ensuring that wildlife, fishery and other needs are met. While you would probably agree that moving irrigation pipe around is a great way to ruin a nice day, it's better than having no access to the resource. When demand for a resource increases without a corresponding increase in the quantity, the resource becomes highly valued. Now is the time to help develop a sustainable plan for irrigation management.

The problem with developing a plan for sustainable water withdrawals is that many competing demands occur at the same time. Maybe it's due to population growth, increased development, climate change (possibly influenced by growth and development), or some other poorly understood factors, but potato growers who rarely needed supplemental water are now seriously considering irrigation. Those once frequent summer showers in Aroostook and Penobscot counties appear to be occurring less frequently and potato stress is becoming a common occurrence. A good deal of research has been conducted in Maine and Atlantic Canada on the effect of irrigation on potato yield and quality. Greg Porter has reported that over a six-year period, the average yield increase from added irrigation over a number of potato varieties was about 65 cwt/acre. In really dry years like last summer, the effect of irrigation on yield can be significant. In a project conducted in Fredericton last summer, researchers found about a 100 cwt/acre increase with supplemental irrigation. After growing seasons like last summer, yield increases like that are peaking the interest of growers who might not have been interested before.

Potatoes respond best to irrigation during July and August, when they require about 0.2 inches of water per day. This is also the time of year when our surface water resources are usually at their lowest seasonal or annual flow. Resource managers are faced with the proverbial question: How low can we go? The challenge is to find out how many people need water, how much water will they use, and how much stream withdrawal is possible without significantly affecting habitat. We seem to be facing a classic public policy question of who should get the water.

You might be wondering what water sources may be available for irrigation. Many people in other states rely on groundwater for their water supplies. While some producers in Maine can use groundwater, unfortunately we do not have many high-yielding aquifers to tap into. That leaves surface water sources like lakes, ponds, rivers, or streams. If you are considering irrigation in your future, it is best to try to build temporary water storage in the form of ponds. Keep in mind that there may be some difficulties, including permitting and cost, but as you will see, some on-farm storage will likely be a key factor in your long-term irrigation plans. Keep in mind that upland ponds don't hold water well. While it is physically much easier to dig a pond in a wet area or to block a small stream, regulators really don't like to approve these. In addition, damming a stream requires considerably more construction cost. My suggestion is to try to build ponds that regulators are likely to approve, and do your best to line the floor of the pond to hold water, or compact the soil to improve water retention. Then, if possible, directly discharge water from a stream to the pond.

Regulators have been discussing the possibility of adopting a flow standard that could potentially restrict the timing and amount of withdrawals from streams and rivers. Although many different types of flow standards have been discussed, they all restrict withdrawals below a certain flow level, which will be different for each river and stream. The ideal flow standard would allow for maximum flexibility in terms of withdrawals, would protect aquatic habitat for fish and other species, and would be easy to determine and apply to streams and rivers across Maine. When and if a flow standard is adopted, it will be necessary to understand what this means for you.

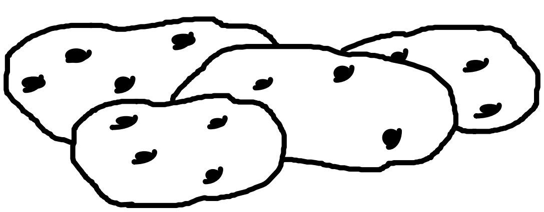
The least restrictive flow standard that regulators have discussed is the 7Q10. This is defined statistically as the seven-day low flow that occurs once every ten years. In some years, 7Q10 is reached naturally without withdrawing significant amounts of water from the stream. Many streams in Central and Northern Maine have reached their 7Q10 level since the drought began last year. If 7Q10 were used as a standard, it would give potato growers maximum flexibility and the greatest amount of withdrawal potential. This standard is unlikely to be adopted by regulators because it does not protect aquatic habitat. Even if this 7Q10 standard were adopted, it would still be useful for potato producers to be able to pump water when the rivers are high and store water on their farm. Growers would then have more flexibility about when and how much they can irrigate when the river water levels drop.

Another possible flow standard that might be used to regulate water withdrawals from streams is the August Median Aquatic Base Flow (ABF). In the humid east, much river flow is generated by groundwater recharging streams. Over a given number of years, one can potentially calculate a median base flow such that half of the time, the flow is greater than the median value and half of the time, the flow is less than the median value. Once the river flow dropped to the ABF, water withdrawals would be shut off. As with the 7Q10, the August Median Base Flow is a flow number for each stream, which applies for the whole year. This flow standard is both more restrictive in terms of withdrawals and more protective of fish habitat than the 7Q10. Even so, it does not ensure that all aquatic species would have sufficient flows in the winter and spring for spawning. This approach would virtually require potato growers to build storage ponds, because potatoes would likely need the most water around the time ABF is being reached.

