

Agricultural Research Stations  
Annual Report  
Calendar Year 2020  
M. Peters, ARS Director

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## Directors Summary

It would be no surprise to anyone that 2020 was a challenging year for the entirety of the Agricultural Research Station Network. Like all of campus, COVID19 changed many aspects of our operations and the conduct of research work. The most predictable and obvious effect of the pandemic was a decrease in our total research work portfolio. When asked by administration to limit work and travel as much possible, campus faculty rose to the occasion and limited the scope of their research station work to only the most essential. Also, of critical impact to the ARS Network was the need to limit station access to only those working on site. Our stations pride themselves in being accessible centers that demonstrate the Wisconsin Idea. Not having field days, wagon loads of visitors on tours, open plots/gardens, and social interactions with our “customers” was demoralizing at times. Some key director observations regarding the pandemic are:

- All the stations are to be commended for their overall management of the pandemic. Through the entirety of 2020 no stations were identified as a place of COVID19 transmission for our employees. Station managers worked diligently to ensure the onsite, essential workers were as safe as possible in their work place. ARS employees are to be commended for their adherence to best practices that helped ensure everyone stayed as safe as possible.
- Although station usage was decreased, the stations were still a robust center of research activity. Table 1 has detailed information on number of projects and PIs that still took advantage of research station resources in 2020.
- The pandemic has led to a slight increase in retirements amongst ARS staff. This loss of institutional knowledge created some temporary challenges as critical positions were posted, filled, and the new staff onboarded. Stations creatively met this challenge and ensured all research work was completed at our expected levels of excellence.
- Stations took advantage of a year with few visitors to improve some critical pieces of their infrastructure. When tours and visitors return to the stations they will see many enhancements including improved entrance roads, safer and more accessible tour wagons, and updated signage.
- The push of the pandemic forced us to use more electronic outreach and meeting structures. While these are not always ideal, the ARS team is now more familiar with how we can use electronic mediums. I fully anticipate the stations will return to hybrids of in person and virtual work in the future, and we will be a more vigorous education unit because of this learning curve we have endured.

While the working to thrive through the pandemic was the main driving theme of 2020 some other notable highlights are:

- Highspeed internet is now available at the Arlington Station. Work is now being done to leverage this capacity to expand the research capacities at all of our Arlington units using this greater connectivity. We will continue working with CALS IT to expand this service across all of the station as time and funding allows.

- Planning work was completed to expand the EnviroWeather Stations to 4 more research stations, and add enhancements to the existing 10 stations. This expansion will become fully deployed in 2021.
- Wisconsin Foundation Seeds small grain program was brought into the ARS network. We are searching for ways to enhance this capacity and make the research stations more integral in completion of this critical mission.
- The stations creatively worked with ARS Management to find ways to absorb the pandemic induced budget reduction. All essential positions were filled as needed, and the few staff positions that were left vacant were covered to ensure no work was left undone during the year.

This annual report includes detailed individual reports from each Station and the Campus Greenhouses. Each station manager was asked to report on activity in the following areas:

- Notable Station Achievements
- Outreach/Instruction Activities
- Research Activity
- Change
- Goals for the Coming Year
- Areas of Concern and Challenges

**Common themes noted from station reports:**

- All stations had impacts from the pandemic. Each station addresses how they managed the impacts in their report.
- Stations continue to evolve to meet needs of a diverse pool of research needs. Staffing and land management are continually reevaluated; thus adapting to different research projects. Work for researchers needing new crops established can be difficult and time consuming, but stations try to accommodate as much as possible.
- Although not completely without error, stations meet research project demands with a high level of precision. This ensures strong repeatable data is available to principal investigators. When errors are made, process improvement is sought.
- Leveraging maintenance funding and replacing aging structures is an ongoing balance act for all stations. All stations are creative in accomplishing what they can with their crews and equipment, and they make the limited funding they have stretch as far as possible.
- It was rewarding to have a growing season in 2020 that generally avoided the detrimental weather impacts of many of the previous years.
- Stations recognize the importance of having certified organic acreage available for research, and are looking to grow their portfolios in this area. Many stations identified acreage that was low productivity or not needed for research work, and began putting these areas into prairie restoration or pollinator habitat.
- The research stations are still a valuable asset for CALS and UW Madison. They are prepared to meet the demands of CALS faculty in 2021 and beyond.

## **General ARS Challenges**

- While not a large impact in 2020, it is worth remembering that climate change is placing real pressures on the art of conducting field research. Historically, documented climate changes and weather events have narrowed the windows in which station staff and researchers are able to get into the fields and complete their work. This is placing pressure on the stations to accommodate precision needs, and many times leaves the stations and researchers doing work in less than optimal field and environmental conditions. Future investments in the station infrastructure need to be carefully planned so the improvements help alleviate some of these climate change demands. Additionally, it is the hope that the stations are a relevant venue for future climate change research.
- Campus budget models of using centralized service assessments to revenue generating accounts is making the operation of agricultural based facilities difficult. Commodity sales do not allow for passing along the costs of centralized service assessments. It is the hope that dialogue regarding different budget models can continue.
- Access to consistent high speed data networks continues to be a struggle in meeting today's research needs. A few stations have addressed this concern, but the need to expand reliable high speed internet to all our stations remains necessary.
- Discussions continue with the Department of Animal and Dairy Sciences and the Dairy Forage Research Center to meet the demands of evolving budgets on the animal housing stations. Ensuring we maintain the right size and scope of animal research units will be an ongoing discussion for the foreseeable future. Being able to ramp these units up and down as investigators switch focus will be integral in meeting our continued mission.

## **Conclusion**

I remain optimistic that the future of the ARS network is incredibly strong. Researchers continue to report that they are happy with the services ARS provides and we generally meet all of their needs. The stations are all operating within their allocated budgets and are able to remain fully staffed. The ARS network remains a critical link in the chain of CALS' research capacities, and we welcome the challenges to keep providing essential services to our Principal Investigators.

**Table 1**  
**Research Projects and PI's using Ag Research Stations**  
**Cropping Year 2020**  
**Compiled by Jane Cahoon**  
**March 19, 2021**

<b>Station</b>	<b>Field Crop Research</b>	<b>Fruit Crop Research</b>	<b>Animal Research</b>	<b>Natural Resources/ Turfgrass</b>	<b>Campus PI's</b>	<b>Total PI's</b>
ARLINGTON	306		68		40	44
HANCOCK	150				25	37
USDFRC	4		7		2	6
KEMP				26**	5	13
LANCASTER	40		8		11	11
MARSHFIELD	49		7		13	18
OJ NOER				53	3	3
PENINSULAR	6	7			7	12
RHINELANDER	2				2	5
SPOONER	22	2			15	17
WEST MADISON	54	4	13	6	30	30
GREENHOUSES*	250 - 450				70	70
<b>TOTALS</b>	<b>883-1083</b>	<b>13</b>	<b>103</b>	<b>85</b>	<b>223</b>	<b>266</b>

\* It is estimated that 250-450 projects occur in the Greenhouses each year.

\*\*Projects: DNR = 5, UW Non-CALS = 7, UW CALS = 18, Federal = 2, Other UW System = 4, Other = 7

## Arlington Agricultural Research Station 2020 Annual Report

### 1. Notable station achievements:

We were able to accomplish the necessary research support despite many limitations from the pandemic. We moved the staff break and meeting area to the Public Events Building to take advantage of the extra space and distancing. The grounds were kept in decent shape despite not having students available. Planting in 2020 was timely, growing conditions were good and grain yields were some of the best in recent history. Corn grain averaged 185 bu/A, corn silage 25 tn/A, soybean 63 bu/A and wheat 86 bu/A.

High speed fiber internet was installed to Swine, Blaine Dairy, and Headquarters in early 2020. The benefit was immediate as many activities switched to virtual during the pandemic. Some equipment still has to be upgraded to realize the full potential and we are still working to connect some buildings, such as the Public Events Building.

Field drainage tile was installed on roughly 10 acres of station fields with perennial drainage problems. This allowed us to plant crops on those acres opening up additional highly sought after land for research.

We planted 2.5 acres of pollinator habitat on marginal station land which we have been unable to farm the last several years. We are also identifying additional areas for future pollinator habitat.

### 2. Outreach/instruction activities:

Over 1,500 in-person Station visitors.

\*Virtual Tour outreach of 3,000 (includes live-stream and YouTube).

2020 Arlington ARS Tours, Field Days, Seminars, Courses			
Month	Group Name	Event	Participants
1/6/2020	Ag Leader	SMS Training	35
1/11/2020	Deforest Cub Scout Pack 35	Space Derby	50
1/15/2021	Chinese Visitors	Undersander Tour	5
1/25/2020	Bristol Blazers 4H	Model Horse Show	40
1/30/2020	CALS Safety Training	SPCC - Booth/Nick Genovese	30
2/12/2020	Bellville High School-Animal	Tours of Sheep, Swine, and Dairy units	20
Jan-Feb	UW AS 415	class conducted at SRTC	20
2/13/2020	CALS Safety training	ARS Safety training	60
2/18/2020	Insight FS	Applicator Training	80
2/22/2020	Lodi Vet Clinic	Equine Client Dinner & demonstration	250
2/26/2020	UW Short Course	SRTC- boar collection/breeding	1
2/28/2020	CALS Safety training	ARS Training	100
3/2/2020	Case IH	Customer/Dealer Meeting	50
3/2-5/2020	MATC students	SRTC for lab class work	80
3/10/2020	Heartland AG Systems	Operator Training	75
3/27/2020	Virtual tour	SRTC tour for high school ag	2*
4/17/2020	Virtual Sheep tour	Sheep tour for WI Youth Livestock	1091*
4/24/2020	Virtual Swine tour	Swine tour for WI Youth Livestock	851*

5/1/2020	Virtual Beef tour	Beef tour for WI Youth Livestock	669*
5/8/2020	Virtual Farm Center tour	Farm Center tour for WI Youth Lvstck	331*
11/11,23/2020	UW PD K9 Kobalt	UW Canine Police	12
11/25/2020	Virtual tour	SRTC tour for 4th grade students	20*
12/17/2020	Virtual tour	SRTC tour for high school students	16*
Annual	WICST visitors	WICST visitors- general	10

### 3. **Research Activity:**

250+ Crop-related research projects with over 40 PIs supported

50+ animal research projects with 30 PIs supported

The feed mill also provides feed for trials on campus and Vet Medicine.

