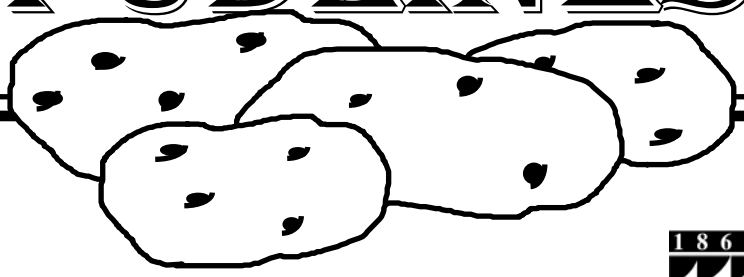
SPUDLINES



DECEMBER 2007 **CONFERENCE ISSUE**
VOL. 45 NO. 3

THE UNIVERSITY OF MAINE Cooperative Extension

Dear Potato Grower,

The agricultural economy appears to have made some dramatic changes over the past year with increased prices of grains and oilseeds such as canola and soybean. It seems that rotation crops will be more economically attractive in the future. This may help folks lengthen rotations and hopefully make crops other than potatoes look more attractive in other regions of the country. The weakening US dollar appears to be acting in our favor as far as marketing our crops goes, but it is acting against us in terms of rising costs for imported fuel and fertilizer. Besides economic variables, there are always pest problems such as late blight and Colorado potato beetles to consider. In this issue we touch on several of these themes. I hope it makes reasonably good reading and is informative.

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 holiday season and a prosperous new year to you all.

All the best,
Peter Sexton, Crops Specialist

Upcoming Programming of Interest

January 14	**Farm Energy Audit Training** Civic Center, Augusta
January 15-16-17	**Augusta Ag. Trade Show** Civic Center, Augusta
January 23-24	**Annual Maine Potato Conference** Caribou Inn and Convention Center, Caribou
January 30-31	**New England Regional Training for Ag. Service Providers** Wentworth Hotel, New Castle New Hampshire

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The Red Headed Flea Beetle

James Dwyer, Extension Crops Specialist

Potato growers in Maine over the past few years have heard and seen more and more about the redheaded flea beetle. Some growers are asking, "Just what is a red headed flea beetle? Is it really different from the potato flea beetle? Why haven't I heard about this insect in the past?"

The red headed flea beetle, like the potato flea beetle, is a small, black, hopping insect that feeds on potatoes and other plants. The red headed flea beetle, however, is approximately three times larger than the potato flea beetle, and under magnification this insect will have a distinctive red patch on the top of its head. The red headed flea beetle is also known as the cranberry flea beetle. Its scientific name is *Systena frontalis*, which is a different genus and species from *Epitrix cucumeris*, which is the potato flea beetle. The red headed flea beetle will feed on over 40 different plant species including many cultivated crops, native plants, and weeds.

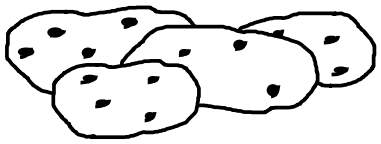
The feeding damage caused by the red headed flea beetle is somewhat different from the damage caused by the potato flea beetle. It creates small, ragged holes which are much larger than the typical "dots" or "windowpane" type of feeding damage caused by the potato flea beetle. Typically, growers will notice a pronounced edge effect of visible feeding damage and insect activity as this beetle moves into a field from the edge.

Potato flea beetles typically become noticeable in Maine potato fields in late June and early July. These are the over-wintering adults emerging and feeding on the potato foliage. These adults will lay eggs near the soil surface of the potato plant, and when the larvae hatch, they will feed on root material and developing tubers. These larvae will pupate and emerge as adults. They feed on the foliage in late July and through August. It is during this time frame the red headed flea beetles are found.

Unlike potato flea beetles, the red headed flea beetle over-winters in the egg form rather than the adult form. Therefore the red headed flea beetle must hatch, feed in the larval form, pupate, and then emerge as an adult. This difference in over-wintering behavior explains why red headed flea beetles are not noticed earlier in the growing season.

