

Agricultural Research Stations
Annual Report
Calendar Year 2021
M. Peters, ARS Director

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Directors Summary

The COVID19 pandemic continued to be an external pressure on our Agricultural Research Stations in 2021. However, the stations demonstrated resilience and returned operations to normal whenever possible. Field research, teaching/tour opportunities, overnight lodging, teams of researchers' boots on the ground, and student intern learning made their return in 2021. As restrictions lifted it was heartening to see our Research Stations do what they do best and embody the Wisconsin Idea.

The stations remain a vibrant tool in the CALS Research Portfolio. The tables included in this report show the value the ARS network brings to our College and University. Included behind this Directors Summary are 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:

- Many of the stations are creatively dealing with land demands and having the correct land to meet new and dynamic research work. The Stations 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.
- A natural "rollover" of many long term key employees is occurring in ARS through retirement. Stations are managing the institutional memory that is lost with these key employees departing, while embracing the fresh eyes that newer employees are bringing to our teams. At times finding qualified applicants can be a challenge.
- Stations recognize the importance of having certified organic acreage available for research, and are looking to grow their portfolios in this area. Stations continue to identify acreage that is low productivity or not needed for research work, and continues placing 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 2022 and beyond.
- The stations that house animals are exemplary in their mission. By all measures, they exceed expectations of animal care and external accreditation groups have commended them for these efforts.

General ARS Challenges

- The pandemic has created real supply chain pressures that impact our ability to deliver research outcomes at a value. Most notable of these pressures is the evolving “Big Red” equipment loaner program. Strategic reinvestment in equipment owned by the stations will be a focus during the next biennium.
- While not a large impact in the last two growing seasons, 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. Data science and data management remain focus of discussions with CALS IT leadership and they are proving to be a critical partner as we face the rural connectivity challenge.
- Lack of a robust mechanism that allows for quickly resolving real facility issues continues to frustrate ARS and our faculty partners. Risking invaluable research while navigating administrative burdens established by campus and state norms only makes projects more expensive and stressful.

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.

Research Projects and PI's using Ag Research Stations
Cropping Year 2021
Compiled by Jane Cahoon
March 28, 2022

Station	Field Crop Research	Fruit Crop Research	Storage Research	Animal Research	Natural Resources/ Turfgrass	Campus PI's	Total PI's
ARLINGTON	275			65		69	70
HANCOCK	136		24		2	55	65
USDFRC	8			11		4	25
KEMP					33	9	29
LANCASTER	45			3	2	3	18
MARSHFIELD	55			22		22	29
OJ NOER					27	3	30
PENINSULAR	8	4				4	7
RHINELANDER	3					2	6
SPOONER	10	2			1	10	13
WEST MADISON	54	6		9		9	45
GREENHOUSES	340	36			84	27	30
TOTALS	934	44	24	107	149	217	367

2021 TOURS/SEMINARS ON AG RESEARCH STATIONS

Compiled by Jane Cahoon

March 28, 2022

<u>Station</u>	<u>Field Days</u>	<u>Tours</u>	<u>Instruction</u>	<u>Seminars/ Meetings</u>	<u># of People attending</u>
ARLINGTON	2	4	5	18	998
HANCOCK	4	8	3	37	600
USDFRC		5			25
KEMP	4	0	7	13	2398
LANCASTER	1	4			60
MARSHFIELD	2	15	11	31	1175
OJ NOER	1	8	5	2	293
PENINSULAR	2	3	1	2	480
RHINELANDER		4	1	4	390
SPOONER	2	4	5	5	390
WEST MADISON	3	8	7	15	4239
GREENHOUSES		12	72	2	500
TOTALS	21	75	117	129	11548

Arlington Agricultural Research Station 2021 Annual Report

1. Notable station achievements:

Operations returned to near-normal through the growing season as covid case numbers fell, vaccines became available, and restrictions were loosened. We were allowed to hire students, which greatly helped balance the workload. The CALS internship program was restarted, and we had three outstanding interns. The biggest achievement for them was evaluating soybean stands after the Memorial Day frost. They discovered areas of fields that required replanting due to frost, dry soil, or poor planter performance.

Neither a cool spring, late May frost, record dryness, tar spot, nor anything else seemed to deter crop growth. The station had record corn and soybean yields and production despite having the lowest precipitation since the National Weather Service records began in 1962 and being in a “moderate drought” all year. The phrase “Plant in dust and the bins will bust.” really came true. Corn grain averaged 197 bu/A, corn silage 23.5 tn/A, soybean 64 bu/A and wheat 98 bu/A. However, alfalfa yield did falter in late summer as subsoil moisture reserves were depleted.

