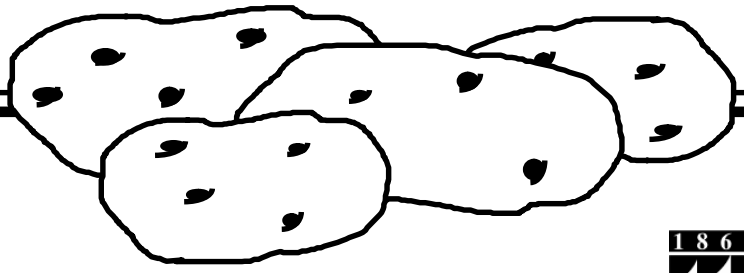
SPUDLINES



DECEMBER 2008 **CONFERENCE ISSUE**
VOL. 46 NO. 3

THE UNIVERSITY OF MAINE Cooperative Extension

Dear Potato Grower,

This past year has been a challenge with poor weather and disease pressure. While we can't change the weather, we can do some things to alleviate disease pressure. The first article in the newsletter deals with steps to take to avoid late blight in the coming season. Since this is a regional effort, it takes a community, and in our case, international, effort to address it. Jim and Steve have worked diligently on this with our counterparts in Canada. Hopefully, progress will be made – we all need to try and do our part.

This issue also has an article on a rotation study being done in Orono, an article on fluctuations in grain prices, and an article reviewing some weather data from the past season. The economic climate as we all know is shifting rapidly. I would like to think potato prices will stay high, but that may be too much to expect. One day at a time.

The agenda for the Maine Potato Conference is included with this issue of Spudlines. We hope to see you at the conference. On behalf of all the folks in our office, let me extend our personal best wishes for a cheerful Christmas season and a prosperous New Year to you all.

All the best,
Peter Sexton, 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.

Upcoming Programming of Interest

January 13-14-15	**Augusta Ag. Trade Show** Civic Center, Augusta
January 21-22	**Annual Maine Potato Conference** Caribou Inn and Convention Center, Caribou
January 28-29	**New England Regional Training for Ag. Service Providers** Wentworth Hotel, New Castle New Hampshire

For further information, call 764-3361

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The UMCE Potato Program website has information on:

- upcoming conferences -
- pest control guide -
- factsheets -
- GAP requirement info -
- talks from past conferences -
AND MORE!

visit our website at :
http://www.umaine.edu/umext/potatoprogram/

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Late-Blight Protocol for Maine and New Brunswick

Everyone Needs Your Help!

James Dwyer, Extension Crops Specialist

Potato late blight was a serious concern for growers in Maine and New Brunswick during the 2008 growing season. The frequency of rain events during the growing season created excellent conditions for the late blight disease to become active and spread. Growers did an outstanding job managing the disease; however, the additional inputs of time and materials were extremely expensive and need to be avoided in the future. In order to avoid this kind of threat in the future, we as a production area of Maine and New Brunswick need to work on a solution to this problem.

The International Maine-Maritime Potato Action Team or IMMPAcT, has developed a plan to minimize potato late blight in the Maine-New Brunswick production area. This plan is designed to minimize the future impact of potato late blight by reducing the threat potential of the late blight disease on a regional basis.

In order for this plan to be successful, all growers in the production area will have to participate in this regional effort.

The Maine Potato Board, Potatoes New Brunswick, University of Maine Cooperative Extension, the New Brunswick Department of Agriculture, McCain-USA and McCain-Canada, and the Maine Department of Agriculture have all agreed to endorse this effort.

The effort to minimize the threat of potato late blight must focus on the following major components.

Minimize risk from potential inoculum sources

Potato late blight is an obligate parasite, which means that the disease organism needs living host tissue in order to survive. From season to season, the disease has only three possible host sources: contaminated seed, cull piles, or volunteer potatoes. This fact provides us with three key areas to focus on in order to minimize sources of the disease:

- Use of only the highest quality seed, which has been late-blight tested is imperative. Late-blight seed testing will be available for both Maine and New Brunswick producers.
- Use of a mancozeb-based seed treatment, which will suppress late blight, is an extremely important component of this late-blight control strategy.
- Control of cull piles and volunteer potatoes will also reduce the threat from these potential inoculum sources.