Yet another approach would be to utilize a seasonally adjusted median flow. This would be more conservative for water withdrawals because it more adequately protects year-round in-stream flow minima. It would be more complicated to put into practice because of the number of changes, depending on the season. This method would require potato producers to pull water out of streams when the "getting was good," and either significantly reduce or completely stop water withdrawals when flow dropped below this seasonally adjusted median base.

Other possible standards being considered by the regulatory community are flows established by hydrologic modeling methods that protect stream integrity, natural flow minus a portion, and natural flow. These more restrictive methods might be left for the highest quality streams.

One of the first three scenarios will likely be used to regulate Maine water withdrawal from surface waters in the future. I doubt the most highly restrictive standards will be put in place, except for the absolute highest-quality streams. So the good news is that if you live close enough to a ready supply of surface water, you should be able to take advantage of some of it. Unfortunately, it also appears that a means to store water will be increasingly important. I recommend that you get involved in this issue. Decisions made on water issues over the next few years may have a tremendous influence on the long-term viability of many potato producers.



## FUNGICIDE RESISTANCE ACTION COMMITTEE (FRAC)

Steven B. Johnson, Ph.D.
Crops Specialist

FRAC is a working group of CropLife International, a recent evolvement from the Global Crop Protection Federation. CropLife is a global federation representing the plant science industry. The purpose of FRAC is to provide fungicide resistance management guidelines to prolong the effectiveness of "at risk" fungicides and to limit crop losses should resistance occur. The main aims of FRAC are to

1. Identify existing and potential resistance problems;

2. Collate information and distribute it to those involved with fungicide research, distribution, registration and use;

3. Provide guidelines and advice on the use of fungicides to reduce the risk of resistance developing, and to manage it should it occur;

4. Recommend procedures for use in fungicide resistance studies;

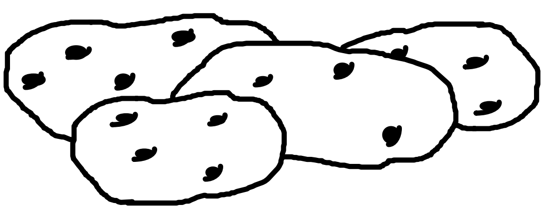
5. Stimulate open liaison and collaboration with universities, government agencies, advisors, extension workers, distributors and farmers.

There is a specific working group within FRAC to develop resistance strategies specifically for the Qo inhibitor (QoI) fungicides. The Qo inhibitor fungicides (QoI) all act at the Quinol 'outer' (Qo) binding site of the cytochrome $bc_1$ complex. These fungicides prevent electron transfer between cytochrome b and cytochrome $c_1$ in the biochemical pathway of mitochondrial respiration. The QoI fungicides are azoxystrobin, famoxadone, fenamidone, kresoxim-methyl, picoxystrobin, pyraclostrobin and trifloxystrobin. They are all in the same cross-resistance group and should be managed accordingly. Quadris is the trade name of the product that contains azoxystrobin. Others in this group are approaching the marketplace and may be available in the upcoming years. The key to remember is that they need to be managed as a group.

This class of fungicides has high risk for resistance development so managing this chemistry to delay the buildup of resistance and to lengthen its useful life is an important task. Resistance has been reported in numerous downy mildews and powdery mildews, among other pathogens. No resistance has been detected in potato late or early blight pathogens.

There are label restrictions limiting the total number of applications and amount of product that can be applied per year. These must be followed. If choosing to use QoI fungicide products, my recommendations are:

- Do not use QoI fungicides in two consecutive applications;
- Only use QoI fungicides tankmixed with a protectant fungicide such as an EBDC (mancozeb, maneb) or chlorothalonil (Bravo, Echo, Equuis) product;
- Do not use QoI fungicides in more than half of the total applications;
- Do not use QoI fungicides at less than the labeled rate;
- Use QoI fungicides preventively.



## THE MAINE POTATO IPM PROGRAM CHANGES FOR 2002

James D. Dwyer
Crops Specialist

The University of Maine Cooperative Extension's Potato Integrated Pest Management program has two purposes: 1) to provide information that enables Maine potato producers to make informed decisions about managing their potato crop; 2) to demonstrate techniques for gathering and processing pest-related information.