### 4. **Change:**

Recovering expenses from researchers is the major part of our budget, encompassing about 75% of our income. Recent changes to the animal research stipend distribution now makes it critical that all activities are documented and accurately billed. Our nearly two-decade old system relied on a series of spreadsheets and was becoming antiquated. A combination of a long-term staff departure, upgraded internet, and key employees being forced to work from home because of the pandemic led us to Quickbooks Online. Expenditures can now be tracked remotely and records easily shared. Reports are generated and internal billing is performed monthly. Efficiency and timeliness continue to improve with experience and it should be a very good process when the pandemic ends.

### 5. **Station goals for the coming year**

The Wisconsin Foundations Seeds facility is located on the Arlington station. The recent retirement of the director left the status in jeopardy. Seeing an opportunity, we negotiated with the Agronomy Department to take over the operation. Assistant Superintendent Mark Kendall will serve as the director. We are developing a budget and he is making contacts with the foundation seed growers and purchasers. This will be a learning year. We are hoping for a seamless transition and planning that we can offer additional services to researchers through the WFS facility.

### 6. **Areas of concern and challenges**

The pandemic will hopefully end and things will get back to normal in 2021. Many research studies were delayed last year, making it necessary to catch up this year. This is already being noticed with the amount of project requests coming in. It will put an added burden on the station land, equipment, and labor resources. Labor is especially worrisome, as two open positions cannot be refilled before July, so we will be short-staffed going into a busy spring.

It is a challenge to keep staff morale high during the pandemic and uncertain budget times. Employees did an excellent job responding to adverse work conditions by wearing masks, distancing, and sanitizing. Several were disappointed that despite all their extra efforts they still faced two rounds of furloughs. There is anxiety over what the new biennium may bring. We try to keep the employees informed and hopefully communication from the UW will be clear and timely.



With the current trend of the animal units decreasing the number of animals they house, the expenses for keeping an older mill operational will be spread out over fewer tons of feed. In order to keep our prices low enough to satisfy our customers and be competitive with commercial mills, we will need to continue to see where expenses can be cut and to consider getting a license to make and sell feed to non UW customers.

## US Dairy Forage Research Center 2020 Annual Report

*Leading the world in integrated dairy forage systems research*

### **Number of Research Projects:**

During 2020 we supported 4 USDA primary researchers, 2 UW researchers on farm and various collaborating scientist. This year we provided 2 sets of bull calves for on campus trials facilitated by UW researchers. The collaborating scientist were from within USDA and UW along with visiting scientist from other institutions from around the world. These scientists performed 7 dairy research trials in various areas in support of the DFRC vision. These trials were using the facilities every month during 2020. There was an average of 82 animals on trial each month (35-130 monthly). This is slightly less than last year in a COVID restricted year. We were able to accommodate 2 UW researchers working with repro and transition cows. One of these trials was ongoing from 2017 which started with newborn calves and a subset (cannulated) of this group also provided epimural rumen samples at the start of their second lactation in 2020. One of the trials included a group of our Jersey cows. Agronomic trials continue with low lignin alfalfa, experimental work on inter-seeding alfalfa in corn silage plots and tracking how much nitrogen is lost in various stages of the growing, harvest, feeding, waste stream and crop nutrient application using N15 marked forages.

### **Outreach:**

We hosted a group of students from SW Tech in February. This visit gave DFRC visibility and a chance to highlight benefits of working at the farm. One hire coming from interest created by this tour is currently working at the farm. COVID put a halt to a couple of other scheduled tours and limited inquiries the rest of the year.

RARC trainers used our facilities and cows to train various research techs for USDA and UW trials.

DFRC took advantage of their membership in The Professional Dairy Producers (PDPW) industry organization by sending employees to a few of their sponsored training and information programs. Including their annual conference, Calf Care and Herdsman training/education seminars. The Calf Care training was especially rewarding for those who attended with their small group hands-on training sessions demonstrating calf necropsies and equipment sanitation.

### **Challenges:**

We struggled to stay fully staffed most of the year with the current staff filling in when necessary. We continue to improve efficiency creating space in each schedule to accomplish extra tasks at each position. This was accomplished by tracking and communicating performance in the areas of milking and calf care. Keeping the facilities/equipment maintained and operating as it ages continues to be a challenge. The continued use of a maintenance position under UW supervision has improved this

aspect of daily operations. These improvements have been noticed in reduced skid steer and manure handling down time and repair costs.

### **Opportunities:**

Increasing production further is possible by improving cow comfort. This can be done by installing bedding keepers and new scrapers in the freestalls. USDA has approved this expenditure and we are waiting for delivery and installation. The other area where we have a big opportunity is in feed inventory shrink control. Working with our feeders and USDA on bunker area repairs and handling and recording options we can reduce the waste of good feed lost to poor facilities. Also, using older mixers for hauling and unloading into elevator to mixer.

### **Accomplishments and Goals:**

- Continuing improving milk production and cow comfort. *The biggest opportunity I see is improving the production of the herd. This can be attained by spending more time fine tuning rations with the USDA nutritionist/researchers (2019 annual report).* Milk production this year is over 87.6# per cow compared to 84# last year (sold/milk cow). Bovi-sync average in currently over 90# and close to 100# on the Holstein cows. Most of this increase comes from improved forage quality and animal health improvements, not ration fine tuning.
- Getting preg rate back over 30%. DFRC was successful in maintaining our pregnancy rate over 29% even with a very challenging summer of getting cows pregnant.
- Reducing bulk tank SCC. For 2020 our herd SCC level remained at historical lows, with a yearly average of 175K (2019 was 150K).
- Though I don't have all the numbers compiled to document it, herd health is perceived by most of the herd care team to be the highest level in recent memory. Transition cow events (DA level <3% Milk Fever 5.8%) and calf scour levels are lower than historical.
- We will continue to use our genomic information to increase the genetic level of our herd with selective culling and mating. We will also be working on employee retention and, through training, increasing the knowledge and performance of our team.
- Improve financial records, budgeting and reduction of 136 deficit. We will lower our expectation of payment confirmation from USDA and use the current system of 700 requests and bid acceptance as our standard for Quick Books entry.

### **Research Activity:**

Our dairy research continues to emphasize new opportunities for improving the efficiency of milk production and ways to improve effective use of our feed, water and land resources. Discovering why and how cows' ability and efficiency of utilizing rations with higher levels of cellulosic materials. Researchers are confirming that cows are very good at turning cellulosic material (non-human food sources) into milk at efficiency levels comparable to high starch (human usable food sources) diets. This is relevant to the growing population and making the best use of our land resources. We are seeing an increase in interest in the whole chain of events for nitrogen cycling by crops, through the cows and back onto the fields and continuing back to the cow. This is designed to calculate where nutrients are being lost and ways to decrease these losses. This trial is part of a "Grand Challenge" that is also analyzing the effects on the human nutrition variables caused by feeding alternatives.

Ongoing buccal swabbing of the whole herd to analyze microbial profiles and the relation to genomic information and the predictability of rumen function. Researchers are seeing a positive tendency to our ability to control the microbial profile in cows if we start early in their life.

The repro trial we did in cooperation with a UW researcher was designed to analyze why a previous reproductive finding did not transfer well in a commercial application.

### **Future Research:**

Trials that are planned for 2021 include:

- “Calf-sync” the possibility to schedule calving times.
- “Re-Breed21” getting open cows re-bred at 21 days after previous breeding.
- Continued whole herd buccal sampling
- More comparisons of Jersey to Holstein efficiencies
- Comparison of low-lignin and regular alfalfa yields and performance through the cow.

# CALS Research Greenhouses ARS Annual Report December, 2020

## Encompasses:

- Walnut Street Greenhouse ~15K sq. ft. bench space
- King Hall (Soil Science) greenhouse ~ 2K sq. ft. bench space
- 2 greenhouses at West Madison station ~4600 sq. ft. bench space
- Eagle Heights research field ~3 acres

## Staffed by:

- 2 full-time managers
- 1 full-time horticultural technician

## Serves:

- **Campus-wide facility**
- **~70 UW faculty, ~55 active at a given time**
- **~230 users and ~140 projects at any given time**  
(Federal and campus researchers, emeritus faculty, visiting scientists, technicians, post docs, graduate and undergraduate students.)
- $\geq 12$  departments
- $\geq 5$  additional organizations/groups  
(Lakeshore nature preserve, GLBRC, WI Energy

Institute, etc.)

## 1. Notable Station Achievements:

### Equipment Acquisition and Renovation:

- Constructed six more auto-watering benches at West Madison. They are in use now, utilizing a newer system to improve water retention
- Cleaned out and reorganized the second and third floor of the old Dairy Barn storage area. We are systematically reorganizing all our many storage areas. We cleaned out the Stock Pavilion storage on the east end, and reorganized the Dairy Barn storage area after the steam leak - A big job!
- Recut, enlarged and created new drainage channels on the cement floors of the West Madison greenhouses. This was a necessary but difficult and unpleasant job that was successful in eliminating almost all of the puddling that was occurring in the greenhouse because of settling of the concrete floors.
- Purchased 8 K worth of modern folding benches from A.J Lauer. These benches are a big improvement allowing us to simply drop the benches to allow for tall crops.
- Completed a large D-40 container purchase. Now we should have enough of these specialized containers for all researchers.

### Services Provided, Investigations:

- Created a pot washing video to help deferred prosecution workers and students to understand what is expected of them when doing this necessary and time-consuming task.
- Conducted a competitive trial with LED vs HPS lighting with soybeans at West Madison. This was with the new style white LEDs.



- Conducted a trial using corn with LED lighting vs HID lighting at West Madison with Natalia DeLeon.
- Experimented with common bean using a capillary mat using slow release fertilizer vs liquid fertilizer.

