

News from the Potato Lab



Spring 2017

Susie Siemsen attends molecular diagnostics workshop in the Netherlands.

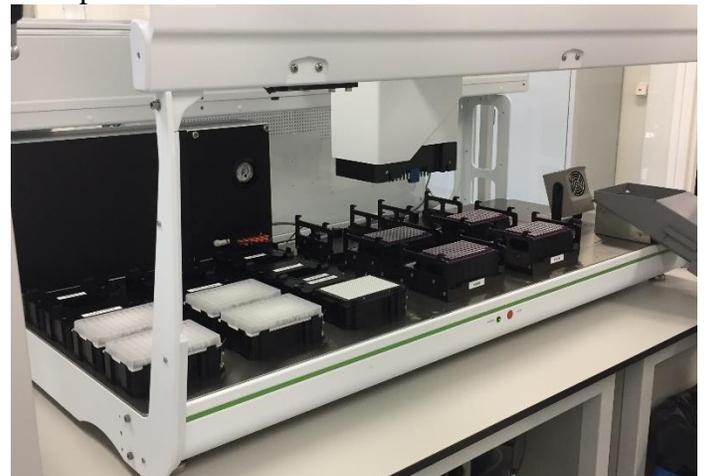


Lab for tuber processing with specialized tables

In February, with support from the Specialty Crops Research Initiative project on necrotic viruses, I attended a workshop for the diagnostics of potato pathogens using high throughput molecular methods at the Dutch inspection agency NAK in Emmeloord, Netherlands. NAK performs the certification of 99,287 acres of seed potatoes and other seed crops. The MSU Seed Potato Certification lab, aka the Potato Lab, performs the similar service for Montana's 10,000 acres of seed potatoes.

Both certification schemes require field inspections and testing for potato viruses. Montana certification involves collecting over 3 million leaves and running 650,000 ELISA tests for viruses in the summer, as well as performing a winter grow out where 650 bags of 400 tubers are collected at harvest and planted in Hawaii, where the leaves are sent back for testing again. Our program has adapted to high throughput testing of leaves using leaf juice with the ELISA method and grower-designed leaf pressing trays. NAK is fulfilling the virus testing requirement by testing harvested tubers using DNA and RNA extractions with Real Time PCR (qPCR), a very

contamination sensitive, labor intensive method. In addition, working with tubers instead of leaves introduces new obstacles to overcome such as space for bags, lifting the heavy bags, soil on tubers, reaction inhibitory compounds present in tubers, and space to do DNA/RNA extractions without contamination occurring. The Netherlands growers submit around 1 million tubers in bags of 200 each. Normally, our lab can process 2 bags of 200 tubers per day by qPCR, resulting in 40 tests. They run 20,000 qPCR tests for potato viruses and another 10,000 tests for bacteria. NAK processes hundreds of bags a day. The facility was capable of separating all their testing stations, limiting contamination. They have 213 permanent staff and hire around 100 temporary staff from August to November to handle the tuber testing. The temporary staff processes the tubers to get them ready for DNA/RNA extractions. Permanent staff performs the extractions and PCR with the help of highly automated lab equipment and 4 large robotic systems (>\$100,000 each) that are programmed to add reagents, samples, and set up the PCR plates.



Robotic station for setting up qPCR

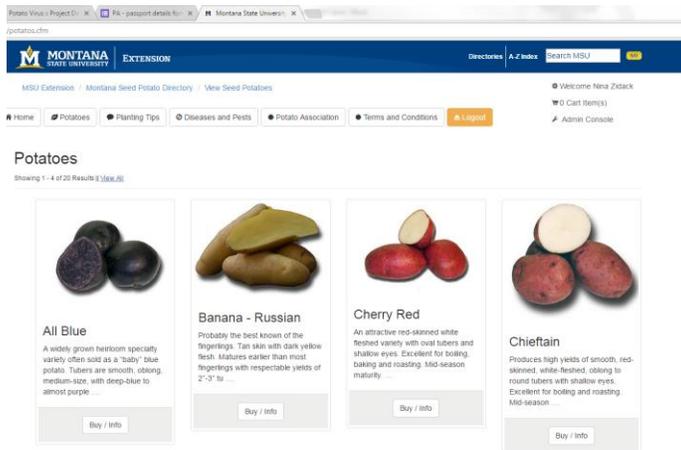
In addition to tuber testing, the facilities allow for screening soil for potato cyst nematodes,

testing of leaf samples, greenhouse studies, and printing certification tags.