Protect the crop with fungicide materials

This vital strategy can be broken down into two key components:

- Calibrate your sprayer prior to the spraying season. If you would like calibration assistance, the Maine Potato Board and the New Brunswick Department of Agriculture have staff who will calibrate sprayers at no charge. Please remember that unless the sprayer is properly calibrated, you cannot expect spray materials to be properly applied.

- Initiate your fungicide protection based upon the "No-Blight" severity value information. This information is available for both Maine and New Brunswick growers. This computer model takes the weather information and interprets how the weather has affected the growth of the disease. When 18 severity values are reached, that is the trigger to initiate fungicide protection. Please remember that the protective fungicides must be on the plant before the disease. This computer program helps us to do that and has a proven record of success.

Conduct regular field observations (scouting)

Finding late blight early, when the spots are small, allows the grower to kill small spots before they amplify and cause further spread of the disease. We also feel that the more people who are looking for late blight, the sooner that it can be found and controlled. Training employees who operate spraying and cultivation equipment to recognize late blight may allow some finds to be discovered while they are small and still have minimal impact.

Vine-kill potatoes in a timely manner
In order to minimize disease transmission during the harvest, potato vines should be completely dead and the skin on the tuber well set prior to harvest. The presence of green vines and poorly set skin increases the grower's risk.

Summary
If this joint program is to succeed and we are to prevent late blight from continuing to be a major economic impact for Maine and New Brunswick, all growers on both sides of the border must make a concerted effort to eliminate potato late blight. We need everyone!

Ten Action Steps for Growers

1) Plant only late-blight tested seed.
2) Plant only "certified" seed.
3) Use a mancozeb-based seed treatment: cut, treat, and plant.
4) Initiate protective fungicide sprays based on severity values.
5) Manage/control cull piles and volunteer potatoes.
6) Perform regular field scouting.
7) Calibrate sprayers.
8) Train farm field staff for late-blight identification.
9) Kill early-season late-blight finds quickly.
10) Kill potatoes in a timely manner before harvest to ensure good skin set.

To read the complete *Joint Potato Late Blight Protocol*, please visit www.umaine.edu/umext/potatoprogram

Late Blight Seed Testing Available for the 2009 Crop

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

Late-blight-infected potato seed initiates late blight epidemics early. The onset of such epidemics is difficult to predict and impossible to control. Early-starting epidemics are the most devastating and need to be avoided at all costs.

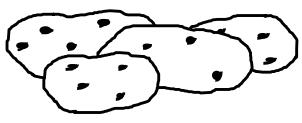
Potato growers in Maine have the opportunity to have their seed lots screened for late blight, which is caused by *Phytophthora infestans.* This program is a resurrection of the mid-1990s late-blight seed-screening and should provide a measure of assurance to seed recipients. The Maine Department of Agriculture's Division of Plant Industry is performing the screening.

Again this year, seed screening is a *requirement* for USDA Farm Service Agency (FSA) clients. FSA clients need to have a late-blight seed screening performed in Maine or elsewhere, but there are no exceptions. Seed screening is highly recommended for all.

The screening program is designed to find seed lots that have a high probability of becoming a late-blight problem if planted. The test will not guarantee that the seed lot is free of late blight, only that it has been tested, and to a certain level of probability should not be a late blight source when planted.

Samples of seed potatoes grown in Maine will be charged $35 per sample. The remainder of the cost is subsidized. The catch is that this price is good only through January 11, 2009. For requests after January 11, the subsidy will be reduced and the cost of the test will be $100. So submit your screening samples by January 11. For additional details, call Maine Seed Potato Inspector Supervisor Allison Todd at 764-2036.

This test is voluntary, and the results will be reported back to the grower. The reported results will not be available to seed customers unless they are released by the seed grower. I wouldn't mind the test being mandatory this year. In fact, I feel that every seed recipient should insist that this test be performed, and I will be encouraging this for all potato growers. Know your seed source and have it tested. You don't want to plant a problem.