### **Safety:**

- Created a safety DVD aimed at deferred prosecution volunteers and student hourlies. It covered slips, trips, falls, chemical and electrical safety, etc.
- Instituted all safety protocols for COVID 19 deterrence in March 2020 including mask wearing, hand washing/disinfecting. Earlier than most other UW facilities.

### **2. Outreach/Instruction and Educational Activities:**

- Hosted a ‘masters of light’ seminar at the Walnut Street greenhouse with other on and off campus greenhouse managers focused on LED lighting in greenhouses. 15 attendees with catered lunch.
- Hosted a tour of the Walnut Street Greenhouse for Oregon High School Middle schoolers on weekend. The students appeared to get a lot out of the talk.
- Hosted the UW Short Course tour.
- PAPR respirator training with Jessica Cebula for Isaac, Deena and Lynn.
- Hosted a tour of the WSGH with Sara Minkoff and her staff and the Forest Products Lab on March 19<sup>th</sup>.
- Toured the new Olbrich Gardens greenhouses with WSGH staff on March 11.
- Volunteers Alex Lieberman 50 HRS, and Peter Campbell 68 HRS unpaid labor via deferred prosecution.

### **3. Research Activity:**

Currently, there are ~125 projects at Walnut Street, with another 10 at the West Madison greenhouses, and 5 at King Hall. However, it must be noted that while we have as many as 150 projects utilizing our space at one time, projects may last a matter of a few weeks, months, or years. We estimate that somewhere between 250 and 450 projects utilize space at our station each year.

### **4. Change Over Time:**

The research greenhouses no longer have the capacity to satisfy the demands of the users. Often, researchers have to wait to be able to obtain greenhouse space and sometimes the quality of space/environmental controls is not the quality that researchers desire (1960’s greenhouses & equipment).

The demand for outdoor field research space has fallen off. We plan to reallocate our resources away from the field at this time.

To cover increasing costs, labor and maintenance, we have increased greenhouse rates.

### **5. Goals for Coming Year:**

- Organize the hundreds of hoses in various storage areas at the WSGH.
- Purchase capacitors, ignitors and transformers for the HID lights (last purchase.)
- Redo evaporative cooling system at West Madison. Clean out pipes; install new pumps.
- Paint doors and cabinets at West Madison to ensure a more professional look.
- Work with UWPP to create a comprehensive storm water drain system on the roof of the new section of the WSGH to prevent flooding so that computer panels and contactor boxes will not be damaged.

- Extend auto-watering for the entire West Madison greenhouse system.

#### **6. Areas of Concern and Challenges:**

- Growing concern that we may not have enough space to accommodate all researchers. With the Biotron closing, will that increase our occupants further? We already occasionally have to turn people away or put them on a wait list.
- Concern over quality of space. The “old section” of houses was built in the late 1950’s, early 1960’s, and does not have the more precise, complex controls that many modern experiments require. It also lacks the safety of overlapping controls; entire projects can be lost if the single air conditioning unit breaks, instead of the 4 units present in the larger “new section” rooms. Renovations were originally planned in the 2011-2013 biennium budget – if we want to serve researchers’ needs, and create a space for high-quality, consistent and repeatable experiments, this renovation needs to be a priority.
- Lighting technology is changing – our mercury vapor lights are being phased out. Soon, the replacement parts we use (ballasts, capacitors, ignitors) will no longer be produced. We do not believe replacing ALL our lights is financially feasible, nor is there a proven, viable lighting technology to replace them with (LED’s have been somewhat unreliable in greenhouse performance to date.) We are currently addressing this by buying a stockpile of parts that should last several years, and hoping technology/reliability improves before we are forced to change to something else.
- Storage. Many of the storage spaces we manage (Dairy Barn, Stock Pavilion, etc.) end up with users leaving things until they die, retire, move away, etc. We need to be able to limit this behavior, and get users to remove their own items in a timely manner. In some cases, having access to a moveable dumpster(s) may be helpful.

## **HARS 2020 Annual Station Report**

### **Notable Station Achievements**

**Field:** We experienced the least amount of issues with our faculty/staff/collaborators using our automated Ag-Ray potato grading line this year. Accuracy and reliability improved compared to prior years. This can be attributed to some computer operating system updates and some mechanical improvements that Paul and his staff invested time in upgrading. After they failed during the growing season, the generator on our S linear and the electric pump motor on our R system were replaced. Considerable dollars were invested in both replacements. Paul and Doug worked with Zeigler's Implement out of Deforest to upgrade our spray coupe. A new computer and monitor were installed with considerable time spent recalibrating/resyncing everything to ensure the new equipment was communicating properly with the sprayer controls. The field team finished building one new style tour wagon and are in the middle of putting our second one together. They look professionally constructed and Paul and I couldn't be happier with how they turned out. We ended up adding Swiderski New Holland as a new implement rental partner thanks to Paul reaching out to them after we had been experiencing issues getting the right types of equipment through Case IH at HARS. As it stands now, we use CASE IH for some of our equipment and New Holland for our other equipment needs.

**Storage:** We performed "Phase One" upgrades to our "Big Red" custom potato piler that we utilize to load our bulk research bins each fall. We replaced the motor governing the transfer belt with one that has more horsepower and worked with Andy Diercks from Coloma Farms who was nice enough to help us recalculate new gear ratios for the new gears we purchased for the motors governing the boom's transfer belts to avoid it kicking out on us during potato loading in years past when there was too much weight on the boom. We added 2 new storage (and field) industry partners that contract with us to do field and storage trial. One is Timac and the other is The Little Potato Company, which is an entity newer to Wisconsin that I have been trying to get them to work with us for the past two years from the storage trial end of things. They are looking to expand their trials this next growing and storage season. We added a second YSI 2900 instrument to our QA lab. These are the new models that replace the outdated and no longer supported YSI 2700's. The new instruments come with a hefty price tag of ~\$20K. Phil helped us set up the purchase of it as a capitol expense over the next 5 years. We finally found a home for our original yellow piler that had been sitting in the yard, rusting and looking like an eyesore. We ended up donating it to industry partner RPE (Russet Potato Exchange) who donated considerable money towards reworking it to suit our needs back when it was initially purchased in 2006. Because of this, I felt good about donating it back to them due to all the money they had invested in it. We have officially transitioned to the new HunterLab Colorimeter instrument used to evaluate chip color of finished fry samples. Our old one was no longer supported and we worked with Jeff Endelman in getting him to donate his newer one to our lab that he wasn't using as much up in Rhinelander any longer now that he and Becky contract us to help them fry/evaluate their trials that they store here in the SRF, instead of RARS where it is not ideal to conduct their evaluations (better continuity of data when we fry it here using our industrial grade fryers and equipment). We also recently updated both of our potato specific gravity instruments in the grading shed and SRF with new ones purchased from WellTech in the UK. The older ones had been acting "wonky" and were proving to be no longer reliable. The new specific gravity scales afford newer hardware and increased accessibility to retrieve data.



**Overall Station Improvements:** We were able to get one half of our historic barn refaced with the other half scheduled to be completed this summer. Finishing touches were done to our new tarp house and SRF lean-to to get them completed this past year (garage doors installed, cement approaches poured, electrical installs, etc.). I am proud to say that under Paul Sytsma's and outgoing HARS Maintenance Lead Steve Grimmenga's direction, our very capable HARS team was able to do most all of the work entirely ourselves (grade prep, foundation pouring, construction, etc.) thereby saving the UW many dollars otherwise. Tiffany and Jerry updated the watering system in our horticultural display garden by replacing the cumbersome to mow around irrigation risers with an underground system, in which we were able to leverage Jerry's irrigation expertise stemming from his days working at the Bruce Co. in Middleton, WI. They also removed the gravel walkway throughout the garden and reseeded it with grass instead for easier upkeep and improved aesthetics (it was hard to manage weeds from constantly popping up in the old gravel walkway).

### **Outreach/Instruction Activities**

With the exception of the Midwest Food Processors Field Day (which was majorly retooled to comply with UW covid compliance constraints), all of our typical outreach activities were canceled due to the pandemic that we are still currently dealing with.

### **Research Activity**

Overall, we were pleased with the high-level of successful research projects we were still able to maintain and help facilitate during this past covid-challenged growing season. We took on almost as many as we typically do in a non-covid-affected year. Typically we average around 160 field projects; this past year we maintained around 150 which ended up being greater than 90% retention of field research projects compared to normal. From the storage end of things, we had 13 PI's carrying out 25 research projects, with two of those collaborators being new to us (The Little Potato Company and Timac).

### **Change**

Other than the slight reduction of field and storage projects due to covid (which we expected), we didn't identify any major changes or trends. The pandemic has presented both opportunities and challenges in reimagining how we facilitate scheduling, lab space, and projects with limited area in our labs. This has also created hurdles for labor (ex. Little Potato Company not being able to leave their HQ in Canada to perform their own data collection). Perhaps not having the "Felix Factor" of extra field and storage projects will force us to take a slight hit to our income as well going forward but some may potentially view this as a win for our other clientele of the station who should see less competition of resources for their projects (increase availability of HARS staff and greater availability of shared station equipment that our clientele utilize to carry out their research projects). My transition to Superintendent is also worth mentioning as change the HARS team and our clientele experienced this past year.