I was shown their facilities and methodology of how they are able to accomplish this massive undertaking. I was able to bring some ideas and methodology back to the Potato Lab with a good understanding of what it would take to gear up to that level of testing. High throughput testing is nothing new to the Potato Lab in that we can process 10,000 ELISA plates in the summer, so gearing up for testing with qPCR plates would be a big challenge, but never say never!

HOLBROOK SEED POTATOES TAKES OVER GARDEN SEED DISTRIBUTION

Home gardeners throughout the state of Montana have increasingly come to demand Montana Certified Seed Potatoes and have found better access to them as a result of distribution efforts coordinated by the Potato Lab and funded by the Montana Department of Agriculture. The Potato Lab developed a website to market the potatoes and started collecting boxed seed potatoes from cooperating growers in 2014 and distributing them to County Extension Offices and Garden Centers throughout the state.



The screenshot shows the Montana Seed Potato Directory website. The header includes the Montana State University logo and navigation links for Home, Potatoes, Planting Tips, Diseases and Pests, Potato Association, Terms and Conditions, and Login. The main content area is titled 'Potatoes' and displays four product cards:

- All Blue:** A widely grown heirloom specialty variety often sold as a "baby" blue potato. Tubers are smooth, oblong, medium-size, with deep-blue to almost purple.
- Banana - Russian:** Probably the best known of the fingerlings. Tan skin with dark yellow flesh. Matures earlier than most fingerlings with respectable yields of 2'-3" tub.
- Cherry Red:** An attractive red-skinned white-fleshed variety with oval tubers and shallow eyes. Excellent for boiling, baking and roasting. Mid-season maturity.
- Chieftain:** Produces high yields of smooth, red-skinned, white-fleshed, oblong to round tubers with shallow eyes. Excellent for boiling and roasting. Mid-season.

This venture has expanded to the point that it has become more of a business than the lab can handle! Montana growers have all expressed strong support for this program and thankfully Scott and Laci Holbrook have stepped up to take over the distribution. MSU Extension continues to support this project due to its' importance for protecting seed potato growers from the import of disease-carrying seed potatoes from outside Montana.

MPIA ELECTIONS

Steve Streich has been re-elected to serve District 1, Steve Cottom was re-elected to serve District 2, and John Venhuizen was re-elected to District 3.

Congratulations Directors and thank you for your continued service to your fellow Montana Seed Potato Growers!

POTATO LAB STAFF PRESENT 4 TALKS AT POTATO VIRUS MEETINGS IN SAN DIEGO

On March 7 Nina Zidack, Susie Siemsen, Alice Pilgeram and Anna Jespersen traveled to potato virus meetings in San Diego coordinated by a multi-state USDA group (WERA-89) and the SCRI necrotic virus project. Nina presented an update on Montana Certification, and results from graduate student Elisa Boyd's project on generation differences in susceptibility to PVY, and the potential of resistance inducing agents to reduce PVY spread. Susie Siemsen reported on her trip to the Netherlands to attend the molecular methods workshop and Alice Pilgeram gave a report showing comparisons of results from lab-based assays and field postharvest tests. The majority of the presentations at the meeting were progress reports from members of the necrotic virus project and included talks centered around 3 viruses: PVY, Potato Mop Top Virus (PMTV) which is vectored by the powdery scab pathogen and Tobacco Rattle Virus (TMV) which is vectored by the stubby root nematode. The objectives of the SCRI project include development of new diagnostics, breeding for resistance, monitoring and management of the virus vectors, and economic implications for virus in the seed supply.

PEST MANAGEMENT RECOMMENDATIONS

Dr. Jessica Rupp has updated fungicide recommendations for 2017 and has published a Bacterial and Fungal Diseases booklet. A copy of both of these bulletins are included with this mailing and will also be posted on Jessica's website at www.msueextension.org/pspp and the Potato Lab website www.montanaspud.org. Jessica and Nina are currently working on updating PVY management recommendations and those will be distributed in April.

POSTHARVEST TEST SUMMARY

Nina Zidack has prepared a postharvest test summary and it is included in this packet.

DATES TO REMEMBER

May 5 – Postharvest Fees Due
June 12 – Registrations Due
June 14 – MPIA Board Meeting, Missoula