Information has been provided by field scouting staff to program participants about their specific fields, and general regional information has been provided to others. The field scouts survey fields for insect populations, diseases and to some extent weed populations. The program has also historically operated 50 to 150 small mechanical weather stations for late blight forecasting. These weather stations have been used to provide growers with site-specific weather data for on-farm disease forecasts. This "demonstration" aspect of the program has proven to be a very effective tool in managing potato late blight.

The mechanical weather stations have worked well, but are slow and cumbersome to operate. In contrast, the automated weather stations currently available are user friendly, allowing users to extract and utilize information much more quickly. So as technology changes, so must the Potato IPM program. The current plans for the 2002 growing season are for the Potato IPM program not to operate any mechanical weather stations (hygrothermographs). Growers are encouraged to purchase automated weather instrumentation for site-specific disease forecasting. In addition, thanks to the cooperation of growers with automated weather stations, regional disease forecasting information will still be available through the cooperation of the growers with automated weather stations that cooperate with the NoBlight computer program. Growers who purchase automated weather instrumentation are encouraged to cooperate with the NoBlight computer program.

Potato pest information, including regional disease forecasts, insect information, weather radar and weather forecasts will be available again this year at:

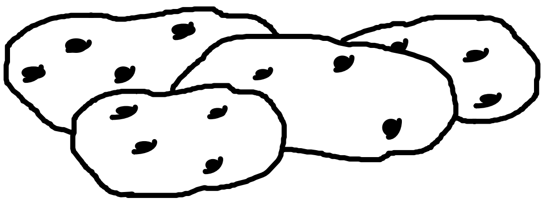
http://www.mainepotatoipm.com

Growers may wish to note that several different types of weather forecasts are available on this Web site. Not only is a traditional seven-day forecast available, but also a detailed forecast by hour for the next eight hours. This type of forecast can be very helpful when scheduling fieldwork.

Pest information will continue to be available via telephone at 1-888-USE-UMCE (1-888-873-

8623). The Pest Alert newsletter will also continue through the growing season.

This change in the Potato IPM program will allow our scouts to spend more time surveying fields, improving the overall quality of our program.



**SPRING CANOLA**

Peter Sexton, Ph.D.
Crops Specialist

Canola is an oil-seed crop developed from rapeseed (*Brassica napus*). It is valued as a cooking oil because of its relatively high proportion of unsaturated fatty acids. A number of potato growers in northern Maine experimented with canola last year and were encouraged with the initial results. Yields were on the order of 1500 to 2000 lb per acre. Hopefully, yields will go up as we gain experience with the crop. The preliminary observation of those growers who had grown canola for two or more years is that it was beneficial for the following potato crop. Tim Griffin and the USDA-ARS research group in Orono have included canola in their rotation studies, and while this is still a work in progress, thus far it appears to be as good or better for potatoes than the other rotation crops they are studying. The objective of this article is to briefly review canola production practices.

***Seeding:*** Plant when the soil temperature reaches 50 degrees F for rapid germination (on the average, this occurs around May 15; soil temperature data from Caribou show a range of May 2 to May 22 over a 10 year period). Late planting decreases yield in the Midwest and Canada, and it probably has a very similar effect here. Data from experiments with mustard (a cousin of canola) done at Presque Isle show that later planting leads to lower yields as follows: May 28, 1010 lb/acre; June 4, 780 lb/acre; June 9, 670 lb/acre; June 21 600 lb/acre.

Frost tolerance of canola seedlings increases with exposure to cool temperatures. Hardened seedlings are reported to withstand frost down to 20 degrees F. However, planting into cold soil slows emergence and increases the probability that weeds and diseases will become problems. All things considered, growers in northern Maine should aim for a mid-May planting date.

A firm seedbed is important for even emergence. Recommended seed rate is 5 to 8 lb/acre. Seed with a grain drill to a depth of one half to one inch. Broadcast seeding and incorporation of seed with a harrow is discouraged for seeding canola, as this may result in uneven stands and uneven maturity.