### **Station Goals**

Finish updating exterior of historic barn at HARS. We need to replace the windows ourselves prior to FM&P coming to complete the second half of it. We are doing everything in our power to preserve the “historic” look with any updates we do. We would still like to pave/blacktop the approaches going to the SRF and connect them to our existing pavement in several areas. Execute “phase two” upgrades to our “Big Red” Potato piler (update the electrical drives, replace sticky lever that controls stinger hopper raising and lowering, add rubber padding to stinger hopper to keep overflow potatoes from falling off the stinger hopper). Get permission from WPVGA to use their SRF maintenance fund to resurface fry lab floor with industrial urethane cement which prevents oil penetration, allows for easier cleanup and can have a non-slip silica sand additive applied to it. The current concrete floor in the fry lab is slippery, stained with oil, causing it to look filthy during tours. We also plan to use the same company to resurface all of the cement landings, stairways and hallways in the main office building with a slightly less industrial flooring product (epoxy resin) that is better-suited for that application. The old coating has worn through in these same areas and looks terrible. Similar to our bulk bins, install steel channel in all of our lockers where the floor meets the wall, then apply spray foam insulation in all corners where the floor and ceiling meet the vertical walls. This will aid in energy efficiency and the lockers being better able to maintain their desired temperatures for greater success in storage projects. This will also help to eliminate unwanted water and CIPC sprout nip gas from travelling between locker to locker via where they meet at the floors and ceilings and afford them to be more liquid and airtight so they act more independent from each other and not sharing unwanted liquids and gases due to their poor original construction. Replace corroded humidity busters in the lockers with plastic ones that resist corrosion. Work with UW faculty Yi Wang and Jingyi Huang on expanding our VRI (variable rate irrigation) capabilities to aid in their water sustainability projects for the coming growing season.

### **Key Areas of Concern and Challenges**

Retirement of key field employees now and in the near future. Steve Grimmenga is retiring in June and the remaining three field positions (David/Doug/Jerry) are all in their early sixties and are starting to think about retirement. Hiring and retention of qualified permanent employees are always a challenge in central Wisconsin’s Ag Industry, namely because of competition from larger farms that can always end up paying their employees better.

The ag industry (specifically the potato industry) took a hard hit with the pandemic. This is forcing restructuring of some of our partners or scaling back in their engagement as they focus on their own operations. This will obviously translate into concerns about funding, but also in the energy/time that it takes to maintain some of these relationships. It may also impact the overall level of interaction that is vital in helping steer the research inputs that ensure we stay relevant.

## **Kemp Natural Resources Station 2020 Annual Report**

### **1. Notable Station Achievements**

- Supported just under 2,300 user-days of diverse station activity and provided a record low 1,499 person-nights of lodging.
- Generated outside donations, including:
  - \$10 thousand donation to implement the Hamilton Roddis Memorial Lecture Series; and
  - \$21 thousand in donations to support general station infrastructure improvements and programming.
- Completed several station improvement projects, including:
  - Painted the white house as a part of our painting maintenance rotation;
  - Installed new commercial water heater in Mead Hall;
  - Completed Mead Hall library classroom remodel and reorganization.

### **2. Outreach & Instructional Activities, Including Hosted Conferences/Workshops**

- ***Outreach***
  - Four outreach events, including the annual Insect Fest and the annual Fungi Fest, which were scheduled and announced in the spring newsletter were cancelled due to COVID-19 restrictions. No other outreach events were scheduled or held for the same reason;
  - Co-organized and implemented the eighth year of the Science on Tap outreach series. We held 3 in-person events before COVID-19 and 3 virtual events in the fall attracting more than 550 people;
  - Continue a monthly radio program called Field Notes that airs on local public radio station WXPR. Program is a joint venture of the Kemp and Trout Lake research stations and it has been very well received. The WXPR weekly listening audience is approximately 13,000 people weekly;
  - Organized the 2020 Hamilton Roddis Memorial Lecture, which was canceled due to COVID-19; and
  - Prepared 2 issues of *Kemp's Point*, the semi-annual station newsletter that is distributed to over 800 households.
  
- ***Instruction***
  - Supported 2 field classes, involving one UW-Madison department. All other planned field classes were cancelled due to COVID-19. Provided 154 person-nights of instructional lodging, which includes 4 nights for a UW-Stevens Point professor to visit and collect data that field course students would have collected had the course not been cancelled.

- **Conferences/Workshops**
  - Scheduled conferences & workshops with overnight lodging were cancelled due to COVID-19;
  - Provided 4 person-nights of conference related lodging to individuals attending meetings off-site; and
  - Hosted 4 day-use only conference & meeting with 89 attendees prior to COVID-19 restrictions. All others were cancelled due to COVID-19.

### 3. **Research**

- Supported 26 research projects, involving 20 principal investigators from 5 UW-Madison academic departments and 8 extramural universities/agencies;
- Provided 1,068 person-nights of research lodging;
- Attracted 2 new researchers to the station; and
- Although our numbers were small due to the pandemic, we did host a diverse range of projects representing 5 of the 6 CALS Priority Themes: *Bioenergy & Bioproducts*, *Changing Climate*, *Economic & Community Development*, *Health & Wellness*, and *Healthy Ecosystems*.

### 4. **Change**

- Campus COVID-19 limitations on the number of day users and overnight guests severely restricted revenue generation;
- L. Dalka was furloughed in the summer, then returned to regular duties in the fall; and
- Ortman and Bowe worked remotely, and G. Dalka and L. Dalka worked on station.

### 5. **Goals for the Coming Year**

- Return to more normal levels of research, instruction, outreach and conference/workshop activity;
- Continue to build relationships with Kemp Station personnel, ARS administration, and community partners;
- Continue five-year maintenance plan for Kemp Station buildings and infrastructure;
- Continue outreach campaign to attract new researchers to Kemp Station;
- Increase Kemp Station's lodging use to more normal levels;
- Increase Kemp Station's Connor Forestry Center use to more normal levels; and
- Foster Kemp Station's relationships of current and new donors.

### 6. **Areas of Concern & Challenges**

- Keep our budget in the black despite restricted station use due to the pandemic; and
- Address \$150k in station maintenance projects, including replacing remaining roofs, replacing decayed structural logs, painting buildings, and replacing sliding patio doors.

## 2020 Lancaster ARS Annual Report

### 1. Notable Station Achievements-

Continued normal Lancaster ARS activities and support throughout 2020 and the Covid-19 pandemic. Animal care duties are part of almost all our permanent staff duties and our crew maintained on site work attendance throughout the whole year. Additional temporary employees also provided animal care and other essential duties to keep Lancaster ARS fully operational in 2020. Researcher safety restrictions required additional station support for various projects due to reduced or inability of researchers to visit Lancaster ARS as normal. Extra duties included crop scouting, data and sample collection, and other management operations. Staff also participated in additional trainings and incorporated safety protocols to ensure a safe work environment for all employees and visiting research staff.

Adapted to maintain successful Station management with University Systems Associate working remotely from March until retirement in August. The Superintendent and Ag Supervisor assumed additional duties and coordinated with secretary to maintain financial operations, staff support, and other administrative duties were sustained. After retirement by the Lancaster ARS secretary, a temporary arrangement began with the Spooner ARS secretary to assist with similar duties. Increased responsibilities have again been assumed by the Superintendent and Ag Supervisor to continue successful Station management operations. This arrangement is allowing us to function well temporarily but will not be efficient long term as compared to employing an onsite employee to perform these duties.

Providing research support for Diane Mayerfeld to complete her PhD program in the silvopasture area in April. Diane worked with the Forestry and Animal Science departments with a multidisciplinary HATCH research project. Lancaster ARS also provided additional support for a new grazing research project for Dr. Mark Renz and a graduate student that began their program during the summer. Lancaster ARS staff assisted with various duties of the project including layout of plots, handling grazing animals, applying herbicide treatments, and collection of research data and samples throughout the growing season. Station involvement included multiple staff and allowed project to be successfully begin this year before the student arrived.

### 2. Outreach/Instruction Activities-

With the absence of in person events in 2020, Lancaster ARS took part and supported other station users in providing virtual programs highlighting the station and its activities.

This spring Lancaster ARS's beef herd was included as part of the Animal Science Department's four-part series of virtual livestock research farm tours. Lancaster and Arlington beef operations cooperated to provide the beef virtual tour. The hour-long tour was watched live by 112 viewers and has since been watched an additional 470 times. Arin Crooks, LARS Superintendent, hosted the Lancaster section of the tour and included cattle and staff caring for the herd.

Other virtual programs coordinated by Lancaster ARS researchers also provided information virtually to the public. An example is Dr. Rodrigo Werle's program that utilized its Lancaster ARS research to help make over 20 virtual presentations that reached over 2,500 participants. Identifying all the virtual programs and number of attendees reached by all LARS researchers has been difficult.

3. Research Activity –

Agronomic Crop Projects – 40 total projects including areas of corn, soybeans, forages, small grains, cover crops, soil conservation, and fertility. 11 different faculty members from 6 different departments.

Beef Cattle and Grazing Projects – 8 total projects including cow/calf genetics, cow/calf reproduction, nutrition, silvopasture, pasture weed management, and grazing plant species performance. 4 different faculty members from 3 different departments including a researcher from the USDA DFRC. Due to 2020 limitations the proposed new research project for the cow calf herd was delayed by Dr. Brian Kirkpatrick until 2021 and current project was extended.

4. Change –

Merger of Animal and Dairy Science Departments and change in management structure of beef research herd. In 2020 the oversight of the department owned Lancaster ARS beef herd has changed with Jamie Reichert and Jessica Cederquist taking leadership for the department. They have replaced the previous faculty advisor position. As part of the merger a review was done of livestock operations and a group decision was made to eliminate Dr. Kirkpatrick's Arlington beef cow herd. A portion of those cows are set to be transferred to Lancaster ARS and to join our herd. The LARS beef cow herd will continue to be 120 cows and coordinating decisions were made to reduce LARS herd accommodate the addition of the 37 Arlington cows. Strategic marketing decisions are being made to maximize cattle sale income. Completion of this process is expected to occur by March 1, 2021.

Changeover of active research faculty and connecting with new faculty members during Covid-19 pandemic. Previous research faculty such as Dan Schaefer, Dan Undersander, Ken Albrecht, and the Beef Extension position were very active Lancaster ARS users. With only Valentin Picasso Risso currently active forages and grazing, Lancaster ARS is missing interest in the continual strong activity areas of beef, grazing, and other forages. Additions of new faculty have occurred over the last few years but reaching and connecting with these faculty as an outlying research station can be difficult. This is especially the case with the limited travel for UW staff in 2020. Continued efforts will be made to establish relationships and new research projects at Lancaster in both the beef and forage areas to maintain our presence in these areas.