The Wisconsin Foundations Seeds transition from the Agronomy Department to the station is going well. Mark Kendall is serving as WFS Director and leading this effort. We have learned how to operate the complex seed cleaning equipment and continue to make equipment improvements to make cleaning, transfer, and bagging of seed more efficient and ergonomic. WFS provided data collection services, seed cleaning and bagging, seed storage, and grain drying to WMARS, three PIs, and two area businesses. AARS has saved money by cleaning and bagging rye seed to use for cover crops. We also use the WFS gooseneck trailer to supply bagged shavings to the Campus Dairy Cattle Center. This allows us to order in bulk at a reduced cost, store at the station, and transport to campus as needed.

2. Outreach/instruction activities:

Over 900 in-person Station visitors.

2021 Arlington ARS Tours, Field Days, Seminars, Courses			
Month	Group Name	Event	Participants
6/24/2021	Grassland 2.0	Grassland 2.0 Summer Meeting	70
6/25/2021	Pest Management	Pest Management meeting	25
7/1/2021	Weed Science/Organics	Wisconsin Cover Crops Field Plot Tour	50
7/1/2021	Agronomy	Wisconsin Small Grains Field Plot Tour	80
8/7/2021	Samoyed Association	Samoyed Association picnic	30
8/25/2021	Crops & Soils Field Day	Crops & Soils Field Day	144
8/26/2021	Organic Field Day	Organic Field Day	40
8/29/2021	Sheep Program	Virtual Badger Production Sale	60
9/15/2021	Wisconsin Soybean Program	Fall Board Meeting	40
11/3/2021	Professional Dairy Producers	Herdsperson Workshop	100
11/16/2021	AgrAbility	Advisory Council Meeting	30
11/19/2021	UW RARC	Covid virus and vaccine Informational	30
12/2/2021	Animal Sci 101	Class at Sheep Unit	95
12/9/2021	Sheep Program	Shearing School	24
12/10/2021	WI Farriers Assoc.	Horseshoeing Clinic	30

3. Research Activity:

275 Crop-related research projects with 44 PIs supported
65 IACUC approved animal research projects with 26 PIs supported
The feed mill also provides feed for trials on campus and Vet Medicine.

4. Change:

The station leased and ultimately purchased a self-propelled high clearance sprayer in 2021. With this acquisition, our crop protection program will deliver more on time applications in a more efficient manner with one operator performing the work that required two employees with two machines in the past. The high clearance machine will also allow the station to make applications in full grown corn as opposed to being limited to 30-inch-tall corn in the past. This is critical as the fungal disease tar spot is becoming more prevalent and corn needs to be treated after tasseling. The wider boom width will result in less tire damage to crops like wheat and alfalfa.

5. Station goals for the coming year

The UW will be acquiring a 70-acre land parcel adjoining the station. This is possible because of a generous gift from an anonymous donor to support organic research. Station staff will be working to include these fields into our current crop plan and begin the process to identify and transition future organic research areas. Our goal is to increase the current 84-acre organic footprint to over 150 acres. There will also be investments needed to equipment that supports organic research as we are using much of the same equipment as when the organic program started 18 years ago with 38 acres.

6. Areas of concern and challenges

The pandemic has brought global supply chain issues and inflation and we are being affected like everyone else. We were mostly able to find what we needed and get by in 2021, but 2022 will be much more challenging. Crop protection products and diesel fuel are more expensive. Fertilizer prices have more than doubled and availability could be problematic. Purchased feed ingredients have also increased in price with the cost being passed on to the units. Most concerning is a tractor and equipment shortage. We were informed in late December that tractors leased through the Case Big Red program will not be built this year. Tractors from the John Deere program are also limited. We are looking into short term leases through other vendors, but supply is very limited through the entire industry and there will be a high cost that is not in our budget. It is also becoming more difficult to find repair parts in a timely manner. We have started ordering ahead on commonly used parts to ensure we have them on hand when needed. Indications are that these supply chain issues will continue into 2023.