***Soil Fertility:*** Based on fertilizer recommendations from other areas, we need about 100:60:90 lb/acre of NPK, respectively, to produce a good canola crop. Consider the previous crop and the soil test, and fertilize accordingly. In the absence of a soil test, given that canola is a good scavenger for P and that we keep soil K levels relatively high for potatoes, we probably do not need to add much P or K. I would suggest applying about 30 lb of each. As for N, if you are following a cereal crop (barley or oats) you may need the full 100 lb of N. If you are following potatoes you might want to decrease the N rate to around 70 lb per acre. Canola is very responsive to N and S. Using ammonium sulfate as a N source would also provide S. Besides S, canola also needs more B than do cereals. Preliminary recommendations for these nutrients are to apply 15 lb of S and 1 lb of B per acre. Canola tolerates low pH better than most cereals. Expect yield to drop sharply at pH values less than 5.5 and show a moderate response to lime between 5.5 and 6.0.

***Weed Control:*** Trifluralin (e.g. Treflan ®), sethoxydim (Poast®), quizalofop (Assure II®), and clethodim (Select®) are registered for use on canola in the USA. Trifluralin is reported to provide partial to good control of lambsquarters and pigweed, along with several annual grasses. It is applied before planting and should be incorporated according to label directions. Sethoxydim, quizalofop, and clethodim are post-emergence grass herbicides. An oil adjuvant is always recommended with the grass herbicides for improved control. Some growers in Maine have successfully grown canola without using herbicides, while others have had severe weed problems. Rapid emergence is important for suppressing weeds. Another factor to consider in choosing weed control options is how clean the field is to start with.

***Insects:*** Flea beetles and aphids are potential problems in canola, as are tarnished plant bugs. The crucifer flea beetle and the striped flea beetle that attack canola are separate species from the one that attacks potato. Thus far these insects have not been a problem for canola growers in Maine.

***Diseases and rotation issues:*** Canola is susceptible to white mold (*Sclerotinia sclerotiorum*), which can cause serious yield loss. White mold can also be a problem in potatoes. Canola is susceptible to clubroot (*Plasmodiophora brassicae*), which is also a problem for broccoli. These factors need to be taken into consideration in planning a rotation with canola. You should not plant canola more frequently than once every four years in a given field.

A fungal disease called “blackleg” is a potential problem in canola. The canola form of blackleg is caused by *Phoma lingum*—this is not the same pathogen that causes “blackleg” in potato (*Erwinia carotovora*). Less often reported diseases are downy mildew, aster yellows, alternaria blackspot, and white rust.

***Harvest:*** Seed shattering can be a very severe problem in canola. Seed matures from the base of the stem sequentially up to the top of the main stem. By the time the seed at the upper part of the plant is mature, the pods at the bottom of the plant will have shattered. Shattering losses can be reduced by swathing. The optimum time for swathing is when the seeds are 30 to 35 percent moisture. Another way to determine swathing time is by changes in seed color. A change in seed color is a sign of physiological maturity. Swathing when 30 to 40 percent of the seeds on the main stem have ***begun*** to change color is optimum. Swathing later than this results in increased losses to shattering, and swathing earlier than this results in decreased seed size and more immature seed. Growers with a small acreage of canola will want to wait for optimum conditions to swath. Growers with larger acreages of canola will want to start swathing before the optimum time (meaning a 20 percent color change rather than 30 percent) so that they can get their whole crop swathed before the better part of it shatters. The unripe seed will continue to mature in the swath. Combine at 10 to 11 percent moisture. Seed moisture should not exceed 8 percent for long-term storage.

***Markets:*** There is a solid market for canola with processors in Canada, the price being subject to fluctuations in global supply and demand for canola oil.

**<u>Canola Information Sources on the Internet:</u>**

Canola Council of Canada. *Canola Growers Manual.*
www.canola-council.org

Berglund, D.R. and McKay, K. *Canola Production.*
www.ext.nodak.edu/extpubs/plantsci/crops/a686w.htm

*Ohio Agronomy Guide.*
www.ag.ohio-state.edu/~ohioline/b472/canola.html

Franzen, D.W. *Fertilizing Mustard and Canola.*
www.ext.nodak.edu/extpubs/plantsci/soilfert/sfl122w.htm

## TREATMENT TESTS FOR POWDERY SCAB CONTROL

Rustin Lovewell and Megan Weymouth
University of Maine Experiment Station

Powdery scab is caused by *Spongospora subterranea* and affects potato crop production worldwide. The genus *Spongospora*, a member of the family *Plasmodiophoridae*, has recently been moved from the fungi into the protozoa kingdom. If a potato tuber becomes infected, small blemishes will appear. These blemishes contain cystosori (spore balls) that spread beneath the epidermis of the plant and erupt, rendering the tuber unmarketable. In severe attacks, tubers can become completely covered by lesions. In addition, *Spongospora subterranae* may transmit viruses, most notably that which causes “mop-top” symptoms in the growing plant. If infected tubers are stored, microorganisms often invade the diseased tissue, leading to storage rot. The *Spongospora* cystosori can survive in soil for approximately 10 years in the absence of a potato crop.