5. Station goals for 2021 –

Manage Lancaster ARS activities successfully through rest of Covid-19 pandemic. Hopefully we are close to moving past altered Covid-19 operations, but we will still have a portion of 2021 with continued restrictions. We will benefit with last year's experiences, but 2021 will still provide additional challenges. Let's hope that we can utilize the new knowledge we have gained during this time to help us operate even better after the pandemic is gone.

Maintain support for existing researchers and establishing relationships with new faculty interested in utilizing Lancaster ARS. As with all the research stations, Lancaster has good relationships with our researchers from UW Madison and other locations. We will continue to strive to maintain the support that helps keep their interest in carrying out their research at our facility. Lancaster ARS staff will also continue to reach out to the recently hired faculty to establish relationships and encourage utilizing our location for their research when applicable.

Continue to maintain and repair of station road and grounds. Heavy rains from recent years have created additional erosion areas in crop fields, pastures, and wooded areas. Repair and maintenance of Lancaster ARS grounds is a routine practice, but the extreme rainfall events have increased the current amount of damage to repair. Additionally, we have been working to upgrade our gravel roads at Lancaster ARS with the assistance of Shaun Frey of Facilities, Planning and Management. With adding gravel to one more section of road we should complete the upgrade of our main gravel road at Lancaster ARS that has taken 3 years.

#### **6. Areas of concerns and challenges-**

Getting permission to deal with demolition of aging station facilities – At Lancaster ARS there are 2 aging former dairy barn structures with significant structural problems. We have been in process for the last number of years trying to get approval to take down and remove these structures. Multiple rounds of safety inspections and other general questions have taken place, but with no progress in getting approval to move forward. Maintenance has been minimal as these structures have been expected to be demolished by now. At some point delayed action could lead to further structural issues and even safety implications. Our addition of a machine shed allows for storage of larger equipment to replace these 2 buildings. Additional storage for other small equipment is still needed. Potential renovation of the footprint of 1 of these old structures could provide space to fulfill these needs.

Requests for larger agronomic plot areas to carry out agronomic research. Lancaster ARS is known for its terrain with steep slopes and contoured fields that help alleviate erosion. Historically most agronomic research projects were able to be adapted to fit our 90 foot wide field areas. A large increase of agronomic projects is looking for larger plot areas that are not able to be located in our narrower field areas. We have a very limited number of crop research areas that can accommodate those larger projects without having too much variation within the plot. There is additional land areas surrounding Lancaster ARS that could provide additional viable land options, but nothing that resides on the land that we operate now.

Decreased faculty numbers in key interest areas of Lancaster ARS such as beef, grazing, and forages. As has been mentioned previously we continue to reach out to limited new faculty to utilize station resources in these areas. These areas also represent strong interest areas in Wisconsin and especially in our local Southwest region of our state. Activity in this area also provides continued interest from important user groups and opportunities to highlight our work in outreach activities to the public in our local area and across the state.

## **Marshfield Agricultural Research Station 2020 Annual Report**

### **Notable achievements**

- Introduced the topic of Emotional Intelligence to the MARS management team through a book study of Emotional Intelligence 2.0 and held routine discussions on EQ. Integration of EQ has greatly improved teamwork, comradery, and open communication within the MARS management team.
- Led a book study on regenerative agricultural practices to facilitate better understanding of our long-term goals among the management team.
- Conducted a series of small trials through a Midwest Forage Association (MFA) focused on expanding the use of perennial grass systems in dairy production.
- Continued development of a plan for partnership between Discovery Farms, MARS, and the Eau Pleine Partnership for Integrated Conservation (EPPIC)
- Proposed and successfully received funding to conduct a fall stockpile grazing trial with the Center for Integrated Agricultural Systems and UW Dept. of Animal and Dairy Science
- Refined goal of keeping “continuous living cover” on all acres all year round with perennial forage crops, annual cover crops, and wide-row corn
- Began process of certifying acres as organic.
- Began program of composting solid manure; making observations and collecting samples through the season to learn more about how composting affects the nutrient characteristics of the manure (i.e., nitrogen tie-up, phosphorus content, moisture, etc.).
- Facilitated an effort to improve research pen conditions, where Calan gates are located. USDA funded cow-comfort quality mattresses and fans providing an environment to more comfortably accommodate lactating dairy cows on study.
- Nominated and awarded a National Dairy Quality Award (third time awarded)
- Established new area for red clover breeding nurseries at MARS north farm campus.
- Converted 2 acres of lawn adjacent to dairy facilities into native pollinator species.
- Worked with USDA to purchase a new forage research plot harvester, replacing the 40-year-old plot harvester.
- Acquired and constructed a rainfall simulator in collaboration with local watershed group, EPPIC. Simulator had been put to use during a couple events during 2020.
- Kept MARS functioning successfully and safely during the global pandemic. Achieved by adding “Public Health Infectious Disease Outbreak” as a new essential service recovery plan to the COOP. Activated that plan. Strategies to keep staff safe include separation of crews, staggering breaktimes to keep livestock crew presence in breakroom to a minimum, erected Plexiglas in the dairy breakroom, enforced face coverings, routine sanitation and disinfection procedures, management of one telecommuting staff member and her work schedule. Temporarily closed the auditorium and assisted with the closing of the DCC (taking in additional cattle). Helped guide SFAL lab during their closure. Rounded up additional PPE per requests from UW (some of it went to Marshfield Hospital as UW opted not to take it). Managed a dairy herd program during the pandemic proactively strategizing the possibility of dumping milk and onsite animal disposal and helped manage cattle and cattle numbers in the ADH. Insured milk through Dairy RP to manage a loss of milk revenue.



## **Outreach and instruction activities**

- Hosted three fall semester field classes for Mid-State Technical College (MSTC) as part of their Agribusiness and Science Technology associate degree program.
- Hosted a soil and water conservation demonstration for the Marathon County Conservation Board
- The closing and restrictions of tours and use of meeting facilities at MARS greatly impacted outreach. Initiatives were taken to proactively conduct virtual tours and interviews using social media. That proved successful; well over 16,500 viewings were recorded.
- An MOU between MSTC and the University (with a December expiration date) was revisited and renewed. The MOU gives MSTC access for teaching purposes within UW MARS farm facilities, herd, and land.
- Tour data: North farm 11 events/tours (124 people); Auditorium 31 events (959 attendees)

## **Research activity**

- Despite the challenges in this unprecedented year, research studies carried on under the umbrella of University pandemic guidelines. At MARS, 49 field trials on 136 acres (including research pastures) involving 13 principal investigators were conducted. Livestock research involved 466 animals and 7 principal investigators.
- Participated in the Dairy Innovation Hub (DIH) grant opportunity. Applied for 2 DIH grants – both were rejected but projects were funded using alternative means as they were deemed critical to North-Central WI agriculture. MARS had been a site recipient of a DIH research capital equipment grant (precision feeding cart). MARS was a study site for use of DIH grant funded research equipment (GreenFeed machine). The GreenFeed machine, a system designed to measure gas fluxes from individual animals, is being used by two studies at MARS.
- Continued long term soil health trial (7<sup>th</sup> year) which has provided extensive content for promoting the benefits of conservation practices.
- Conducted several field trials in collaboration with the local watershed group – had over 200 soil and forage sample analyses funded by the watershed group, including an Italian ryegrass management trial and a wide-row corn trial, both of which were inspired by the interests of local farmers.
- Expanded acres of pasture equipped for managed grazing. Did so with funding from UW Dept. of Dairy Science fees generated through research conducted at MARS. The new pastures were utilized during a stockpile grazing study.
- MARS will reap research benefits from the merger between Dairy Science and Animal Science with a dairy-beef cross study. The protocol had been approved, study team meetings took place, and plans to carry out the study will begin at MARS in 2021.

## **Change**

- MARS continued to explore the path toward forage production systems that are more resilient and well-suited for North Central WI, e.g., annual forage grasses, perennial grasses in lieu of alfalfa, wide-row corn to accommodate interseeded cover crops, etc. MARS management team met before and after the growing season to discuss the direction of the forage program. Additionally, the management team met with Daniel Olson, agronomy consultant with Forage Innovations, Inc. to discuss the future of the MARS forage program.
- Land will change ownership at the MARS south campus. The City of Marshfield made good on a land purchase agreement drafted almost 20 years ago and will take ownership of 125 acres located at the south property (Marshfield) in the near future. Ultimately, this acquisition by the city takes

land out of MARS crop production and research, leaving about 8 acres owned by the UW at the south campus. Agronomy research will begin relocation to the north farm campus (Stratford).

- MARS anticipates becoming part of MSU's Enviro -Weather Network collaborator, along with other ARS stations. We anticipate installation of new weather equipment that will support agronomy and soil science research.

### **Goals for next year**

- Continue long-term tillage x cover crop trial (year 8) and begin working with interested scientists to explore publishing data (USDA research scientist Eric Young and Rock River Lab/Adjunct Asst. Professor Animal and Dairy Sci. John Goesser have expressed interest).
- Progress toward completion of certification of organic acres.
- Explore possibilities of expanding pasture research program to lactating cows.
- Draft and implement a plan for minimizing area of mowed lawn at both south and north facilities, and how such areas can be used to demonstrate good land management practices.
- Complete the construction of a hoop building which will house animal bedding. Additional building projects on the docket include an upgrade to the calving barn ventilation system, installation of a ceiling in the manure collection barn to control internal climate and repurpose the manure processing barn.
- Retrofit corn planter for precision technology and functionality. Updates including adjustable rows, hydraulic downforce, electric drive, liquid fertilizer, GPS monitor upgrade, etc.
- Succeed in the reaccreditation efforts of CALS by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC). Efforts are in place to prepare the MARS livestock program for the assessment.
- Establish a rapport with the anticipated hire of a USDA grazing specialist (position posted, hire process in the planning). This position is to be based in the USDA-ARS facility at MARS south campus.

### **Areas of concern and challenges**

- Lack of admin building, including temporary student housing, internal meeting space, and a public meeting space. Met with local pre-fab home building company requesting a donation. No progress in that discussion.
- Loss of land for production and research. Conversations are taking place with neighboring farms to locate potential sites to relocate agronomic research and/or production acreage.
- MARS will likely be charged with maintaining the aging CALS-owned building on the south campus following closure of the UW Soils and Forage Analysis Lab (program scheduled to end in April). The auditorium, connected the main building, is widely used (well over 4000 people annually). This will require MARS to make a decision about utility of the auditorium following the closure of the main complex.