US Dairy Forage Research Center 2021 Annual Report

Leading the world in integrated dairy forage systems research

Number of Research Projects:

During 2021 we supported 4 USDA primary researchers, 4 UW researchers on farm and various collaborating scientist, post docs and graduate students from within both institutions. These scientist/researchers performed 11 dairy research trials in nutrition and reproduction supporting the DFRC vision. These trials utilized an average of 99 cows per month (range 42 -153). We continue to use the Jersey herd in trials comparing them to the Holstein cows. In addition, a UW researcher conducted a 5-month study involving an average of 23 heifers in a heat synchronization trial over the summer. We also started collecting data and colostrum samples for a trial collaborating with the University of New Hampshire analyzing colostrum production in Jersey cows. This is an increase of 5 trials over 2020 and included at least 2 new researchers from UW. 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.

Outreach:

Visiting groups in 2021 were less than 2020 due to stricter COVID guidelines. We had no schools or other tour groups over the year. RARC trainers visited training various research techs for UW and USDA. A small group of employees was able to attend the PDPW annual conference and trade show in Wisconsin Dells. They came back with some ideas on improving the working environment through relationship management.

Challenges:

LABOR – we continue to struggle getting full-time employees for the PM position. We have a trio of high school boys, all friends, that have been extremely helpful in filling the schedule on weekends and some evenings. Our long-term employees continue to get stuff done with what we have for help.

The bulk tank somatic cell count was a big struggle for most of 2021. Averaging 207,000 for the year. This did drop considerably the last couple months of 2021 into the low 170s.

Opportunities:

Reducing feed waste is still our biggest opportunity to improve performance. We have materials on hand to fix rough areas where bouncing equipment increase losses. A second area where we can improve our bottom line is reducing the number of heifers we raise but end up selling due to lack of room. We will be increasing the use of beef semen to produce a more valuable calf at birth and reduce the number of heifers entering our raising program.

Accomplishments and Goals:

- Pounds of milk sold is always a SMART goal for the year. We did sell 50,000 pounds less milk than 2020 (10,907,096 vs 10,961,372) but increase the pounds of combined fat and protein per cow by almost 0.2 pounds (6.2 vs 6.04). The area we need to concentrate on to improve this in 2022 is transition cows.
- Our preg rate ended the year at 32% and increase from 2020's 29%.
- We saw mastitis cases for the year drop by 60 after 2020's increase. The BTSCC for the year was higher than 2020 at 207,000 average. Our goal for 2022 is to get it back to the 150k range.

2021 Average	207
2020 Average	175
2019 Average	150
2018 Average	247
2017 Average	251
2016 Average	315

- Herd health was a big bright spot in 2021. As mentioned, total cases of mastitis down 60 cases (17%). Twisted stomachs and milk fever we both down another percentage point from last year's numbers (2.3% LDA and 4.4% MF). Calf scours dropped from 56% of calves being treated to 37% for the year with November and December below 10% on about 40 more heifer calves.
- I do not track employee turnover, but I do know the employees we do have are the most cohesive, high performing team we have had at DFRC in the years that I have been here. We have seen a few of the longest-term employees step up to their potential and become leaders instead of instigators.

Research Activity:

The USDA "Grand Challenge" mentioned in this section for 2020's report 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. Repro trials being conducted by UW researchers are looking for ways to get more cow pregnant sooner, what body condition is ideal for this and what farmers can do to improve outcomes.

Future Research:

We have 2 trials continuing into 2022 and one starting in 2022 piggy backing with calves from one of these trials:

- Comparing the milk production of cows on canola meal vs. soybean meal
- The reproductive performance of cows based on body condition at dry off from the previous lactation
- Starting a trial on calves from the above trial, tracking their performance up to and through their first lactation.

CALS ARS Greenhouses 2021 Annual Report

Three facilities:

- Walnut Street Greenhouse
 - 72 glass greenhouses, campus steam heat, 66% air-conditioned, 15,000 ft² bench space
 - 4 growth chambers
 - 52 cold frames
- King Hall (Soil Science)
 - 4 glass greenhouses, campus steam heat, all air-conditioned, 1000 ft² bench space
- West Madison ARS
 - 2 polycarbonate/vinyl dome-roof greenhouses, 44 benches, natural gas forced air heat, evaporative cooling, 4200 ft² bench space