Complicated Price Picture for Corn, Barley, Oil, and Fertilizer

Peter Sexton, Extension Crops Specialist

Over the past 12 months we have seen grain prices take quite a roller coaster ride. Average cash prices for corn rose sharply and peaked near seven dollars a bushel in June and then dropped to near three dollars a bushel as of early December (Fig. 1). Not much corn is grown for grain in Maine, but this is important for us because corn has a large influence on the price of other grains. Barley prices tend to closely track corn prices. And we all know these prices influence potato growers in other regions as they contemplate how much potato acreage they will plant in the coming season.

Petroleum costs appear to be an important factor driving fluctuations in grain prices. Prices for crude oil rose and fell in the same pattern as corn (Fig. 2). Enough processing capacity has developed for converting corn to ethanol in this country that the fuel market seems to have a clear and direct influence on corn prices (Fig. 3), which in turn affects the price of other feed grains.

On the input side of the production equation, fertilizer prices are also very closely associated with petroleum prices (Fig. 4). Petroleum, of course, is used to varying degrees in the manufacture of fertilizer, with production of N fertilizer being particularly energy intensive. Another factor influencing both petroleum and fertilizer is the growth of the Chinese and Indian economies. As these countries become more economically powerful they purchase more oil and fertilizer, contributing to higher prices for both.

The recent downturn in the world economy has caused decreased demand for petroleum. At the same time it has lead to an increase in the value of the US dollar as overseas investors seem to look to the dollar as a "safe haven" for their wealth. Whether by cause and effect or just by association with other factors, there has been a strong negative association between the value of the US dollar and the cost of petroleum over the last 18 months (Fig. 5). It seems that a strong dollar and low petroleum prices tend to reinforce each other.

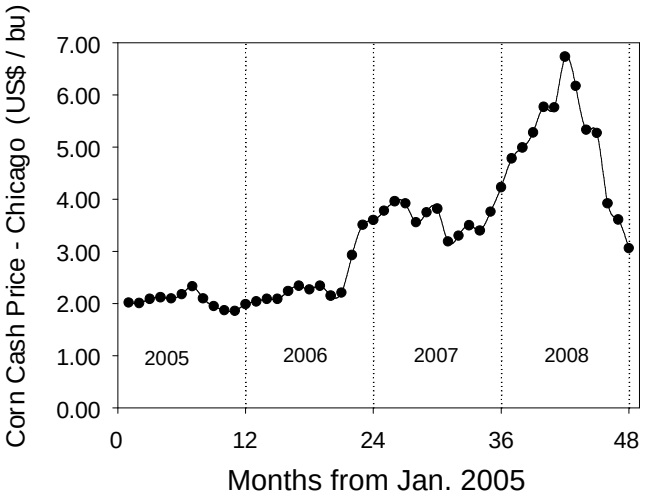


Fig. 1. Average monthly cash price for corn as reported by the USDA Economic Research Service plotted from January 2005 through December 2008. The December 2008 value is estimated.

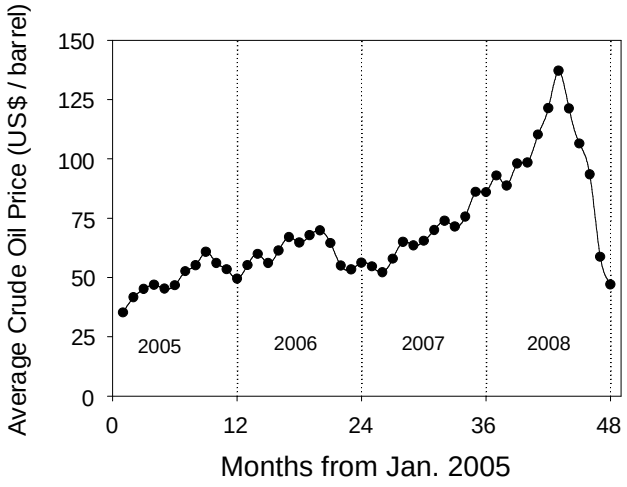


Fig. 2. Monthly average spot prices for crude oil as reported by the USDOE-EIA. The value for December 2008 is estimated.