## 2020 O.J. Noer Turfgrass Research Facility Achievement Report

### 1. Accomplishments

The Spring brought a new challenge with Covid-19 pandemic. Dealing with the pandemic created many new challenges to protect the research, the researchers, the staff and mission to serve the Green Industry. Along with everyone else it was a trying time to get everyone to wear face coverings, social distance, wash their hands and most important wash equipment and tools they used throughout the day. The Noer did its best to provide all the necessary cleaning supplies needed.

Extra steps the Noer took to curb the spread of Covid-19 was to assign each department using the Noer two utility vehicles and made them responsible for the cleaning after us. The use of some equipment was limited, and the use was to be requested of the station superintendent. The main irrigation computer was removed from unlimited access. All program changes were to be requested via an electronic work order system. The door from the shop to the office area of the building had Step-N-pull unit installed so the door could be opened with your foot. This removed one possible area of transmission, doorknob.

The Noer staff disinfected high touch areas daily, often multiple times per day. All equipment was to be cleaned outside the shop and left in the sun as long as possible to aid in the disinfecting process.

The Noer stayed up to date on all UW-Madison Covid-19 policies and procedures.

The gutters and downspouts at the Noer developed leaks and the Noer worked to have the a few gutter sections replaced and a new downspout installed.

Over the winter month I worked with Dr. David Hogg, emeritus, Entomology to install and manage two beehives on the west edge of the property. Often times bees and turfgrass management are at odds. Through 2020 we saw no decrease in hive quality and Dr. Hogg felt the honey harvested was very successful. The plan is to maintain the beehives for many more years.

Dr. Soldat continued his Robotic Mower research and increased the size of the pot to five acres. Working with Echo we installed the guide wires, modified the irrigation schedules, established cleaning protocol for the Robots and manually raise 37 irrigation boxes that would cause the Robot to get stuck. The irrigation system at the Noer is approaching thirty years old and many of the irrigation heads will stick and not retract when cycled, the Robot would then break them off. Over the summer the Noer staff replaced 80 heads at \$12.00 each or \$720.00 without labor. The Robots were prone to issues and the Noer staff would attend to any issues and get the Robots back online every time there was an issue.

Dr. Soldat used his homeowners style Robots to maintain general turfgrass variety and height demonstration plot. The three robots required electrical power which the Noer staff installed from the Pesticide Building underground to a main power source.

Plot B21 was killed and re-established as an NTEP Grant plot. During renovation the Noer installed and new tile line to move water off the plot after heavy rain events.

In early summer the UW Police contacted me about doing K9 training at the Noer. The balance of the year we cooperated with UW Police hosting multiple training events.

## 2. **Outreach/instruction activities:**

Syngenta filmed a Dollar Spot control segment here in August for use nationally. Weedman and TurfBots filmed segment of various topics throughout the summer, highlighting the Robotic Mower Study and other studies on property.

Due to Covid-19 there were no station visits conducted

## 3. **Research Activity:**

### **Soil Science**

In 2020, at the O.J. Noer Turfgrass Research and Education Facility, the Turfgrass Soils Program continued to evaluate how various factors affect the growth of creeping bentgrass in hopes of creating a growth prediction model using machine learning. The group also conducted or continued several studies aimed at reducing the inputs required for maintaining turfgrass. In particular, they evaluated how mycorrhizal fungi can decrease turfgrass nutrient requirements and evaluated the performance of different clover species and establishment methods to provide nitrogen to cool-season lawns. The Turfgrass Soils Program also led the installation of four new variety trials that will evaluate the performance of scores of different turfgrass cultivars for Wisconsin homeowners and turf managers. Finally, the Soils Program executed several product efficacy trials examining the performance of herbicides, wetting agents, fertilizers, and plant growth regulators. The information from these studies was communicated in many different ways, including a virtual field day, articles in trade association magazines, scientific manuscripts, and internet blogs and video presentations.

### **Plant Pathology**

In 2020, the Plant Pathology program continued to update and modify the Smith-Kerns Dollar Spot prediction model, which was created at the University of Wisconsin and is used by turfgrass managers around the world to effectively manage an important disease using fewer fungicide inputs. Continuing research with the Smith-Kerns Dollar Spot Prediction Model included research to use it in a site-specific manner, the impact of early-season fungicide applications on model thresholds the remainder of the year, and potential upper model targets for reducing fungicide reapplication intervals. In addition, the second year of field portion of the study 'Alterations in ecological competition within the plant microbiome in response to repeated fungicide applications' was conducted at the OJ Noer in 2020. This study was a recipient of a UW Fall Research Competition Award and is investigating the impacts of repeated pesticide applications on the soil microbiome and how they may alter resistance to plant pathogen invasion. The use of iron sulfate as an alternative dollar spot control product was also tested, with promising results that may lead to reduced fungicide usage. Lastly, a new molecular assay to detect and quantify the dollar spot pathogen in the soil was tested at the OJ Noer. This project is being funded by the United States Golf Association and is providing important insights into the biology of this pathogen that will lead to more effective control using fewer fungicides.

### **Entomology**

Dr. Christelle Guedot and Dr. Shawn Steffen began a nematode trial to control Japanese Beetle grubs. By the time we discussed the study the desirable plots space was limited. The trial was installed, and

the results showed some promise. The discussion for 2021 has begun and will allow the trial to be installed on a more suitable site.

4. Station goals for the coming year
  - Keeping the Noer Protocols fair and followed
  - Work out a streamlined process for hosting Golf Channel and UW Police Incident Command during the AM Fam Senior Championship and adhere to UW Covid policies
  - Work toward refurbishing the irrigation system around the main building
  - Work with Entomology of maintenance of 'Operation Pollinator' demonstration
  - Procure donations of seed, fertilizer, pesticide and as many additional supplies as possible
  - Assist researchers to install as many new projects as needed
  - Continue an outreach program to show the value of turfgrass in the local area with seminars to various groups like, Kiawana, Rotary and Master Gardener groups
  
5. Areas of concern and challenges
  - Budgets have not provided for any fertilizer application to the general grounds. Over the off-season negotiate with a distributor to sponsor this application with a donation for product.
  - The access path on the south side of the property is used by Golf Channel, University Ridge Staff, researcher doing projects through West Madison AG Research Station and our staff and is grave disrepair. They challenge will be the find a window of time to repair and possibly update the path. If nothing is done the path will become a mud path.
  - Keeping all users of the Noer engaged in the Covid-19 protocols even after they might be vaccinated.

#### **Challenges for the coming year**

- Staffing remains the major challenge. The 2020 growing season there was budgeted two AREO six-month staff members at 25-30 hours per week, these two positions were never filled. Positions that offer less than 40 hours per week and low pay are major limitation when hiring. The Noer has been managing short staffed since September 2019. The consequences of short staffing are showing in many areas.
- Maintaining Covid-19 protocols until the UW recalls them.
- Keeping key pieces of equipment operational while trying to secure newer equipment through donations.
- Securing fertilizer, fungicide, herbicides and insecticides through donations as the effects of 2020 Covid-19 are seen by the Noer supporters.
  
- Hosting any public event to showcase the research done at the O.J. Noer.
- Working with the Ice Age Trail to maintain the trail through the Noer. Daily management of Ice Age Trail users as the pass through the Noer.

## Peninsular Agricultural Research Station – 2020

### Notable Station Achievements

Data collection continued for the rootstock trials maintained on the Station. There are currently three NC140 cooperative research trial plantings, all replicated at other sites throughout North America. These plantings include the 2014 Apple Rootstock, 2015 Organic Apple Rootstock, and 2017 High Density Tart Cherry. The halfway summary for the 2014 Apple Rootstock study is currently in process. A complementary study utilizing the same Michigan State University clonal tart cherry rootstocks being tested in the 2017 High Density Tart Cherry trial investigates the impacts of irrigation on tart cherry establishment.

Station PI established connections with various researchers at UW Madison, UW Extension, and College of Menominee Nation to instigate research projects for the upcoming seasons. Additionally, an existing vineyard was removed to prepare the area for planting of a more in demand grape variety, Itasca, that will be used for various research studies.

Insecticide trials evaluating efficacy of selected insecticide control programs for Spotted Wing Drosophila in tart cherry were conducted with a focus on ground-applied insecticides. This invasive insect pest continues to disrupt IPM programs resulting in control failures and crop loss with the potential to economically devastate cherry growing in Wisconsin.

United States Potato Genebank supplied 3996 germplasm units in 2020 to 127 domestic recipients in 35 states and 16 foreign recipients in 12 countries. These went to support efforts in breeding, genetics, home gardeners, pathology, physiology, entomology, taxonomy, and education.

### Outreach/Instruction Activities

- Provided Station tour for Brown and Kewaunee County Extension Committee (7 participants).
- Hosted informal grower meeting (5 participants).
- Hosted grower meeting with state representative (6 participants).
- Organized *Virtual Annual Cherry Grower Association Meeting* for commercial producers (11 participants).
- Provided 20 weekly seasonal PARS webpage *Commercial Fruit Pest Updates* for apple & cherry producers.
- Coordinated a commercial apple and cherry scouting program covering 220 cherry & 210 apple acres (five producers) and delivered over 100 seasonal pest reports.

## **Research Activity**

- 3 Tart cherry: 1 PARS, 1 PARS/Horticulture, 1 Entomology
- 2 Apple: 2 PARS/ Horticulture
- 1 Small grain: 1 Agronomy

## **Change**

The Station will be hiring a new Facilities Manager in March of 2021.

