Researchers Share Findings at Field Days

Growers and those invested in the ag industry get a first-hand glimpse at current potato trials

By Joe Kertzman, Managing Editor, Badger Common'Tater

Like a science-driven triathlon, the three field days held at the Hancock, Langlade and Rhinelander Agricultural Research Stations paint a comprehensive picture of potato, cover cropping, and vegetable trials being conducted by University of Wisconsin (UW) Extension specialists.

Held on consecutive Thursdays, this year falling on July 9, 16, and 23, the field days showcase ongoing potato and vegetable research in central and northcentral Wisconsin carried out by UW scientists and collaborators to help growers continue raising high-yielding crops efficiently and sustainably.

The 412-acre Hancock Agricultural Research Station (HARS), located in the state's Central Sands potato production area, focuses on developing and evaluating ways to grow vegetables sustainably in the region's sandy, fast-draining soils above a high water table.

Above: In Dr. Jeff Endelman's update of his Potato Breeding Program during the Rhinelander Agricultural Research Station (RARS) Field Day, he highlighted two experimental chipping varieties, W17066 and W17AF6670, that have good starch content, processing quality, disease resistance to common scab, and the ability to store for nine months, as well as W17AF6670 being resistant to PVY.

Far Left: At the Antigo Field day, Ph.D. student Claire Schloemer, UW Department of Entomology, covered full-season PVY management, such as early vine kill, crop isolation, using disease-resistant cultivars, high- and low-input programming, and scouting.

Left: USDA Agricultural Research Service scientist Dennis Halterman gave Hancock Agricultural Research Station (HARS) Field Day attendees an up-close look at drought- and disease-resistant wild potato varieties from South and Central America being grown as part of a diploid breeding trial. The varieties are maintained at the U.S. Potato Genebank in Sturgeon Bay, Wisconsin.

On July 9, HARS Superintendent Troy Fishler welcomed field day attendees and introduced the day's master of ceremonies, UW-Extension Agricultural Water Quality Outreach Specialist Guolong Liang.

Wagon tours and potato research updates included presentations by Dr. Russell Groves and Ph.D. student Claire Schloemer, UW Department of Entomology, on "Insect Management in Potato & Processing Vegetables,"

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Left: Dr. Yi Wang, UW Department of Plant and Agroecosystem Sciences, discussed "Using Precision Agriculture Technologies in Vegetable Crop Production" at the HARS Field Day.

Right: Brooke Babler gave a Wisconsin Seed Potato Certification Program update during the RARS Field Day.

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and Dr. Jeffrey Endelman, UW Department of Plant and Agroecosystem Sciences, who gave a "Potato Breeding Program Update."

The work by Dr. Groves and Schloemer includes research on the first principles of Potato Virus Y (PVY) disease management, Colorado potato beetle (CPB) insecticide resistance, and looking at coordinating insecticide application and crop rotation across multi-farm acreage to prevent resistance.

Dr. Endelman's Potato Breeding Program is conducting variety trials to determine which potatoes are resistant to CPB, including the evaluation of 300 wild diploid potato varieties with desirable traits and genetic variations for resistance.

U.S. Department of Agriculture (USDA) Agricultural Research Service scientist Dennis Halterman talked about "Developing Wild Materials for Diploid Breeding," and Dr. Yi Wang, UW Department of Plant and Agroecosystem Sciences, discussed "Using Precision Agriculture Technologies in Vegetable Crop Production."

Dr. Jed Colquhoun, UW Plant and Agroecosystem Sciences, told HARS attendees that, "Water hemp is on the move like I've never seen it before, showing all the signs of rapid herbicide resistance and most likely metabolic resistance. It can resist any stressor that touches it."

Above: During the Antigo Field Day, Dr. Amanda Gevens, UW Department of Plant Pathology, provided a potato common scab research update, a report on late blight (no cases reported in tomato or potato in Wisconsin), and an overview of an early blight trial at HARS targeting early disease detection.

Dr. Halterman is working on drought- and disease-resistant wild varieties from South and Central America for diploid potato breeding. The varieties are maintained at the U.S. Potato Genebank in Sturgeon Bay, Wisconsin.

AI-DRIVEN TECHNOLOGIES

Dr. Wang reviewed projects on commercial potato farms where drones are flown over fields to create spatial maps and predict potato nitrogen uptake, as well as multiple Artificial Intelligence (AI)-driven technologies to predict yield and manage fertilization and irrigation.

