



Maine and New Brunswick Potato Industries working together. **Joint Potato Late Blight Management Strategy**

Background: The potato late blight epidemic of 2008 has cost potato growers in Maine and New Brunswick millions of dollars in additional management costs and crop losses. This disease appears to be a recurrent problem which is largely preventable. The Potato Industries of Maine and New Brunswick need to implement a comprehensive late blight management program to prevent this disease from becoming a major issue for the region in the future.

A comprehensive effort undertaken by the potato industries of both New Brunswick and Maine can prevent future major potato late blight epidemics. An effective program, however, can only be successful if all growers and all industry personnel work together to eliminate this disease.

Amongst the many analysis tools available, the IMMPAcT group followed a widely accepted approach known as Hazard Analysis Critical Control Point. This method follows a 7 Principles process to identify the problem, its causal aspects and opportunities for positive intervention. The 7 Principles are included as Appendix A. This document outlines a late blight management program that we recommend for implementation throughout the Maine-New Brunswick potato production region. Using the HACCP approach, the following 14 points outline critical control points that are available to and adoptable by each and every producer.

Critical Control Points:

1) Know Your Seed Source

Growers will benefit from developing a positive relationship with their seed grower/seed supplier. Having a positive relationship with the seed grower/seed supplier will help to insure that complete and accurate information regarding the quality of the seed being purchased is available to the purchaser.

2) Seed Handling

Wherever possible, growers should not precut seed. Precutting seed under some conditions has led to a spread of late blight within seed lots. In addition to the use of a mancozeb based seed treatment, growers may also want to consider using cymoxanil as part of their seed treatment strategy. This product has been proven to provide additional late blight disease suppression in seed lots. Growers should only purchase late blight tested seed.

3) Initiate Fungicide Applications via Severity Values

Protective fungicide applications should be initiated based upon severity values thus providing the grower with an adequate target time for beginning crop protection strategies. 18 Severity values accumulated from the 50% potato emergence date is the threshold to initiate protective sprays. The further accumulation of severity values can be utilized to schedule additional protective fungicide applications. This is a proven strategy for crop protection. Further, this approach can save the grower unneeded chemical and application costs later in the production cycle.

4) Build a Good Hill

Building a good hill helps to prevent late blight spores from washing onto tubers.

5) Maintaining Fungicide Protective Coverage on New Growth

Understanding that most fungicides are protective in function and need to be on the plant prior to the disease, necessitates frequent applications during the period of rapid foliar growth, especially, if the conditions are conducive to disease development.

6) Regular Field Observations

Potato late blight can develop very rapidly and it is vitally important to discover infections early. Small infections can be managed to prevent further spread. Only regular field observations will provide the grower with the opportunity for discovery, before late blight is out of control.

7) Train Employees for Late Blight Detection

Training employees that operate hilling and cultivation equipment and sprayers for late blight identification can provide growers with additional field observations for early detection.

8) Additional or Alternated Chemical Strategies

Some disease management situations may be enhanced by the addition or selection of a specialized chemistry. Some fungicide materials may enhance the grower's ability to manage potato late blight depending upon matching the situation to the chemistry.

9) Finding Potato Late Blight

If potato late blight is found on your farm report it to the New Brunswick Department of Agriculture or the University of Maine Cooperative Extension, so that other growers in the region can protect their crop and make any needed changes to their disease control strategy. Inform your neighbors so that they can take appropriate actions. Keeping late blight a secret is unfair and hurts everyone in the industry in both Maine and New Brunswick.

10) Management of Early Season Late Blight Finds

If potato late blight is found early in the season, kill/destroy “hot spots.” Prevent the amplification of the initial finds, allowing the small “hot spots” to grow, increases everyone’s risk. After the “hot spots” are killed continue to monitor the area on a regular basis to prevent further expansion. This will help to prevent this field from being of source of late blight inoculum for other fields.

11) Management of Mid Season Late Blight Finds

If potato late blight is found during the mid season period of the season the areas should be killed and closely monitored for further developments.

12) Management of Late Season Late Blight Infections

Potato late blight found late in the season – assess the situation and kill the “hot spot” or field as soon as practical. Whereas a weather event with heavy precipitation can wash late blight spores into the tuber zone, consider killing infected fields prior to the anticipated weather event.

13) Vine Killing

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 the harvest. The presence of green vines and poorly set skin increases the grower’s risk.

14) Crop Insurance

Growers should consider crop insurance as a method of minimizing their financial risk.

Imperative Program Components

The following 6 strategies will greatly enhance the probabilities of success on the part of each producer:

1) Late Blight Seed Testing

All seed potatoes to be planted in Maine and New Brunswick should be screened for potato late blight. The 400 tuber late blight testing protocol currently available both in Maine and New Brunswick will detect lot infections at approximately the 1% incidence level. This will prevent highly contaminated lots from being planted. This protocol should be instituted by both Maine and New Brunswick. It is hoped that industry partners, such as potato processors and financial institutions will support this concept by including late blight testing requirements within contracts and agreements in Maine and New Brunswick.

2) Shipping Point Inspection of Seed

Each load of seed for export will be inspected at the point of shipment by the Maine Department of Agriculture in Maine or by the Canadian Food Inspection Agency in New Brunswick. Point of shipment inspection will be a recommended practice for local sales. This will insure that potato seed lots being shipped are within acceptable tolerances.