The question has arisen in the past of whether or not the red headed flea beetle has the potential to cause tuber damage from larval feeding. We have felt that the potential was certainly there, however, we did not have any confirmed evidence. During the 2007 growing season we have seen confirmed evidence of red headed flea beetle larval feeding damage on tubers. The holes created by the larvae are somewhat elliptically shaped, and penetrate into the flesh of the tuber about half an inch. The holes created by the potato flea beetle, on the other hand, generally penetrate into the flesh of the tuber just below the skin, not usually deeper than about three-eighths of an inch. The feeding galleries caused by wireworms tend to penetrate much deeper into the flesh of the tuber.

The literature notes that the red headed flea beetle is found in Maine. Historically numbers have been at trace levels; just enough to note that they were here. About four years ago we began noticing increasing levels in potatoes. Those levels have increased from trace "isn't that interesting" to levels where noticeable damage has occurred in some instances. Why the population of this insect is increasing in Maine potato fields is unknown; however it is known that growers should watch for this insect in the future.



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Results of the 2007 Imidacloprid Resistance Survey in Maine Populations of the Colorado Potato Beetle

Andrei Alyokhin, Associate Prof. of Entomology

Colorado potato beetle populations resistant to imidacloprid have been found on several commercial potato farms in Maine since 2003. Currently, the problem appears to be contained on relatively few isolated fields. However, it is likely that in the absence of appropriate resistance management it will spread to new areas. During the 2007 growing season, we continued monitoring beetle populations for reduced susceptibility to imidacloprid.

Monitoring techniques were identical to those used in the previous years. Adult Colorado potato beetles were collected on farms that had high beetle populations according to grower observations or scouting reports.

The samples were shipped overnight to Dr. Galen Dively at the University of Maryland. Eggs laid by those beetles were collected and incubated in the laboratory until hatching. The larvae were then fed artificial diets containing a range of imidacloprid concentrations. Lethal concentrations that were killing 50 percent of the population (LC50 values) were calculated based on larval mortality. The Colorado potato beetle strain maintained in laboratory confinement for many generations and never exposed to imidacloprid was used as a reference.

Based on their LC50 values, beetle populations could be grouped in three categories: susceptible, tolerant, and resistant to imidacloprid. Beetles are considered to be susceptible when the imidacloprid concentration killing 50 percent of exposed larvae in the laboratory is below four parts per million, tolerant when the concentration is between four and eight parts per million, and resistant when the concentration is above eight parts per million.

Previous studies have shown that there is a good correlation between bioassay results and imidacloprid performance in the field. Susceptible beetles can be successfully controlled by a single application of imidacloprid to seed pieces or in furrow at planting time. Tolerant beetles still can be controlled by imidacloprid to some degree, but additional applications of non-neonicotinoid insecticides are required later in the season to prevent beetle damage. Resistant beetles experience relatively little negative effects from feeding on imidacloprid-treated plants.

Beetles in eight out of twelve assayed samples showed signs of tolerance to imidacloprid (Fig. 1). Similar to the 2006 growing season, no resistant populations with LC50s above eight parts per million were detected. Populations sampled in Aroostook County (samples AR1-4 on Fig. 1) were invariably susceptible to imidacloprid. The two central Maine populations (CM1-2) that had problems during the previous years remained tolerant. Beetles from all samples collected in southern Maine (SM1-6) were also tolerant. However, all fields studied in that area were located in the same small and relatively isolated valley where the very first Maine case of resistance was reported. Therefore, Fig. 1 somewhat overestimates the spread of imidacloprid resistance because its last six bars essentially represent a single resistance hotspot.

Highly localized distribution of resistant populations is certainly good news for potato growers. Unfortunately, the bad news is that resistance appears to be rather persistent. Despite the fact that southern Maine growers have not been using imidacloprid since 2004, the beetles on their fields remain tolerant to this chemical. A similar situation exists on the two affected central Maine farms (Fig. 2). After the initial drop in resistance that could be attributed to crop rotation and, in case of the CM1 population, an untreated refuge left in the field in 2005, LC50 levels stabilized above the desirable level of susceptibility.

So far, we have not observed widespread failure of neonicotinoid insecticides to resistance development. Nevertheless, this does not mean that it is not going to happen. Although a number of new chemicals are projected to become available for Colorado potato beetle suppression during the next growing season, imidacloprid and other neonicotinoids still remain one of the best control options. Therefore, growers who intend to continue

using them on their fields should pay close attention to resistance management.