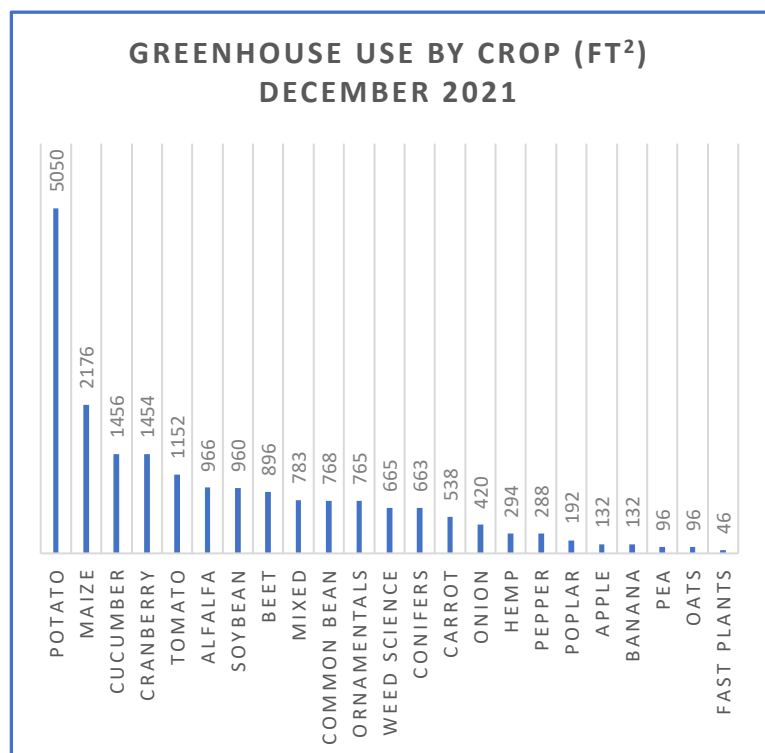


Summary of research activity

- The greenhouses served 43+ principal investigators and their research groups in 2021. These groups are associated with various departments within CALS, L&S, UW Extension and USDA, as well as some external entities.
- Research was conducted on a large variety of vegetable, grain, pulse, fiber, fruit, nut, and ornamental crops.
- There are currently over 120 active greenhouse users.
- Hundreds of experiments are conducted in these facilities each year.

Notable station achievements

- Maintained excellent services and stable operations during transition to a new superintendent, despite a temporary reduction in staff and continued pandemic conditions.



- Began implementing digital recordkeeping and scheduling tools to replace paper systems.
 - Built simple digital tools for transitional operations and recordkeeping while a more long-term solution is developed. Several Excel files were created to track research projects, greenhouse users, space reservations, supply inventories, facility repairs and maintenance, etc.
 - Approached outside vendors as well as CALS IT to explore options for robust station data management solutions.
 - Collaborated with CALS IT on early-stage scoping and development of space reservation, greenhouse user, and pesticide application recordkeeping software applications.
- Worked with CALS IT to upgrade outdated greenhouse staff computers and replace obsolete printers and fax machine with a single networked all-in-one printer/scanner.
- Implemented Walnut Street weekly facility closure during pesticide applications. This greatly decreases chances of greenhouse users experiencing pesticide exposure.
- Upgraded ridge vent control systems in two greenhouses in the older area of Walnut Street.
- Several storage and work areas were cleaned up and reorganized.
- PPE supply at Walnut Street was gone through, disposing of broken and expired PPE, and ensuring adequate supplies of safe and functional equipment.
- All staff passed exams to become certified and licensed commercial greenhouse pesticide applicators, or to renew past certifications and licenses.
- All staff trained in CPR and AED use by UWPD.
- Conducted experiments related to algae control and algaecide phytotoxicity.
- Upgraded office and breakroom seating at no cost.



Outreach and instruction activities

- Administered greenhouse orientation and WPS training to new and returning greenhouse users, and CALS at large.

Of special note: our Horticultural Technician provided WPS training across the entirety of CALS via Zoom since in-person sessions were not possible due to the pandemic. She delivered WPS training to over 130 people during this time.
- Provided tours and interviews to prospective and current students seeking educational and career advice in the protected plant culture industry.
- Furnished hands-on greenhouse learning and work experience to six undergraduate student volunteers from the fall semester Horticulture 120 class.
- Greenhouse superintendent was a panelist for Horticulture 120 career advice discussion.
- Coordinated with other campus plant care experts to conduct tours and discussions at Walnut Street, West Madison, King Hall, Leopold Hall GreenHouse, DC Smith, Eagle Heights, Birge Hall, WCIC and Exact Sciences.