Dr. Jed Colquhoun and Assistant Professor Steven Hall, UW Plant and

A stop alongside a flowering pollinator field at RARS had Maura Koth, a student in the Dr. Endelman Lab, UW Department of Plant and Agroecosystem Sciences, confirming to those on the wagon tour the vital role pollinators play in our ecosystem and farmland.

Agroecosystem Sciences, delved into their research on "Water Quality and Weed Management," and Dr. Matt Ruark, UW Department of Soil and Environmental Sciences, presented "Potato and 4R Nitrogen Management."

Dr. Colquhoun said, "Water hemp is on the move like I've never seen it before, showing all the signs of rapid herbicide resistance and most likely metabolic resistance. It can resist any stressor that touches it."

Like Wang's research, Colquhoun and Hall are looking at AI-driven tools, in this case precision sprayers using high rates of herbicides in precision micro-doses, as well as potential new herbicide registrations, cover crops, including camelina, and even adding paper mill residuals into fields to capture nitrates.

Dr. Ruark is asking, "When can we 'break' the potato through nitrogen management?" He is not only spoon-feeding nitrogen to crops but also applying it at the highest rates to

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– Dr. Amanda Gevens,
UW Department of Plant Pathology

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determine uptake, leaching, and yields, and where the sweet spots and breaking points of nitrogen application fall.

He's also evaluating which crops that were grown in fields preceding potatoes, like soybeans or corn, take up the most nitrogen or leave the most behind via crop residue.

Dr. Amanda Gevens, UW Department of Plant Pathology, gave a "Potato Disease Research Update" in which she explained fungicide strategies being implemented to comply with Endangered Species Act regulations.

Dr. Gevens also covered foliar trials in Russett Burbank potatoes looking for potential replacements for chlorothalonil, as well as black dot and white mold fungicide application trials, and a PVY study using hyperspectral detection.

Following the wagon tours to research fields, attendees enjoyed a social hour and grilled chicken dinner with sweet corn, baked potato and potato salad provided compliments of the Associate Division of the Wisconsin Potato & Vegetable Growers Association (WPVGA).

GRILLED CHICKEN DINNER

Brady Patoka of Jay-Mar, Inc. and his fellow Associate Division board members grilled the chicken, potatoes and sweet corn, the latter being courtesy of Flyte Family Farms.

Above: LARS Manager Kevin Gallenberg gave an overview of potato research activities at the station and, in the absence of Dr. Maria Caraza-Harter, presented her findings on a potato common scab resistance and susceptibility trial, including studying markers for PVY resistance.

The station's horticultural garden and Wisconsin Potato and Vegetable Storage Research Facility (SRF) were open for self-guided tours throughout the day.

Researchers use the SRF, erected in 2006 through a WPVGA gift, to study ways of curbing losses and improving the quality of stored potatoes.

Langlade County Agricultural Research Station (LARS) Manager Kevin Gallenberg welcomed guests attending the Antigo Field Day, July 16, and thanked local businesses and sponsors, including the Wisconsin Potato Industry Board, WPVGA and WPVGA Associate Division, and Wisconsin Seed Potato Improvement Association, as well as several companies and area potato growers.

Brooke Babler, assistant research program director for the Wisconsin Seed Potato Certification Program (WSPCP), had good news for Antigo Field Day attendees, citing 9,200 acres of seed potatoes certified this year, and a first inspection completed with PVY levels down overall from last year and early generation seed looking good.

Babler noted that direct tuber testing was approved by Wisconsin seed potato growers as a post-harvest test, and that her lab is also offering the same potato seed evaluation options as in the past, such as ELISA and PCR, as well as greenhouse and Hawaii winter grow-outs and certified seed lot tests.

RARS Superintendent Becky Eddy wrapped up the field day saying the research station in Rhinelander is pushing the boundaries of what is possible with commitment to quality crops.

UW Extension Regional Crops/Soils Educator Dr. Scott Reuss asked growers in attendance if there was an ideal month for pesticide applicator training, and touted cover crops that reduce diseases such as Rhizoctonia and common scab, and at the same time give growers an economic return on investment.

UW Extension Nitrogen Management Outreach Specialist Megan Blauwet reviewed the Nitrogen Optimization Pilot Program (NOPP), pointing to a current LARS potato nitrogen and phosphorus application rate trial looking at uptake, leaching, and yields.