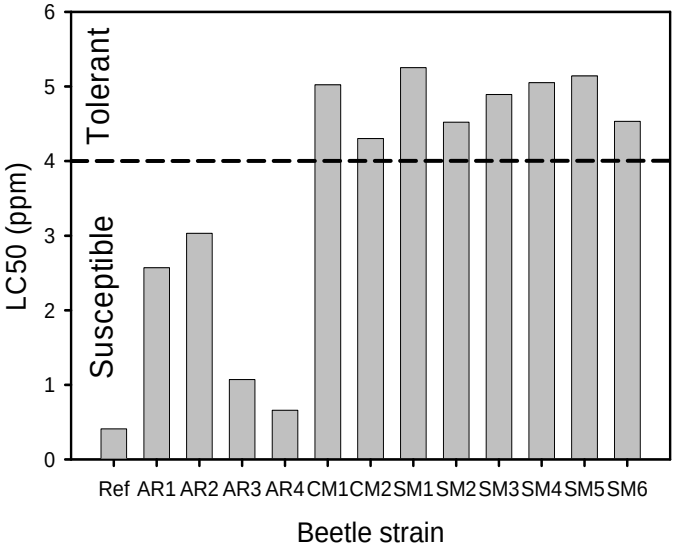


Fig. 1. Concentration of imidacloprid required for killing 50% of Colorado potato beetle larvae in diet incorporation bioassays. Higher LC50 values indicate more resistant populations.

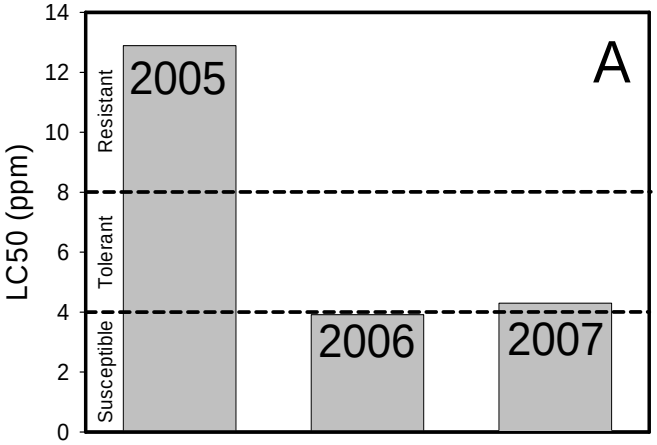


Fig. 2A&B. Changes in imidacloprid resistance in two areas of Central Maine. A – samples from two adjacent fields growing potatoes in alternate years. In 2006 an untreated area was left as a refuge in the field; beetles were controlled by mosaic applications of different chemicals. B – field rotated out of potatoes in 2006.

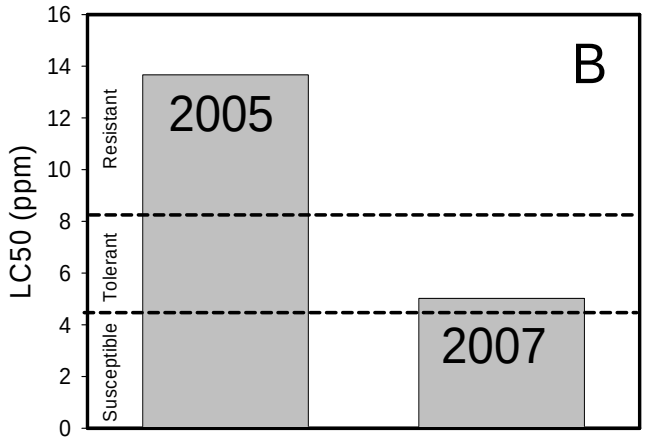
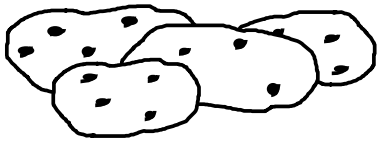


Fig. 2B.