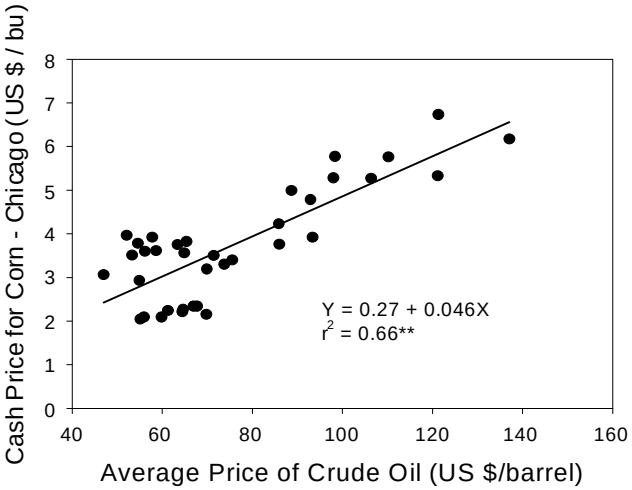


Fig. 3. Monthly average cash price for corn versus the average monthly spot price for oil from Jan. 2005 through Dec. 2008. Data are from the USDA and the USDOE, respectively.

To put all this together, it looks as if the global economic downturn has caused petroleum prices to drop and has brought about a stronger US dollar. This has brought about lower grain prices as the stronger dollar strains export markets, and cheaper petroleum decreases economic returns from using corn ethanol as an alternative fuel. On the positive side, if historic relationships hold, we should see falling fertilizer prices as long as petroleum stays low and the dollar remains strong to pay for imported materials. On the negative side, feed grain prices may also stay low unless there is some perturbation in supply. A strong dollar will tend to dampen export opportunities, and low petroleum prices will correspondingly decrease the economic value of fuel ethanol. This being the case, if the dollar were to get weaker, one would expect petroleum, fertilizer, and grain prices to all strongly spiral up together. That is my view on the situation anyway. However, it's good to keep in mind that sometimes the future doesn't follow the patterns of the past. Things don't always happen the same way twice. The world has a way of being more complex than that. It could be that other factors not considered here (e.g. drought, disease problems, government policies, piracy, etc.) may influence supply and strongly impact these markets in the coming year.

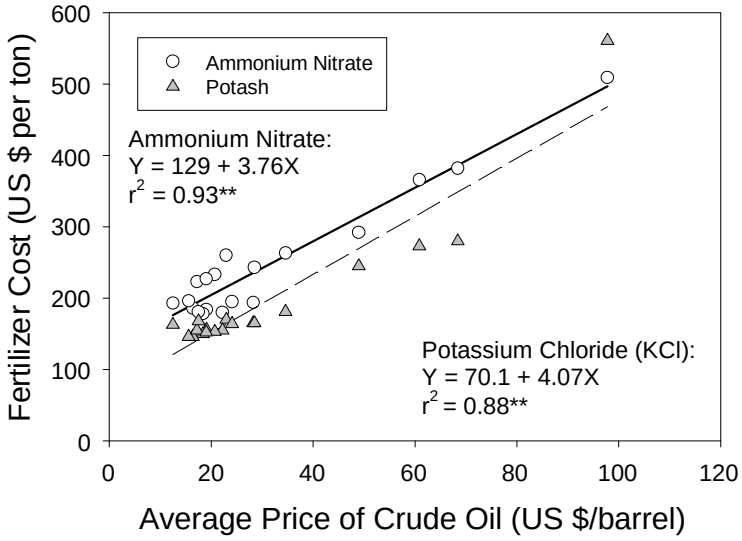


Fig. 4. The average cost of fertilizer in April of each year from 1990 through 2008 versus the annual average price of crude oil for each year. Data are from the USDA and the USDOE.

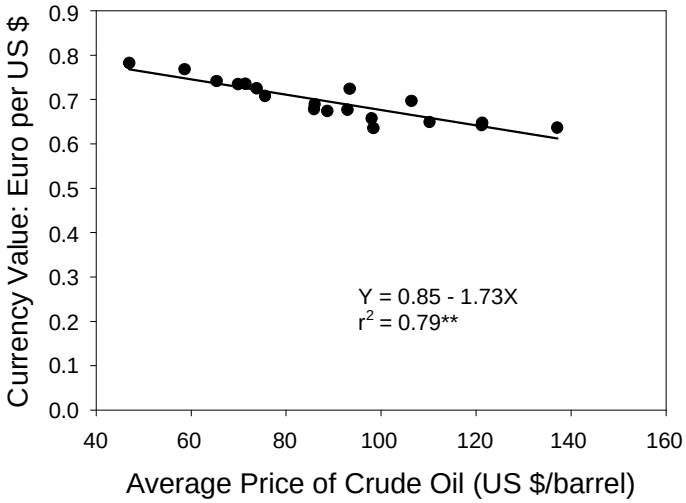


Fig. 5. The ratio of the Euro to the US dollar taken on the fourth day of each month from June 2007 to December 2008 versus the monthly average spot price for crude oil as reported by the USDOE.