The NOPP is a farmer-driven grant program administered by the Wisconsin Department of Agriculture, Trade and Consumer Protection with the goal of increasing nitrogen uptake efficiency in every region of the state across crops.

PVY RESISTANCE

Dr. Maria Caraza-Harter, UW Plant and Agroecosystem Sciences, could not be in attendance, but shared information on a potato common scab resistance and susceptibility trial being conducted at LARS, including studying.

She noted that two PVY- and common scab-resistant chipping potato lines were approved in national trials.

Dr. Gevens gave a potato common scab research update, as well as a report on late blight (no cases reported in tomato or potato in Wisconsin), and presented an overview of an early blight trial at HARS targeting early disease detection.

"Breeding for resistance is where many of our answers lie for multiple potato diseases," Gevens noted.

Dr. Groves and Claire Schloemer covered full-season PVY management such as early vine kill, crop isolation,

Above: Dr. Matt Ruark, UW Department of Soil and Environmental Sciences, presented "Potato and 4R Nitrogen Management" at the HARS Field Day.

disease-resistant cultivars, high- and low-input programs, and scouting.

A reception with food and refreshments, sponsored by Insight FS

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and the WPVGA Associate Division, was held at Antigo's East City Park immediately following the Antigo Field Day presentations.

UW Director of Agricultural Research Stations Mike Peters welcome guests to the Rhinelander Agricultural Research Station (RARS) Field Day, July 23, saying, "I'm so glad you're here to help celebrate the Wisconsin Idea and groundbreaking research conducted by our researchers."

Ryan Vinhal, a biological sciences aid with the U.S. Forest Service, explained how RARS has been phyto-filtering disinfectant wastewater using poplar and willow trees. The trees are used to break down and prevent movement of contaminants and clean up contaminated sites.

Dr. Ann Impullitti and Dr. Shannon Riha, UW-Stevens Point Departments of Biology and Chemistry, respectively, presented "Understanding How Plant-Soil Interactions influence PFAS Distribution and Transport" and their research into PFAS (per- and polyfluoroalkyl substances) extraction from soil using different cropping systems.

POTATO ROT NEMATODE

Babler gave a Wisconsin Seed Potato Certification Program update. Of note is that, for any potatoes being exported to Canada, the Canadian Food Inspection Agency is requiring certified seed and commercial potato growers to have crops tested for potato rot nematode and fill out a food survey.

A stop alongside a flowering pollinator field at RARS had Maura Koth, a student in the Dr. Endelman Lab, UW Department of Plant and Agroecosystem Sciences, confirm to those on the wagon tour the vital role pollinators play in our ecosystem and farmland.

Another of Dr. Endelman's students, Johan Aparicio, presented "Remote Sensing to Improve Breeding for Highter Yield," and discussed the role drones play in breeding by using imaging data that, when combined with DNA and other field data, can help growers make more accurate decisions in selecting for higher-yielding varieties.

In Dr. Endelman's update of his Potato Breeding Program, he highlighted two experimental chipping varieties, W17066 and W17AF6670, that have shown to have good starch content, processing quality, disease resistance to common scab, and the ability to store for nine months, as well as W17AF6670 being resistant to PVY.

Dr. Gevens shared "Strategies for Early Blight and White Mold Management in Potato," including timing of fungicide application, using reduced-risk fungicides, and those such as VM Agritech's Curezin that could replace chlorothalonil should it lose registration in Wisconsin.

She also gave an overview of a PVY demonstration plot in Hancock with five potato cultivars inoculated and planted, and her team's use of hyperspectral reflectance to collect data that can't be seen in the field, an improved tool for PVY strain identification.

In her presentation "Insect Management to Limit Transmission of Potato Virus Y," Schloemer explained the distinction between colonizing and non-colonizing aphids, and went over control strategies such as paraffinic oils, early vine kill, spatial isolation, and alternatives to neonicotinoids such as Syngenta Platinum and FMC Verimark.

RARS Superintendent Becky Eddy wrapped up the field day saying the research station in Rhinelander is pushing the boundaries of what is possible with commitment to quality crops.

"Not a single potato variety has failed to achieve foundation or certified seed status because of disease or virus," she noted. "The work we do today is essential for securing food for tomorrow." BC'T