Late Blight Seed Testing Available Again for the 2008 Crop

Steven B. Johnson, 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 screening 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 FSA clients. These clients need to have a late blight seed screening performed either in Maine or elsewhere, but there are no exceptions. Seed screening is highly recommended for all.

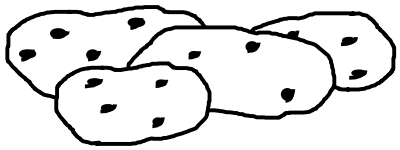
The screening program is designed to find seed lots that have a high probability of becoming a late blight problem if planted. The test will not guarantee that the seed lot is free of late blight—only that it has been

tested, and to a certain level of probability should not be a late blight source when planted.

Screening of seed potatoes grown in Maine will cost $35 per sample. The remainder of test costs are subsidized for Maine samples. The catch is that this price is good only through January 11, 2008. The subsidy will be reduced for screening requests after January 11 and the cost of the test will be $100. Screening of seed from outside Maine will cost $100 and samples will be accepted based on workload. So submit your screening samples by January 11. *For additional details, call Allison Todd at 764-2036.*

This test is voluntary and results will be reported back to the grower who requested the screening. 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.



Some Observations on Fertilizer Costs

Peter Sexton, Extension Crops Specialist

As everyone knows, fertilizer costs have gone up dramatically over the recent past. For example, in 2003 N cost was on the order of $0.29 per pound. By January 2006 it was close to $0.45 per pound, and this year the cost of N looks like it will be over $0.55 per pound. Based on what I could gather at the American Society of Agronomy meeting last month (November, 2007) this price trend seems to be driven by the following factors:

- Demand for fertilizer is increasing in eastern and southern Asia (primarily China and India). As these economies grow, the demand for agricultural products increases, especially high-protein foods like meat and dairy products. As a result, farmers in those countries are making more money and buying more fertilizer for their crops. China uses more fertilizer than any other country in the world and by itself accounts for about one third of global fertilizer use.

- Domestically, the emphasis on ethanol has driven corn acreage up. A few years ago the corn promotion board set a goal of producing a 15-billion-bushel crop by 2015. Right now it looks like they are on track to attain this goal by 2012. Corn uses more fertilizer than soybeans (especially when corn follows corn), so as corn acreage increases—whether from the opening up of new ground, or the displacement of other crops—fertilizer use tends to increase. While this expansion of U.S. corn production contributes to a tighter supply situation for fertilizer, it appears to be a secondary effect. The primary driver for the tighter market is said to be increasing fertilizer demand overseas.

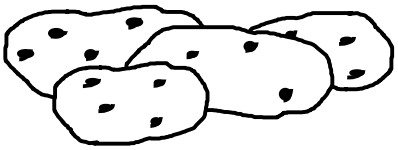
- The cost of building a fertilizer processing plant that will produce one million metric tons per year of P or N is on the order of 700 million to one billion dollars. It takes two to three years to build such a plant. Given economic uncertainties, no one is adding new processing capacity for N or P in the western world. Apparently the only countries adding processing capacity for N or P are China and Saudi Arabia. Canada is said to have scope for increasing K production and will most likely move in that direction.

- Natural gas prices are higher in the U.S. than in much of the rest of the world. Because natural gas burns more cleanly than coal, there has been a tendency to promote its use for generating electricity. In any case, the relatively high cost of natural gas is a deterrent to anyone interested in building a new N fertilizer plant here in the US. And at the same time, the weakness of the American dollar means that whatever we import costs us more money.

It seems that we are faced with a relatively static supply versus an increasing global demand for fertilizer over the next few years. The decline in

value of the U.S. dollar also contributes to increased fertilizer costs and seems unlikely to change anytime soon (though this is an advantage in marketing our products). The bright side of this scenario is that the growing demand for feed grains and the weakening dollar means we should get better prices for our crops over the long run. The down side is that we'll have to pay more for inputs, especially imported items. It's a judgment call, but it looks to me like neither of these trends is likely to change in the near future.

The long-term trend towards increased fertilizer costs suggests one should seek more efficiency in fertilizer use. Petiole sampling to monitor crop N status is an important tool in this regard. The ability to use manure from livestock operations will be more of an asset in the future as far as fertilizer costs are concerned. The value of underseeded clover will increase, as will the value of fall cover crops to help prevent erosion and to hold N against leaching. We will try to address these issues in future editions of *Spudlines*.