Key changes

- Longtime superintendent Lynn Hummel retired in May 2021.
- Ben Erdman joined as superintendent in July 2021.
- Began shifting away from legacy paper recordkeeping systems in favor of digital tools.



Challenges and areas of concern

Ongoing:

- Insufficient amount of space to meet research demands. Some requests for research space were not accommodated in 2021 due to lack of space during peak demand time frames.
- Greenhouse facilities are aging. The environmental control systems in many greenhouses are generally inadequate for modern research needs, and some spare parts are either difficult to obtain or unavailable. Lighting systems are mostly comprised of high-pressure sodium and metal halide lamps, both of which are rapidly becoming obsolete, with spare parts increasingly difficult and costly to obtain. Even in newer areas of the greenhouses, equipment is starting to require more frequent and costly repairs. Overall, greenhouse systems and facilities are not as current, dependable, and functional as might be desired in a world-class research facility.

Emerging:

- Increasing demand for growing environments with precise environmental control. The loss of the Biotron has contributed to more frequent requests for highly specific environmental parameters. These precision growing environments are sometimes not achievable due to limitations of current equipment and technology in the greenhouses.
- Pandemic-related supply chain issues. Parts and supplies are becoming more difficult to obtain.
- Current pesticide rinsate disposal practices are questionable. There is a need for evaluation of alternatives. This is being addressed with the assistance of CALS Safety and UW EHS.

Goals for the coming year

- Continue design and implementation of robust greenhouse space assignment, billing, maintenance, inventory, and pesticide application recordkeeping systems.
- Develop system to easily view relevant project information and desired environmental conditions for individual greenhouse spaces.
- Explore alternatives and supplements to chemical pest control.
- Seek opportunities to expand staff knowledge and skills through learning and networking.
- Work with Physical Plant to address issues with aging environmental control equipment.
- Increase efficiency of greenhouse workshop and storage areas.
- Improve automated watering and algae control at West Madison.
- Improve temperature monitoring and alarm systems.

HARS 2021 Annual Station Report

Notable Station Achievements

Field: Under HARS Farm Manager Paul Sytsma's lead, he and HARS AREO David Peterson designed and built a new dirt eliminator for our Gallenberg single-row potato plot harvester that when combined with smaller chains allows us to dig little potatoes with less labor and more precision. With a few adjustments we now have the capability to switch back and forth between harvesting smaller diameter potatoes and regular-sized potatoes utilizing the same piece of equipment without any compromises or the need for another implement; Russ Groves introduced us to a project that entailed us working with Google Research to equip our linear irrigation system in our K fields with specialized Hi-Res cameras. This project is ongoing for 2022 and is designed to have the cameras take photos of the plants every pass through to track crop and pest development throughout the growing season. The ability of these cameras to track the onset and development of these two fluid growing season dynamics are also being ground-truthed against the current industry-standard crop scouting and IPM techniques; we refurbished a mechanical transplanter and used it on potatoes for a small trial with Paul Bethke as the PI; Paul worked with HARS spray coupe operator Doug Klabunde and rebuilt our ancient plot sprayer to improve reliability and ease of use; I would be remiss if I didn't mention that Paul Sytsma (Farm Manager), Amber Walker (SRF Manager) and Tiffany Buchholz (Research Gardener) have all stepped up after Felix's departure and have been acting in an increased capacity supporting the field plot layout design, oversight of planting/data gathering/harvest/grading of several FFS industry cooperator and Potatoes USA trials that were historically managed by Felix. These trials added substantial income to our station for 2021.

Storage: I am officially in the process of promoting SRF Sr. Research Specialist Amber Walker to Storage Research Facility Manager. Since my transition from SRF manager to superintendent, Amber has done an excellent job in the interim maintaining continuity in the level of service provided to our users of the Storage Research Facility and the programs managed therein and demonstrates her dedication to this new role on a daily basis; executed the "phase two" upgrades to our SRF's "Big Red" Potato piler (updated both electrical drives, replaced sticky lever that controls stinger hopper raising and lowering, installed rubber padding to stinger hopper to keep overflow potatoes from falling off; new anti-slip epoxy resin grease-proof flooring installed in SRF lab (financed by WPVGA SRF maintenance fund); replaced corroded ceiling humidity buster/refrigeration unit housings in all the SRF lockers with plastic ones that resist corrosion (financed by WPVGA SRF maintenance fund); took delivery of new Photovolt instrument (measures/quantifies post-fry French fry quality) in SRF fry lab and have begun vetting it;