## **Station Goals for the Coming Year**

- Collaborate with researchers, extension agents, and producers to expand the research portfolio of the Station in a way that benefits agriculture throughout the county.
- Expand the amount of research focused on agronomic crops and sustainable production.
- Expand the fruit pathology research being done on the Station in conjunction with the new Plant Pathology faculty member.
- Continue efforts with Entomology faculty in efficacy testing of economically viable pest management strategies to control Spotted Wing Drosophila. We will also provide graduate student research project support and industry outreach efforts related to this pest.
- Encourage and support small and perennial grain research conducted by Agronomy faculty.
- Eliminate plantings that are no longer relevant to research based on production strategies and replace them with plantings that can benefit future research.
- Conduct more outreach and Station tours for the local community once COVID19 restrictions are lifted.

## **Areas of Concern and Challenges**

The retirement of our Facilities Manager this year was a big loss and led to a general understaffing of the Station. With the replacement of this position this spring, our primary challenge will be educating that person on the wide variety of tasks that are their responsibility. Currently our Horticultural Technician has been filling many of the roles our Facilities Manager did formerly, meaning that an additional concern will be the transfer of responsibilities when the new team member is hired. Additionally, if we are unable to find a qualified person, the continuation of the Station in its current understaffed state limits us to maintaining existing projects rather than expanding our research and output in the ways we would like.

Additionally, we are still dealing with the loss of our County Agent last year. Our County Agent not only acted as our primary contact with the Master Gardeners and homeowner questions, responsibilities that now fall largely on the Station, but also conducted and facilitated a wide variety of research on the Station in everything from fruits to cover crops to pollinators

## Rhineland Agricultural Research Station (RARS) 2020 Station Report

**Full-time Staff:** Becky Eddy-Program Manager, Scott Woodford-Ag Project Supervisor, Sam Eddy-AREO-Obj, Kimberly Goodin-Office Manager/Research Gardener, Alexandria Zacharias & Emily Zeddies-Research Gardener

**Seasonal Staff:** Rick Zarm, Matthew Langheim & Michael Janz-AREO-Entry, Emma Roberts-Research Gardener, Jaden Olski-Certified Crop Advisor (CCA) Intern

*Awarded FY20 Hatch internship however we were unable to fulfill due to the pandemic*

### Notable Achievements

1. The UW potato breeding program is at the forefront of using uncrewed aerial systems (i.e., drones) to improve the efficiency of potato breeding. The following 2020 publication from the Endelman Lab describes new software for researchers, using data from the potato breeding program:

Matias FI, Caraza-Harter MV, Endelman JB (2020) FIELDimageR: An R package to analyze orthomosaic images from agricultural field trials. *Plant Phenome Journal* 3:e20005.  
doi:10.1002/ppj2.20005

2. One of the populations developed at RARS (W16215) was used to identify the gene responsible for late blight resistance in the potato variety 'Payette Russet'. This discovery creates new opportunities for molecular breeding.

Karki HS, Halterman DA, Endelman JB (in press) Characterization of a late blight resistance gene homologous to R2 in potato variety Payette Russet. *American Journal of Potato Research* (<https://doi.org/10.1101/2020.09.27.315812>)

3. Two new potato varieties, which were originally developed at RARS, were accepted as new inventions by WARF based on interest from commercial partners: W8822-1 (P200213US01) and W10209-2R (P200214US01).

4. Due to sustained interest from the WI potato industry in the recent release W9433-1rus, which was originally developed at RARS, this variety was named 'Lakeview Russet' by the WPVGA/UW SpudPro committee in November 2020.

5. Based on its commercial potential for the fresh market, the potato variety W13103-2Y, which was originally developed at RARS, was accepted for foundation seed production by the WPVGA/UW SpudPro committee in November 2020.

6. Completed the new access road and sanitation area. In collaboration with phytoremediation researchers of the USDA Forest Service, Northern Research Station (USDA FS NRS) designed and implemented strategically-placed phytoremediation plantings to target the overland and subsurface flow of sanitation runoff.

7. Bee & Butterfly Habitat Fund: Seed A Legacy grant recipient. Received 8.4 acres of pollinator seed to establish on acreage taken out of potato production, supporting our mission to be committed to environmental stewardship.



8. Delivered 500 cwt of potatoes to the Department of Corrections, generating \$5,087 in revenue.
9. The Station received in-kind donations totaling \$13,811 in the form of labor, equipment, product, and materials.
10. Completed a timber sale that generated \$9,433 in revenue and created an area to establish the phytoremediation biomass planting.
11. All research objectives were met despite the challenges posed by the COVID-19 pandemic.

### **Outreach/Instruction Activities**

1. All RARS scheduled outreach events were cancelled due to COVID-19.
2. Updated the RARS website and recently created a Facebook page.

### **Change**

1. Completed a new station access road to limit on-station traffic and developed a station-wide sanitation policy. In collaboration with USDA FS NRS implemented a phytoremediation research project in the areas where rinsate runoff will occur. We embrace collaborations that are environmentally sustainable.
2. Drastic measures to purge PSTVd pathogen from potato breeding material in 2018 left the program with no FY2 potato crop.
3. In 2020, we hand planted all potato breeding plots except FY1. By creating precise field plot grid patterns, the drone could be used to capture spectral data. The objective is to combine canopy reflectance data with genomic markers to develop yield prediction models.
3. To minimize the destruction of research material by deer (which occurred in 2019), purchased and erected 3,000 linear ft of 8' reinforced fencing around our advanced breeding lines.
4. Updated our South field pivot with a new electrical line, variable frequency drive (VFD), and flowmeter. This improvement will significantly reduce electrical and water consumption. We continue to strive towards permanent stewardship advancement through the entire operation.

### **Research**

1. Bioenergy – 3 PIs

The Great Lakes Bioenergy Research Center has a field study at RARS to evaluate how spatial and temporal variability influence biomass quality in dedicated bioenergy crops. RARS is one of six sites located on a latitudinal transect across the Great Lakes Region of Wisconsin and Michigan. Soil spatial variability is a well-known factor influencing both ecological and agronomic processes and, together with temporal variability associated mostly with climate, appears responsible for most of the environmental variability that affects plant growth, hence feedstock composition and the potential development of hydrolysate inhibitors. The research evaluates field-scale variability, both naturally occurring and imposed by management, to quantify the influences of abiotic plant stress on hydrolysate composition, microbial chemogenomic responses, and specialty biofuel synthesis.

## 2. Phytoremediation – 2 PIs

With RARS collaborators, phytoremediation researchers of the USDA FS NRS designed and implemented strategically-placed phytoremediation plantings to target the overland and subsurface flow of sanitation rinsate. Three tree plantings were established that together comprise the Northwoods Phytoremediation Demonstration and Education Center: 1) a biomass demonstration planting consisting of *Populus* and *Salix* hybrids; 2) a rain garden collection basin consisting of native plants and *Salix* hybrids; 3) an agroforestry forest buffer strip consisting of hybrid *Populus* and *Salix* species interplanted with nitrogen-fixing cover crops for weed management and soil rehabilitation.

### Station Goals

1. Efficaciously complete RARS mission supporting existing research and facilitating new research.
2. Increase awareness of RARS and its role in potato variety development and the WI Potato Industry.
3. Continue to enhance RARS sanitation and testing protocols to mitigate devastating pathogens.
4. Continue to ensure RARS remains a safe working environment, improving on-site safety programs.
5. Continue to build collaborations, welcome requests for outreach/teaching opportunities.
6. Continue to work on determining opportunities for improving efficiency and lessen inputs while remaining within our budget. RARS is in need of mechanization for laborious tasks (e.g. pot washing, pot filling operations).
7. Continue to build on-farm sustainability for long-term success.
8. Utilize our website, social media, and events to increase awareness of Station activities.

### Challenges

1. Keeping the Station performing at an efficient and successful level while continuing to deal with the challenges of old facilities, and a reduced budget.
2. Requiring all vendors/researchers/visitors to follow updated sanitation protocols.
3. Maintaining program efficiency and staff morale during times of low staffing.
4. Maintaining applied research interest with decreased number of research faculty.

# Spoooner Ag Research Station

## 2020 Report

### 1. Notable station achievements:

The Spooner Ag Research Station (SARS) hosted 22 agronomic or horticulture research trials for 15 different principal investigators. This is a relatively normal number of trials for SARS (despite COVID). Many trials were unchanged in 2020 as SARS staff do much of the planting, management, data collection and harvesting. Eight of the trials were variety testing for the corn grain, corn silage, soybean, oats, and barley variety testing or development programs. Variety trial results are disseminated statewide through UWEX publications, internet sites and two state farm newspapers. Varieties were also tested in switchgrass and miscanthus for winter survival up north and potential biofuel production. Soil fertility trials were conducted in irrigated corn, boron products/rates on alfalfa and corn after cover crops. Three fields are maintained for organic crop research. The Seed 2 Kitchen vegetable trials, organic soybean production demonstration and fall planting of winter wheat varieties were projects on the organically managed fields.

A major project each year at the Spooner Ag Research Station was the Julie Dawson “Seed to Kitchen” organic vegetable variety trial. A new High Tunnel Greenhouse was purchased and erected by station staff in late April/Early May. This Greenhouse replaced a High Tunnel that collapsed and destroyed from snow load on December 1, 2019. The cost was mainly covered by UW Risk Management and with station staff assembling the greenhouse, I asked (and Risk Management) approved coverage of some of the staff labor costs.

Due to COVID, the hiring of summer TE’s was limited to 1 TE so the size of the trial was scaled back on some vegetables. There still was a large tomato trial that was part of a graduate student project, squash trials, organic potato seedstock production and a carrot variety trial. A notable side benefit of this project is the positive publicity gained from donating produce to area food pantries and non-profit agencies. Separate from the vegetable trial is the demonstration garden in conjunction with area Master Gardeners and UWEX. With social distancing and working individually, a part-time intern and the Master Gardeners still maintained a beautiful demonstration garden this summer, but no field events were held. There were some individual visitors who could do self-guided tours of the garden.

### 2. Outreach/instruction activities:

SARS usually hosts many groups and individual visitors for station activities or UW-Extension Ag Agent meetings but due to COVID these activities were cancelled. The UW-Extension Ag Agent and the

Master Gardeners initiated several ZOOM meetings on horticultural topics that featured the Spooner Ag Research Station Demonstration Garden and trials on the station. Grape Pruning, Apple Tree Grafting, Kids in the Garden, Composting, Container Gardening, Native Plants, Meet Me in the Garden and even the Twilight Garden Tour were transformed into ZOOM offerings.