Plots were planted June 8, 2001 on land that was planted to clover the previous year. The experiment was a randomized complete block design with four replications of five treatments. Treatment rows were five feet long and planted with Shepody seed spaced 12 inches apart in 36-inch rows. The land chosen for the plots had no history of powdery scab, so the soil in each treatment row was infested with the pathogen by incorporating ten powdery scab infected tubers. All chemical treatments were applied in open furrows at planting. A row of clean Shepody seed was planted between each treatment row to serve as a buffer. At harvest time all treatment rows were harvested, washed, and visually rated for the presence of powdery scab.

| Treatment | rate of application Clean # (fl oz product/ft) | Scab Wt | (lbs) | Scab # | Clean Wt (lbs) |
|---|---|---|---|---|---|
| 1. Reason | 0.0025 | 0.00 | 0.00 | 7.99 | 30.75 |
| 2. Previcur | 0.0013 | 0.12 | 0.25 | 7.92 | 31.00 |
| 3. Fluazinam/EBDC | 1.8/6.7lb | 0.31 | 0.75 | 9.89 | 31.50 |
| 4. Scab seed | ---- | 0.48 | 1.50 | 6.76 | 19.75 |
| 5. Clean seed | ---- | 2.59 | 6.75 | 7.60 | 26.50 |
| **LSD *p*=0.05** | | **1.02** | **2.76** | **1.73** | **4.29** |

*Scab Wt* and *Clean Wt* refer to the weight of tubers with powdery scab and the weight of tubers without scab. *Scab #* and *Clean #* refer to the number of tubers collected that exhibited powdery scab symptoms and those collected that exhibited no symptoms. The results were compared using an LSD test ($p = 0.05$). None of the chemicals tested stood out as exceptional. Interesting to note is the significant reduction in yield when starting with seed infected with powdery scab.

## CUT SEED VERSUS WHOLE SEED

Steven B. Johnson, Ph.D.
Crops Specialist

In a recent report, Phil Nolte from Idaho reported on a study he has conducted over the past five years. Whole seed from 2.5 to 3 ounces was used. All the cut and the whole seed was inoculated with Fusarium, and the cut seed was treated with a dust formulation of a seed treatment. Treatments were evaluated six weeks after planting and again at harvest. I have reproduced his data in table 1.

| **Treatment** | **Stems** | **Decay** | **Stems** with Rhizoc | **Total** Yield | **Mktbl** Yield |
|---|---|---|---|---|---|
| Check - whole seed | 4.06ab | 41.1a | 25.7a | 364 | 237 |
| Check - cut seed | 3.92 bc | 6.9 b | 26.2a | 375 | 241 |
| Tops MZ | 3.66 c | 4.6 c | 7.9 c | 389 | 282 |
| Maxim | 4.31a | 4.4 c | 15.3 b | 398 | 275 |
| Mancozeb | 3.79 bc | 2.6 c | 9.8 bc | 402 | 280 |
| | | | | ns | ns |

Phil concluded that whole seed did not outperform treated cut seed, and in fact, may need to be treated with a seed piece fungicide to maximize its performance.

Untreated seed, whole or cut, had similar amounts of stems with *Rhizoctonia*, which is not unexpected. While there were no statistical differences in the total or marketable yield, there seems to be a grouping of treated versus nontreated seed. This has appeared in my trials as well. Maxim-treated seed pieces produced more stems than did other seed treatments. This too, has appeared in my trials.

## SUMMARIES OF SOIL TESTS, 2001

Steven B. Johnson, Ph.D.
Crops specialist

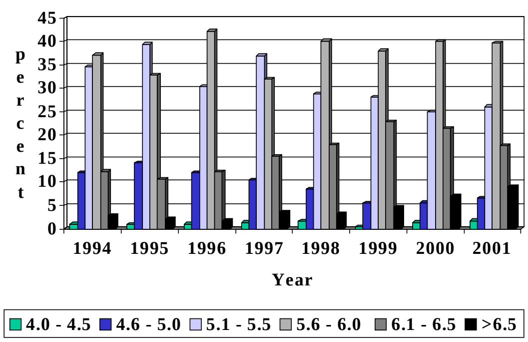
During 2001, the University of Maine Soil Testing Laboratory processed 1,146 soil tests for soils to be planted to potatoes in Aroostook County. The yearly summaries provide a good general picture of the soil fertility and pH conditions in Aroostook County. I have produced charts of the CEC, pH, phosphorous, potassium, and magnesium levels of the soils tested by the University of Maine lab.

