Potato Progress

Research & Extension for the Potato Industry of Idaho, Oregon, & Washington

Andy Jensen, Editor. ajensen@potatoes.com; 208-939-9965

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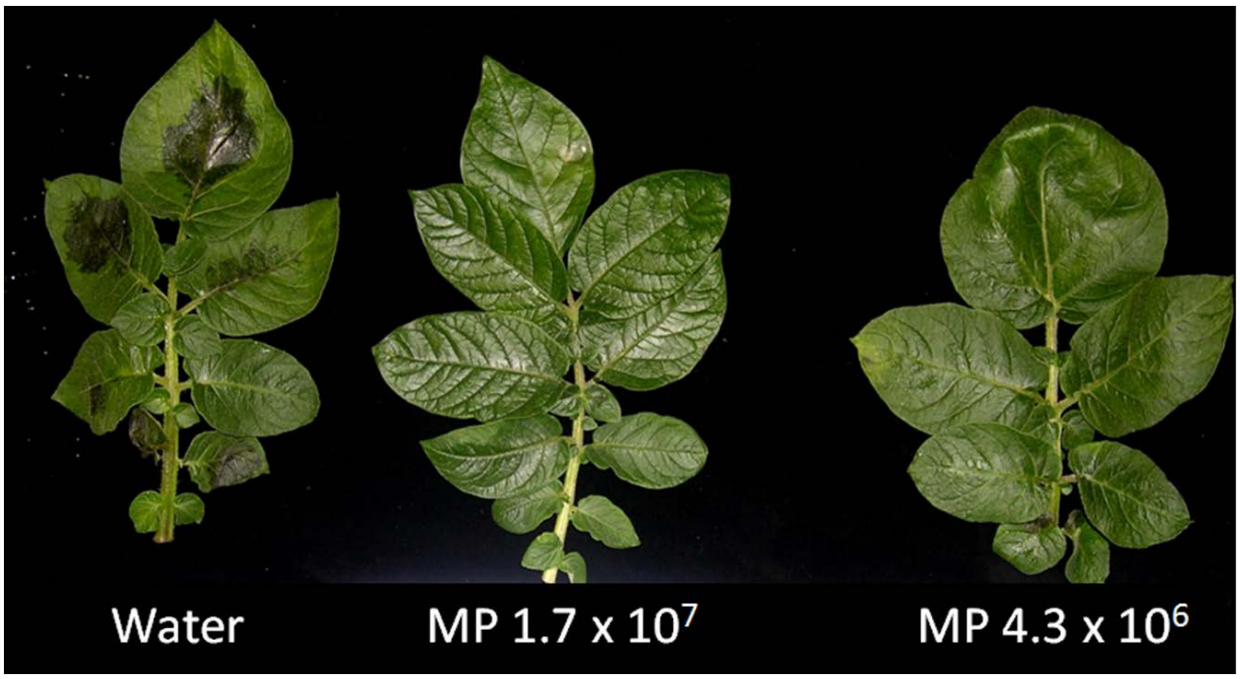
Plant Immunity Research at WSU

Lee Hadwiger, Department of Plant Pathology, Washington State University, Pullman

Agricultural research has developed some real innovations, many of which the potato commission revenues have made possible. There is a creeping, if not running, change occurring in consumer preferences, the most dramatic of which is in their interest in "organic" products. Some of this change stands in the face of agricultural practices which have been the most beneficial to the industry. As a researcher I have been on both sides. I started the marketing of the natural ingredient, chitosan, which induces immunity responses in plants as well as being antifungal. The remainder of my effort has been to uncover plant genes that actually defend the plant against plant pathogen fungi. Many of these genes now called PR genes (pathogenesis related genes) are genes which I initially hoped would alleviate much of the chemical fungicide dependence for controlling fungal diseases. Some of these genes indeed did work. However there is persistent resistance to genetically modified plants, which currently dooms many advances in the realm of GMOs. Scientists live to accomplish something for society and thus I am currently researching ways to enhance the natural immunity of plants against the pathogens that decimate their own specific hosts. The miracle of plants is that all species can resist most of the fungal and bacterial pathogens in their environment, but not those true pathogens that have developed a "niche" on specific plant species. This means that when the spores of non-specific fungi, without this niche, fall on plants they incite a resistance response that limits further advances of this plant pathogen. This is call "nonhost resistance." Often if this response is generated in advance of the true pathogen, it is effective against the true pathogen as well. Further, microorganisms other than non-pathogens can generate this resistance response. Other non-innocuous organisms such as the yeasts have the ability to induce this defense response. Dr. Dean Glawe in the plant pathology department at WSU and his students have collected and described some of the wild yeasts occurring in Northwest vineyards. We have found in leaf infection assays that these yeasts effectively enhance the defense response of potatoes if introduced to plants within 24 hours prior to the true potato late blight pathogen, *Phytophthora infestans.* The response dramatically reduces the symptoms caused by this pathogen. This manipulation of disease resistance is dependent on timing and application rates. That is, excessive concentrations of yeast can affect the plant in such a way that late blight symptoms are not reduced. Alternately, marginally low levels of yeasts also are ineffective. Also, as with all natural immunity responses, they persist until the normal physiology of the host returns. Thus the timing of subsequent yeast applications is important. The induction of plant immunity in this manner would conform to organic standards.