Longer and Alternative Rotations: Benefits and Limitations

John Jemison, Extension Water Quality and Soil Specialist
Steve Johnson, Ph.D., Extension Crops Specialist
Peter Sexton, Extension Crops Specialist

In an ideal and perfect world, you would be able to plant all your best ground to potatoes, your crops would get timely rains, production costs would be stable, and growing potatoes would not be hard on soils. As you are well aware, the world is less than ideal, and you have to make many decisions about rotations, inputs, and practices that will help your overall production.

We continue to look at the value of various rotations, inputs, and cover crop practices. For example, Peter Sexton has found that mustard crops planted before potatoes increased yield on the order of 5 to 10%. Steve Johnson has many years of research data showing the benefits of seed treatments. Researchers like Greg Porter have many years of nitrogen (N) response trials in which they have studied appropriate N rates to get optimum yield.

This year, with funding from the Maine Potato Board, we conducted a single trial to evaluate many of these factors together. We were interested in taking Peter's mustard work a step farther. We wanted to see whether plowing down a mustard cover crop would reduce rhizoctonia and scab damage as effectively as application of a chemical seed treatment might. We also wanted to see the level of N contribution that a full-season, high-glucosinolate mustard crop, mowed and plowed down, would make to the subsequent potato crop.

We started the project in 2007 by planting strips of barley, canola, and mustard across the research plot. (Corn had been grown in the field in 2005, and potatoes in 2006.) The barley and canola were treated like full-season crops. We harvested and took yield measurements from each of these strips. The mustard was mowed at full flower and plowed into the soil on the same day.

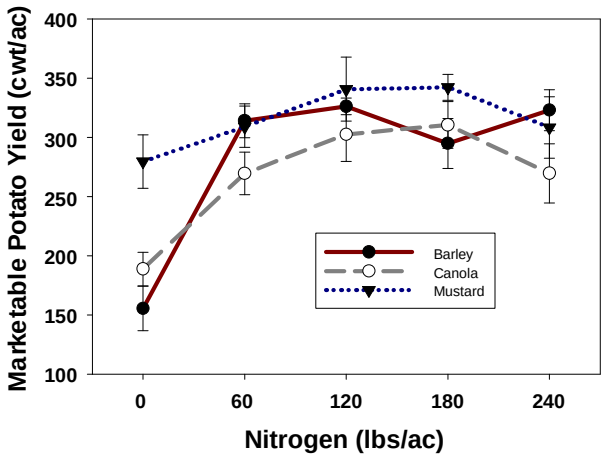
This year, Steve treated the half of the potatoes with a mancozeb seed treatment. We worked the field and hand-planted the treated and untreated Kennebec potatoes across the research plot, perpendicular to the direction of the previous barley, canola, and mustard strips. We then applied five N rates (0, 60, 120, 180, and 240 lb N/ac) to see how the potatoes responded to N. The potatoes were managed in a typical manner throughout the year.

The rainfall patterns in the summer of 2008 made production particularly challenging. We had one dry period at the start of tuber initiation, which created conditions conducive to scab production. We found consistent levels of scab across all N rates and rotations, and seed treatment did not influence scab. Generally scab levels ranged from 5 to 6% of the potato surface area. Rotation and N rates had a greater effect on rhizoctonia levels. Rhizoctonia levels were highest following canola (2%) across all N rates. Potatoes following barley tended to have the highest incidence of rhizoctonia where the plants were N stressed (>3% surface area), but where potatoes had sufficient N, rhizoctonia levels were lower (1–1.5% surface area). Plowed-down, high-glucosinolate mustard appeared to reduce the incidence of rhizoctonia across all N rates.