In early September, the Spooner Ag Research Station was featured in the Campus Badger Talks Live series. This involved working with the Badger Talks Live staff to put together videos about the Spooner Ag Research Station and the Agronomic Crop research conducted here. Also the UW-Extension Ag Agent highlighted the demonstration garden and the Extension presence here. The day of airing "Live" was a combination of station videos with live comments, questions, and answers with public participants. The link to the presentation is:

[https://www.youtube.com/watch?v=M2u4mDUQ\\_o0](https://www.youtube.com/watch?v=M2u4mDUQ_o0)

### **3. Research Activity:**

Joe Lauer, Agronomy, Wisconsin Corn Grain Variety Trial (Dryland, Silt Loam & Irrigated)

Joe Lauer, Agronomy, Wisconsin Corn Silage Variety Trial (Silt Loam & Irrigated)

Shawn Conley, Agronomy, Wisconsin Soybean Variety Evaluation (Silt Loam & Irrigated)

Lucia Gutierrez, Agronomy, Oats and Barley Variety Breeding Line Trial

Lucia Gutierrez, Agronomy, Organic Winter Wheat Variety Breeding Line Trial

Valentin Picasso, Agronomy, Evaluation of Intermediate Wheatgrass for Northern Wisconsin

Erin Silva, Plant Pathology, Organic Soybean Demonstration into Winter Rye

University of Illinois grad student Winter Rye Phenology project cooperation for Erin Silva Organic Soybeans Project

Carrie Laboski, Soil Science, Irrigated Corn Nitrogen Rate Verification Trial

Carrie Laboski, Soil Science, Corn Grain and Silage Yield Response to pH Level (pH plot area)

Mike Casler, USDA Dairy Forage, 2019 Switchgrass Hardiness Evaluation

University of Illinois multistate Miscanthus Variety Hardiness Evaluation

Julie Dawson, Horticulture, Seed to Kitchen Vegetable Variety Trials

Yoana Newman, UW-EX Forage Specialist UW-River Falls, Boron Product and Rate Effect on Alfalfa Yield

Kevin Schoessow, UW-EX Ag Agent & Area Master Gardeners, All America Display Garden

Jason Fischbach, Ashland/Bayfield UW-EX, Willow and Poplar Replant Demo

Jason Fischbach, Ashland/Bayfield UW-EX, Hazelnut Production Trial

Kevin Schoessow, UW-EX Ag Agent, Garden Demo of Wine Grapes

Farmer Led Council, Soil Quality and Cover Crops research area with Inter-seeding Cover Crops for their Effects on Corn Grain Yield

SARS Demonstration, Corn Grain and Silage Yield with Kura Clover Living Mulch

#### **4. Changes:**

- COVID, COVID, COVID affected interaction with researchers, staff, field days and the general public
- The Station Program Assistant mainly worked remotely and is also covering Program Assistant needs for the Lancaster Ag Research Station due to the retirement of their Program Assistant. She does visit the office for a couple hours each week to get invoices, payments, and needed mail.
- UW-Extension Agriculture Agent worked remotely too so it is just myself in the office (when I am not out in the field or checking on facilities) but nobody is really coming to the station during COVID either.
- A new High Tunnel Greenhouse was purchased and erected by station staff in late April/Early May. This Greenhouse replaced a High Tunnel that collapsed from snow load in December of 2019.
- The local CASE Equipment dealer did not supply a tractor or combine for SARS in 2020. SARS has adequate tractors from prior to the CASE program but was in need of combining for close to 200 acres. We found and purchased a reasonable priced older model combine that should be good enough to cover our needs for many years.
- Continued removal the hybrid poplar area to increase row crop acres.

#### **5. Station goals for the coming year**

- Hopefully COVID changes and restrictions are less in 2021.
- Increase number of agronomic research trials.
- Explore different crops and cropping systems to reduce costs or increase income
- Utilize more acres of reduced tillage and/or no-till row crop production

#### **6. Areas of concern and challenges**

- Guessing what is next after COVID!

## 2020 West Madison ARS Annual Report

In 2020, the Agricultural Research Stations (ARS) were able to remain open and functional during the coronavirus pandemic. At West Madison ARS, COVID-19 reduced research activity by about 1/3 and conference room rental was practically nil after mid-March this year. However, the weather conditions allowed for timely cropping operations for achieving good yields. We also saw an increase in compost demand. Unfortunately, the Dairy Cattle Center was closed for the summer so manure and feed services were halted, and composting operations for generating new compost were disrupted. Close cooperation continues among WMARS, OJ Noer, AARS and Walnut St. Greenhouses. Campus livestock needs were met pre and post COVID.

### 1. Notable station achievements

A 20' x 30' concrete pad was poured in the hay shed for pallet shelving for horticultural storage and agronomic threshing space. LED lighting upgrades were made to the Hort/Genetics shed. A 20' x 12' heavy duty barn curtain was installed on the northwest side pack shed lean-to to provide extra protection for researchers while washing produce. Also for Horticulture, a heavy-duty raspberry trellis was installed. Another seed dryer unit for Agronomy Dept. was obtained from Corteva, installed on a concrete pad, and hooked up to natural gas (electrical connection to be completed in 2021). New equipment acquisitions such as the Landoll vertical tillage implement and a cabbed Kubota utility tractor with front-mount snow blower, and mutually-beneficial partnerships with Ritchie Implement (Barneveld) and Sloan Implement (Mt. Horeb) increased operational efficiency. Also upgrades to the high capacity well with a new motor last year and a new variable frequency drive this year have improved its energy efficiency and reliability. We also began troubleshooting the floating concrete heaving issues that can block walk-in doors from opening during winter.

### 2. Outreach Instruction/Activities

Though all UW field days and tours were canceled due to COVID-19, WMARS still accomplished outreach to the community safely. We established/maintained/displayed over 5,000 bedding plants and maintained thousands of perennials in the display gardens. We estimate that visitors/passersby that stopped to stroll through the gardens was over 3,000 people enjoying the beauty during a self-guided tour, while getting fresh air and exercise. Six Master Gardener Volunteers were able to contribute time to meet their 30-hr annual accreditation requirement. We hosted an outdoor 2-day agro-ecology event for a group of ~25 prospective students in late August. The Wisconsin Peony Society (WPS) and the Wisconsin Daylily Society added new cultivars to their nursery space. The WPS also used our parking lot for curbside pickup of plants sold on their online auction. The Wisconsin Hardy Plant Society also used our parking lot for their annual sale of plants. The Commercial Flower Growers of Wisconsin compiled and disseminated a video from photographs taken of our garden plots. Our website and facebook page were also updated with garden summaries and pictures. As part of historical research at UW, N-fixing corn, first grown here at WM in 2019 and continued in 2020 was covered by *Radio Canada* in an episode for the show called "la semaine verte" using drone footage over the plot; then *Grow* magazine highlighted the N-fixing corn project as the feature article in the Fall issue. We also distributed the station's factsheet to 13 FFA state officers and 90 sheets were taken from the information box at the entrance of the garden. Another 515 folks used the station's conference room (pre-COVID) and outdoor space for tours and instruction.

### 3. Research Activities

We managed 69 acres (2/3s the norm) for plant research with 30 PIs with 54 field projects. Among plant research, perennial fruit research plots focused on local grape production with 100 replacement

vines added, as well as maintaining a plot for raspberry work evaluating mulch to suppress spotted wing drosophila continued. Other perennial research included hazelnuts (420 plants put in to date) that have been established by BSE and Bayfield Co. Extension to assess genetic potential and productivity. BSE faculty, Bohnhoff and Sanford worked on rehabilitating and using two over-the-row mechanical harvesters (a blueberry picker and an olive picker) that the station's crew delivered to their on-farm research sites. Kernza (perennial wheat grass) is established in two fields and seed collected from here will provide material for future research. We also maintained pollinator habitat (perennial buffers, alfalfa, gardens) for ongonig leafcutter, bumble and honey bee research for Entomology and USDA researchers. The 30 acres of certified organic land continues to have intensive land use for research, and contains 'veggies under plastic', i.e. hoopouses, and includes matching land rested in cover crops each season as well as small grains, corn, potatoes, and alfalfa. A third hoopouse was constructed and the original unit was rebuilt and relocated for organic horticultural research. For teaching support, we cleaned/provided large farm equipment for BSE classes on campus. Two peer-reviewed articles were published on grapes acknowledging WMARS staff.

#### **4. Change**

Nick Ganser, senior equipment operator, retired. Two equipment operators were hired as fluctuating FTE. Our office manager also reduced her appointment. Regarding technology, it was tricky to learn how to best function given the telecommuting directive for many UW employees during COVID-19. Several virtual platforms had to be learned to conduct meetings or just to stay in touch.

#### **5. Goals for the coming year**

1) Continue station user-orientation 2x for improved communication/expectations among researchers and WM staff; 2) work on budget management with WISER/QB; 3) Maintain sanitation protocols that were adopted due to coronavirus; 4) Adapt to personnel changes.

#### **6. Areas of concern and challenges**

Well water is above 10 ppm threshold for safe drinking forcing us to provide alternative drinking water. Tapping into the city water line was bid at \$80K so prohibitively expensive for our budget. Also with regard to water, we have very low water pressure from our domestic well which impedes tank filling and irrigating. The latter would require resizing the pump and water lines.

Providing resources for maintenance of gravel roads, buildings/structures and facilities is difficult (i.e. Chemical Management Facility (CMF), the Dryer Facility, BSE/Genetics/Hort/ Agronomy shed included general heating, walk-in coolers, biomass dryers). The furnace in the CMF needs to be replaced as soon as possible and overhead doors are being replaced one at a time as they fail. It is unclear how to create a model that is fair to all users and most researchers do not have flexible funding for such FPM costs. Additionally, the repair of washed out/eroded gravel roads is a continuous budget drain from very intensive rainfall events that seem to be more and more frequent the past 5 yrs.