It would be advantageous to control the induction of this immune response through chemicals for which we have found a good economic candidate. Even though this immunity-inducing candidate has been used in I.V. lines and elsewhere medically, it still will likely be categorized as un-usable by the

National Organic Program. Both of these immunity-inducing approaches will continue to be pursued with the hope that the obstacles against their commercial application will subside in future years.



The effect of the wild yeast species *Metschnikowia pulcherrima* (Mp) on *Phytophthora infestans* (late blight) symptom expression on excised potato leaves. The yeast cell concentrations of 1.7 x 10^7 through 4.3 x 10^6 were effective when applied prior to the *P. infestans* inoculum.

Annual Northwest Potato Conferences

Idaho Potato Conference: January 20-22, Pocatello, Idaho
http://web.cals.uidaho.edu/potatoconference/

Washington-Oregon Potato Conference: January 27-29, Kennewick, Washington
http://www.potatoconference.com/

Checklist for Managing Late Blight Infected Tubers in Storage

Dennis A. Johnson, Plant Pathologist, Washington State University

In areas where late blight was present this growing season, infected tubers are inevitably being harvested and placed in some storages. Following is a checklist for managing potatoes in storage that may contain late blight infected tubers. These suggestions also apply for pink rot and Pythium leak. Additional information can be found at http://plantpath.wsu.edu/dajohn/potato/.

1. Continue late blight fungicide applications until harvest or until all vines are dead.

2. Harvest only during dry weather.

3. Harvest when tuber pulp temperature is 45-65º F.

4. Store known infected tuber lots separate from non-infected lots.

5. Store known infected tuber lots where they can be easily obtained for processing.

6. Sort for rot going into storage –Provide sufficient light and people to do the job.

7. Provide adequate air flow throughout the storage (25 cfm/ton).

8. Cool and dry the tubers as quickly as possible.

9. Cure tubers at the lowest temperature possible (50º F) or eliminate the curing period, depending on the amount of rot.

10. Cool the pile to the final storage temperature as quickly as possible – about 42º F for table stock, 45º F for French fry processing and 50º F for potato chips. It may be necessary to cool and hold tubers for processing and chips below the typically recommended temperatures.

11. Do not humidify.

12. Run fans continuously. Recirculate air through the tubers at all times, even when outside air is not being introduced.

13. Keep piles shallow to promote air movement and removal of hot spots.

14. Monitor storages daily. Determine temperature of the piles at various depths and locations. Serious late blight problems usually show up within 6 weeks of storage.

15. Do not expose cold tubers to outside air and any tubers to air at or below freezing.

16. Tubers of Alturas and Umatilla are moderately resistant, and tubers of Defender are resistant. Storage problems with these cultivars should be less than with other cultivars. However, good air movement and temperature and humidity management will be needed when storing infected tubers of all cultivars.

Northwest Potato Research Consortium

A Cooperative Effort of the Potato Commissions of ID, OR, & WA

In February 2012 the state potato commissions in Washington, Idaho, and Oregon officially launched a new cooperative effort in research, referred to as the Northwest Potato Research Consortium. The aim of this Consortium is to increase cooperation and efficiency of the research programs funded by the three potato commissions that total about $2 million annually. It will also work toward a comprehensive research results reporting process that aims to get useful information to the growers and industry members who need it. The Northwest Potato Research Consortium has one staff, Andy Jensen, as Manager, who is essentially a shared employee of the three potato commissions. He is directed by a Consortium board of nine members, three persons representing each commission.

The winter of 2013-14 was the first fully integrated and cooperative research review and funding cycle that the three potato commissions have undertaken. The great majority of the research and extension dollars available in each commission for the current fiscal year was allocated through this cooperation. Proposals were received in December of 2013 from throughout the Northwest potato research community. These were then reviewed and prioritized by each potato commission's research committee. The Consortium board then used the three sets of priorities from the commissions to build a set of funding recommendations for approval by the commissions.

A detailed list of the approved projects has been created and is posted here:

http://nwpotatoresearch.com/PR/CurrentProjects.cfm

Research Funding and Review Plans for Fall 2014 – Winter 2015

For the second time, a majority of this research funding will be allocated through a cooperative 3-commission research review process during the fall-winter of 2014-15. As in 2013-14, the nine-member Consortium board will review research and make funding recommendations to the commissions. One goal of the Consortium is to encourage collaboration across state borders and across disciplines. The Consortium recognizes that this transition will take time and effort, and intends to work cooperatively with the research community to achieve this goal.

Details on the research review process, timeline, etc. have been posted here:

http://nwpotatoresearch.com/

Members of industry and the research/extension community are invited to offer comments or ask questions about the Northwest Potato Research Consortium at any time.

Andy Jensen, *Manager*
(ajensen@potatoes.com; 208-939-9965)