The UMCE Potato Program website has information on:

- upcoming conferences -
- potato pest control guide -
- soil temperature (in May) -
- meeting GAP requirements -
- talks from past conferences -
AND MORE!

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

Maine's Agricultural Mediation Program

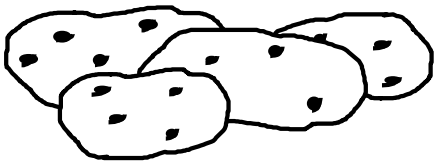
Are you having trouble making payments on your farm loan? Were you turned down for a USDA subsidy or deferment? Are your new neighbors complaining about the smell, drift, or noise from your farm? Are you in dispute about a property line? Are you and your family at odds about whether to keep the farm going or sell to a developer? Mediation can help.

Maine's Agricultural Mediation Program is the official U.S. Department of Agriculture (USDA)-certified agricultural mediation program for Maine, offering assistance to help resolve agricultural disputes before they end up in court. This program is provided in Maine by Community Mediation Services in Hallowell, and serves the entire state's farming community.

Mediation is a voluntary process in which a neutral third party—the mediator—helps farmers, agricultural lenders, agencies, families, and citizens resolve disputes in a non-adversarial setting outside of the traditional legal and regulatory process. There is no charge to the participants.

Unfavorable decisions made by USDA agencies, conflicts between farmers and their neighbors or communities, agricultural credit issues, family farm or estate planning concerns, and any dispute affecting an agricultural operation are examples of some of the disputes that may be mediated.

If you are in conflict, and are wondering whether mediation can help you, or if you'd like more information about Maine's Agricultural Mediation Program, contact Community Mediation Services at (800) 381-0609 or (207) 621-6848 [Voice and TTY], or www.communitymediationservices.org.



Canola Update

Peter Sexton, Extension Crops Specialist

The price of canola is near US $445 per ton (about $0.22 per lb). At a yield of 1500 lbs per acre, gross income would be near $330 per acre. I estimate the cost of production for canola to be near $230 per acre (this includes $25 per acre for fungicide application to control of white mold and $35 per acre land rent). Thus, estimated net return would be on the order of $100 per acre.

Canola fits well within our growing season. With an early May planting, it will come out of the field in early September. It has benefits of mellowing the soil, and potatoes following canola tend to have less black scurf. On the negative side, it is susceptible to white mold, so this needs to be controlled particularly if one is growing potato varieties such as 'Superior' that are very susceptible to white mold (early maturing varieties and varieties that flower prolifically tend to be more susceptible to white mold). In this article canola production practices will briefly be reviewed.

Seeding. The recommended seed rate for canola is 5 to 7 lbs per acre. Canola will branch prolifically and can compensate somewhat for poor stands. In trials done recently in Maine and Vermont, seed rates as low as 3 lbs per acre have been adequate under good conditions (Fig. 1). Plant into a firm seedbed and target a depth of 0.5 inches. In my experience with canola I have yet to see problems from a field that was planted too shallow, but planting too deeply has caused poor stands. Row spacings of 6 to 12 inches have produced good yields in our trials (Fig. 2). Wider row spacings may help decrease white mold incidence, but they will also promote weed problems. I would not recommend planting canola at a row spacing wider than 12 inches.

Soil Fertility. Canola yields poorly at soil pH less than 5.5. Based on work done by John Jemison in Orono, it appears the optimum pH for canola is near 6.0 to 6.2. Work done by Greg Porter indicates that P and K are not needed for canola planted in rotation with potatoes on our soils. There seems to be enough residual fertility from the potatoes to cover these nutrients. Canola has shown a response to N up to 70 lbs of N per acre following potatoes. Canola is more responsive to boron than most other crops, so it would be prudent to apply 1 lb of B with the N or with a preplant herbicide.

Pests. For weed control, growers have either applied trifluralin preplant incorporated with conventional varieties, or used varieties that have been genetically modified for herbicide resistance to compounds such as glyphosate and glufosinate. Both systems have worked well in our environment.