Potato yields were influenced by both rotation and N rate. Potatoes following canola and mustard followed a typical N response curve (Figure 1). However, there appeared to be a consistent yield benefit with potatoes following the plowed-down mustard across all N rates, compared to potatoes following canola. The potatoes following barley were a bit more variable in their response. The lower potato yields following canola in 2008 could have been caused by not having a grain planted between potato crops. Ideally, we would have had potatoes in this field in 2005, corn in 2006, mixed cover crops in 2007, and potatoes in 2008, but with limited space to conduct research, sometimes you do what you have to do. In 2008, we also planted the same cover crops—barley, canola, and mustard—in another field that had been in potatoes in 2007. If we get a consistent yield response again next year with a different set of environmental conditions, we may confirm our theory.

Figure 1.

Nitrogen and Rotation Effect on Marketable Potato Yield



Exactly how much N we gained from the plowed-down mustard is somewhat difficult to determine in this trial. Peak potato yields following canola were found at 180 lb N/ac, while the potato yields following plowed-down mustard appeared to peak between 150 and 180 lb N/ac. That would suggest about a 30 lb/ac N contribution from the plowed-down mustard. However the barley yields appeared to be flat from 60 to 240 lb N/ac, which makes this determination a bit more uncertain.

The results of this project indicate that we can derive some direct benefits if you can extend your rotation from a two-year potato-grain rotation to a

three-year potato-grain-mustard rotation: 1) incidence of rhizoctonia in the potato year will likely be reduced; 2) soil quality will be improved by going an extra year between potatoes in the field; and 3) some N will be made available to the subsequent potato crop, probably on the order of at least 30 lb N/ac.

Summer Weather in 2008

Peter Sexton, Extension Crops Specialist

The 2008 season was wetter and cloudier than usual and our crops suffered for it. Yields of potatoes, barley, oats, canola, and soybean in the County tended to be 5% to 15% lower than average this past year. Rainfall was above average in June, July, and August. Soil moisture tracked across July and August in St. Agatha showed a prolonged period (7 out of 12 days) in early August with soil water potential above –10 centiBars (Fig. 1). This is wet soil. During much of this period the soil was saturated or very close to it. Usually at this time of year, one expects there to be enough sun and the crops are growing fast enough that excess moisture doesn't persist for very long. The 2005 season is plotted with the 2008 season as a point of contrast. August in 2005 was relatively dry. In general, the rainfall that occurred did not keep up with crop use so soil moisture declined as time progressed. When there was a heavy rain in 2005, the soil did not remain saturated for a long period.

Cumulative solar radiation measured at the Aroostook Farm showed lower than average sunlight, particularly in early August, coupled with the damp weather (Fig 2). I plotted it somewhat arbitrarily from June 20th through Sept 10 as this is the period where the crop has foliage out and most of our yield is determined. Note the drier 2005 season had above average solar radiation. Ideally, we would get both adequate rain and plenty of sun. Modified growing-degree-days (50 F base temperature) over this same period are plotted for 2008 in Figure 3. Growing degree days over this portion of the season were very close to average. The cloudy weather meant we had warmer night temperatures, so even though the days were not warm, the total growing degree days came out on average. Rather than lack of heat, the low yield potential came from decreased solar radiation coupled with excessive moisture. The crops we grow here do not have root systems that function well in saturated soil – they don't like to have "wet feet". Along with this, disease pressure for late blight, white mold, and head scab, for example, are all greater under damp, humid conditions. Most of the crops we grow (potatoes, barley, oats, and canola) produce best under sunny, cool conditions. In my opinion, the reason yields are high in irrigated high-altitude deserts in the Pacific Northwest is that clear skies (high solar radiation and cool night temperatures) are coupled with a longer growing season and no moisture stress (i.e. irrigated crop without rainfall). Cool temperatures during bulking for potatoes, and seed-filling for grain crops, tend to lengthen the filling period and to cause more energy to go into the harvested portion of the crop. Note that in our region 2004 had fewer growing degree days than usual (Fig. 3), but it was a year with good yield potential for potatoes.