3) Potato Seed Treatment

All potato seed lots prior to being planted in Maine and New Brunswick will be treated with a mancozeb based potato seed treatment. Mancozeb has been shown to significantly reduce the incidence of potato late blight in plants in which the seed had been treated with mancozeb.

4) Plant Only Certified Seed

Only certified seed will be planted for any type of potato production in Maine and New Brunswick. Seed not having been certified by the appropriate certifying agency in Maine or New Brunswick will not be planted.

5) Cull Piles and Volunteers

All cull piles will be controlled by June 10 and rechecked on a regular basis. Cull piles pose a significant threat to the potato industries of Maine and New Brunswick. Volunteer potato plants should be controlled when possible.

6) Sprayer Calibration

All sprayers will be calibrated and regular maintenance performed prior to the pest control season.

Action Steps Towards Suppressing Potato Late Blight

For a comprehensive late blight suppression program to be efficacious there must be a strong commitment from the potato growers in both Maine and New Brunswick. Program leadership will come from joint cooperation from the Maine Potato Board and Potatoes New Brunswick with educational support from New Brunswick Department of Agriculture and the University of Maine Cooperative Extension. Additional program support will come from the Maine Department of Agriculture, Canadian Food Inspection Agency and the United States Department of Agriculture.

Educational and Extension efforts:

A collaborative educational effort will be undertaken to prepare growers and industry personnel to implement an industry wide effort to manage potato late blight. This educational effort will encompass:

- a. Potato Conferences in both New Brunswick and Maine will feature late blight management information.
- b. Late blight management workshops.
- c. Potatoes New Brunswick District Meetings will feature late Blight management strategies.
- d. Newsletters
- e. Fact sheets
- f. Telephone hot-line
- g. Internet based information

www.maine potatoipm.com

www.potatoesnb.com

<http://daamaaextweb.gnb.ca/010-001/index.aspx?lang=en>

<http://daamaaextweb.gnb.ca/010-001/index.aspx?lang=fr>

www.maine potatoes.com

www.umaine.edu/umext/potatoprogram

www.potatoimpact.com

Communication – message and methods:

Providing growers and industry representatives with real time information on current conditions, weather and crop predictions, disease finds, chemical selection and other pertinent information is critical. Several communication technologies are available and each will play a role in providing timely and useful information. These include:

- a. Voice mail
- b. Text messaging
- c. Radio and Television messages
- d. Email
- e. Newsletters
- f. Telephone hot-line

While maintaining brevity, messages should be as detailed as possible.

Role of the financial institutions to influence availability and directed use of funds:

Financial institutions have a role to play in influencing growers to be part of the industry wide effort to manage potato late blight.

- a. Private banking institutions
- b. Public banking institutions

Summary of Grower Action Steps

Growers need to implement practices that minimize late blight risk:

- 1) Plant only late blight tested seed.
- 2) Plant only “certified” seed.
- 3) Use a mancozeb based seed treatment and cut, treat and plant
- 4) Initiating protective fungicide sprays based on severity values.
- 5) Manage/control cull piles.
- 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 to insure good skin set.

Late Blight Management Plan Organizers and Sponsors:

The importance of creating and implementing a regional solution to the regional late blight problem has brought the following organizations together:

Maine Potato Board
Potatoes New Brunswick
New Brunswick Department of Agriculture
University of Maine Cooperative Extension
Canadian Food Inspection Agency
Maine Department of Agriculture
McCain Foods Canada
McCain Foods USA

Appendix A

HACCP plans are developed using seven principles standardized by the Codex Alimentarius Commission. Created in 1963 by the FAO and WHO, the Codex Alimentarius Commission was tasked with developing standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme.

The HACCP Seven Principles (Adapted to Crop Production)

Principle 1: Conduct a hazard analysis. Determine the cropping hazards and identify the preventive measures the producer can apply to control these hazards. A cropping hazard is any biological, chemical, or physical property that may cause a detrimental effect to the crop.

Principle 2: Identify critical control points. A Critical Control Point (CCP) is a point, step, or procedure in the cropping process at which control can be applied and, as a result, a cropping risk can be prevented, eliminated, or reduced to an acceptable level.

Principle 3: Establish critical limits for each critical control point. A critical limit is the maximum or minimum value to which a physical, biological, or chemical hazard must be controlled at a critical control point to prevent, eliminate, or reduce the risk to an acceptable level.

Principle 4: Establish critical control point monitoring requirements. Monitoring activities are necessary to ensure that the process is under control at each critical control point.

Principle 5: Establish corrective actions. These are actions to be taken when monitoring indicates a deviation from an established critical limit. The final rule requires a producer's HACCP plan to identify the corrective actions to be taken if a critical limit is not met.

Principle 6: Establish record keeping procedures. The HACCP process requires that all producers maintain certain documents, including its hazard analysis and written HACCP plan, and records documenting the monitoring of critical control points, critical limits, verification activities, and the handling of processing deviations.

Principle 7: Establish procedures for ensuring the HACCP system is working as intended. Validation ensures that the producers carry out their plans thus providing evidence of ensuring the production of a healthy crop.