Flea beetles, and less frequently, cutworms have been problems for canola grown in Maine. There are seed treatments for control of flea beetles. Outside of the Sherman area, cut worms are rarely a problem, but when they do occur they can be devastating. So keeping an eye out for cutworms is important. European corn borer has been observed in canola, but it does not appear to be of economic importance in this crop.

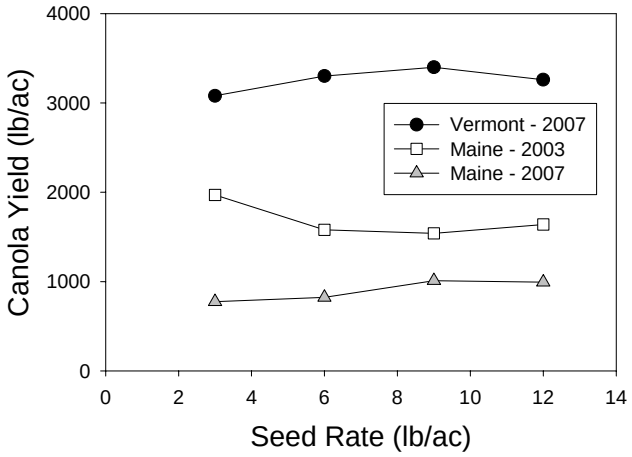


Fig. 1. Canola seed yield versus seed rate from trials conducted in Maine and Vermont. Data from Vermont are compliments of Heather Darby, University of Vermont Extension.

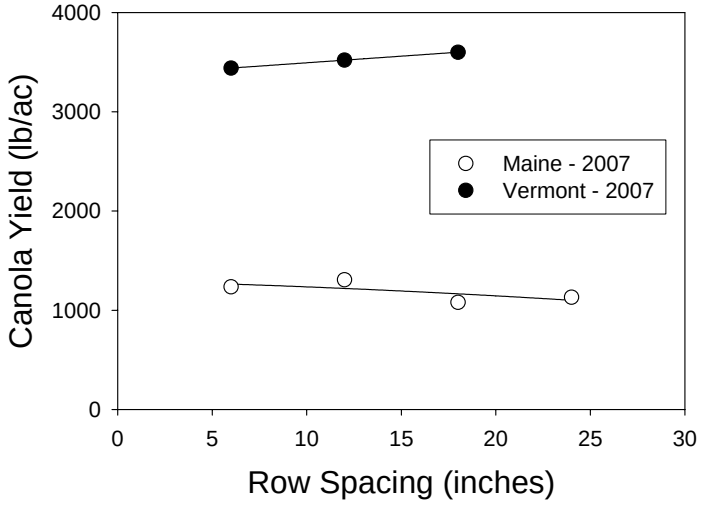


Fig. 2. Canola seed yield versus row spacing from trials conducted in Maine and Vermont. Data from Vermont are compliments of Heather Darby, University of Vermont Extension.

Canola is susceptible to white mold (*Sclerotinia sclerotiorum*), which can cause serious yield loss. White mold can be controlled by timely application (just before 50 % blossom) of a fungicide such as vinclozolin

or azoxystrobin registered for use in canola. 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. It is not recommended to plant canola more frequently than once every four years in a given field.

Harvest. Seed shattering can be a very severe problem in canola if harvest is delayed and high winds buffet the crop. The risk of shattering losses can be reduced by swathing. The optimum time for swathing is when 30 to 40 % of the seeds on the main stem have begun to change color. Direct cutting canola is also an option – if it is done in a timely manner, it has produced good results. The advantage of swathing is that it provides a broader window for combining the crop.

Maine Rural Partners and Kennebec County Soil & Water Conservation District are sponsoring a training on farm energy audits on January 14, from 8:30 AM to 5:00 PM at the Civic Center in Augusta. This is the day before the Ag. Trade Show starts in Augusta. The purpose of the training is to allow growers to identify points in their operations where energy might be conserved.

To review the full training program or to register online go to: http://events.abcsignup.com/mainerural

The registration cost is $50 for farmers.

For a hard-copy registration form, sponsorship opportunities, or more information contact Jennifer

Anderson at jennifer@mainerural.org or 766-5562

Farm Energy Audit Training

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