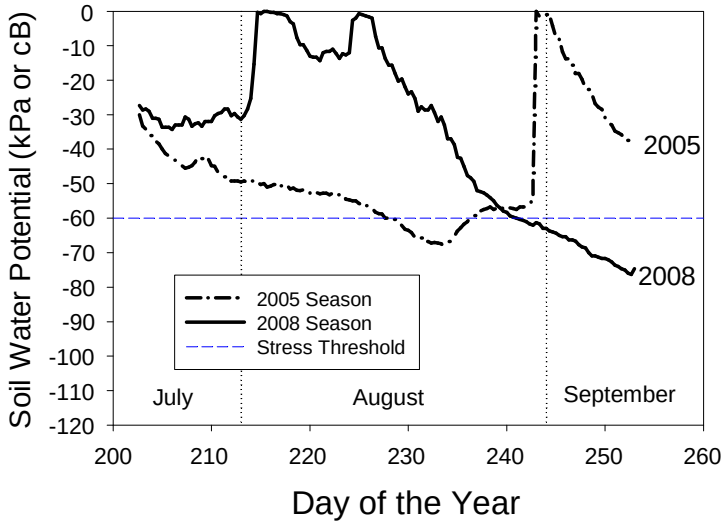


Fig. 1. Soil moisture at a depth of 8" for late July through early September in 2005 and 2008 at LaBrie Farms, St. Agatha, Maine.

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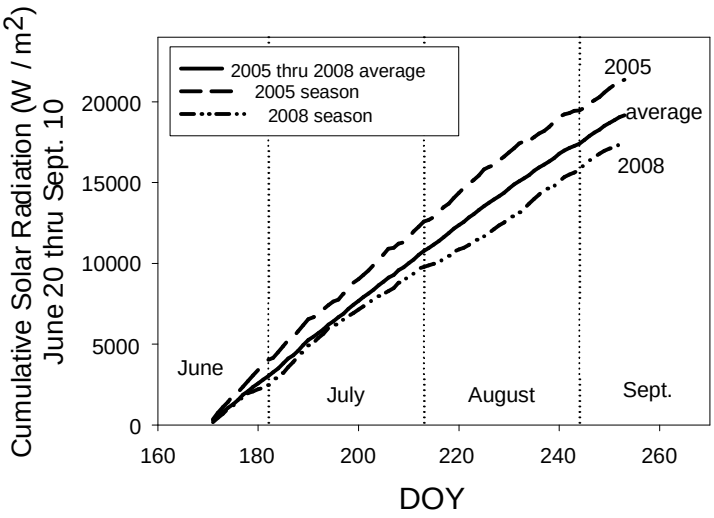

Fig. 2. Cumulative solar radiation from June 20 through Sept. 10 at Aroostook Research Farm for the 2008 and 2005 seasons. Data are complements of Greg Porter and Paul Ocaya.

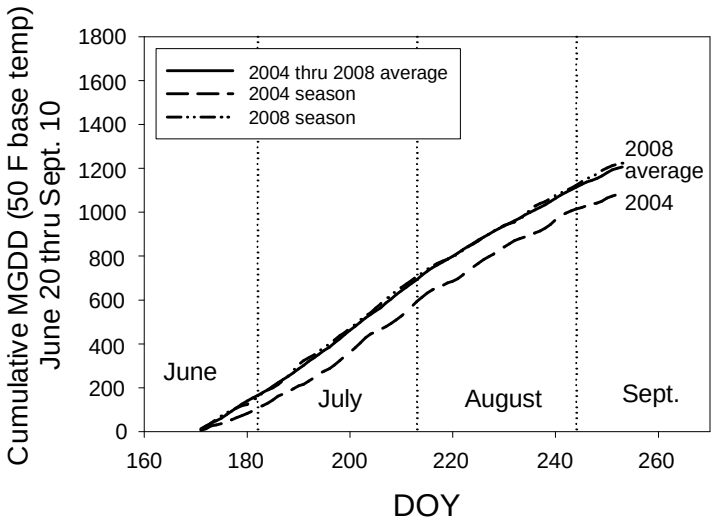

Fig. 3. Modified growing degree days (base temperature of 50 F) June 20 through Sept. 10 for the 2008 season plotted along with a five year average (2004 through 2008). The 2004 season is also plotted as a point of contrast.