The chart of the pH ranges in Aroostook County shows that 72 percent of the soils tested are between 4.6 and 6.0, with 26 percent of them from 5.1 to 5.5, and 40 percent of them from 5.6 to 6.0. I think that the growers are doing well maintaining the pH at a level most desirable for potatoes. This is just slightly higher across the board than in 2000.

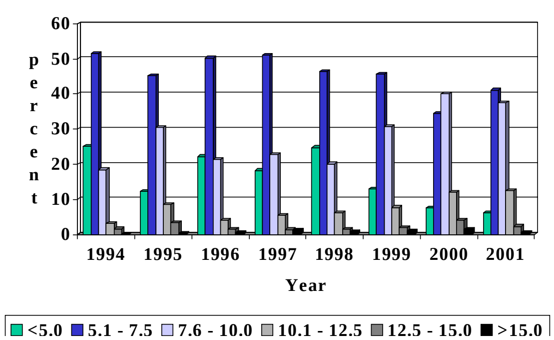
The charts of the nutrient levels of the soils show a tendency toward overfertilization with potassium. Fertilizer sold as 10-10-10 means that it is 10 percent by weight of N-P-K or nitrogen-phosphorous-potassium. One thousand pounds of 10-10-10 would add 100 pounds of nitrogen, phosphate, and potash to the soil. Soils with excess phosphorous or potassium do not need the addition of these elements for the next crop. Over 28 percent of the soil tests showed excess levels of potassium. This is down from over 50 percent just five years ago. Reduction of potassium in the fertilizer may be appropriate for some of these soils.

If your soil test results are at the extremes of one or more of the charts, it is possible that you could save some money by adjusting your potato fertilizer usage.

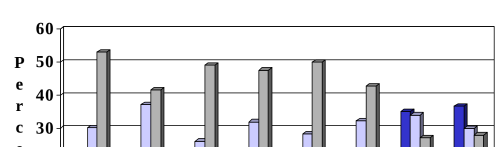
For further information on soil tests, or to have your soil tested, contact the University of Maine Cooperative Extension (764-3361 or 1-800-287-1462).



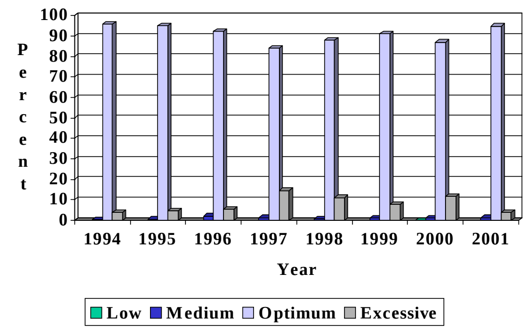
pH Values: Potato Soils Aroostook County 1994-2001



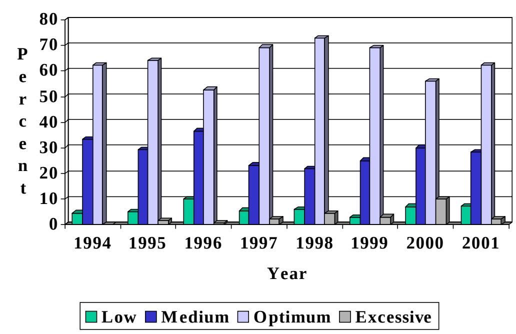
CEC Values: Potato Soils Aroostook County 1994-2001



Potassium Values: Potato Soils Aroostook County 1994-2001



Phosphorus Values: Potato Soils Aroostook County 1994-2001



Magnesium Values: Potato Soils Aroostook County 1994-2001

# 2002 MAINE POTATO PEST CONTROL RECOMMENDATION GUIDE TO BE RELEASED

Steven B. Johnson, Ph.D.
Crops specialist

After May 1, 2002, the 2002 Maine Potato Pest Control Recommendation Guide will be available at the Internet site:

http://www.mainepotatoipm.com

This is an updated format from the past. Recommendations, rates, REI, PHI, as well as other information will be included. We will not distributing printed copies with this issue as has been the case in past years. If you do not have Internet access and wish to have a copy, please contact the office and one can be printed and mailed to you.

**2002 Maine Potato Pest Control Recommendation Guide**

Prepared by:

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|---|---|---|---|
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The University of Maine Cooperative Extension

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