Overall Station Improvements: completed installing siding on the two remaining sides of the barn this summer;; the field team completed construction of our second "new style" tour wagon; new textured flake anti-slip epoxy resin floors installed in main office building (all three levels); with Irrigation Lead Jerry Pierce's expertise, an in-ground lawn sprinkling system was installed on the grounds behind the main office and around our outdoor pavilion where we host many of our outdoor outreach activities (typically these turf areas are brown and dried up when we host our annual field day and outside barbeque lunch each year so it will be a tremendous improvement from an aesthetic standpoint; Jerry utilized his connections with irrigation suppliers from his previous job to take advantage of obtaining the materials for this project at close to cost pricing); Tiffany has been reworking many landscape improvements in our horticultural display garden as well as our grounds, including retooling some of the overgrown landscaping around the superintendent's station house and resealing the garden's timber pillars with weatherproof stain. Under my and Paul's oversight, she took the lead and did an excellent job in redesigning/updating the three station signs at the entrances to the station and the garden and worked with now retired field team member Steve Grimmenga in getting them erected.

Outreach/Instruction Activities

HARS Field Day (July); Midwest Food Processors Field Day (July); hosted our annual Garden Show in our horticultural display garden (July); WPVGA Member Development Program (December); we were recipients of the National Weather Service's (NWS) prestigious 100 Year Cooperative Observer Program (Coop) Award where they honored us for being one of the few sites across the nation that have been consistently collecting/reporting local weather data/observations for them over the course of the past 100 years!

Research Activity

Once again, we were pleased with the number of successful research projects we were still able to maintain and help facilitate during yet another 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; in the 2020 growing season we maintained around 150 total projects, and this past 2021 growing season we ended up managing ~136 total projects across 53 different PI's. From the storage end of things, we had 12 PI's carrying out 24 research projects, with two of those collaborators being new to us (a potato variety development company named SunRain based out of Idaho and Greenlight Biosciences, an environmentally friendly RNA-based crop treatment company that Russ Groves has been working with out of Massachusetts). We were also able to transition some of our grower clients back to utilizing our SRF FFS lab YSI and test fry evaluations after their instruments ended up breaking down. Our third-party independent insurance claim verification FFS business observed an uptick in business this year compared to last which is always helpful towards our annual SRF income. Also worth mentioning under this research activity section of the report was Tiffany's oversight of 8 summer students. She did a nice job with balancing and scheduling their support of faculty-led and FFS research trials while still supporting lab functions in the SRF, as well as her existing duties in and around the gardens and grounds.

Change

Other than still experiencing a slight reduction of field and storage projects due to covid, we thankfully didn't identify any major changes or trends, other than crop inputs drastically increasing due to inflation. We have also been experiencing some covid-related supply chain issues in sourcing reagents and consumables for the SRF's QA Lab; While we were worried this time last year about taking a potential hit to our FFS station income upon not having Felix around any longer to lead these trials for our outside industry cooperators, Paul, Amber, Tiffany and myself stepped up our game and have taken a team approach in collectively managing this work with our goal always being to not take on too much of these FFS trials so that they don't detract from the quality level of service our faculty, staff and students have come to expect when conducting their research at the station. These FFS trials provide us with the opportunity to address our station needs in terms of needed equipment and facility updates, thereby affording us to control our own timeline in making improvements to the station and the programs it supports.

Station Goals

Finish updating exterior of historic barn at HARS. We recently received quotes and are going to have a local contractor finish updating the remaining windows and doors still needing to be replaced then the cement foundation needs pressure-washing and new paint as well as garage doors are needing to be scraped and repainted yet. Shaun Fry said to contact him regarding getting the underside of the eaves around the entire perimeter wrapped with aluminum to get this project officially completed; we also obtained 2 quotes to replace the windows in the main office building (windows in the offices only, the rest of the buildings windows have already been updated); we would still like to pave/blacktop the approaches going to the SRF and connect them to our existing pavement in several

areas; we have all of the materials in-house and have begun construction of two more “new style” tour wagons so that our end total will be four by the time our 2022 HARS Field Day in July rolls around; We are still needing to 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; improve Wi-Fi reception in SRF alleyway by installing a repeater to boost signal to extend to far west end; Finalize rollout of the newly acquired Photovolt instrument (still ironing out some wrinkles with it); replace the lightbox in the processing lab (fluorescent bulbs for our current model are no longer available and the manufacturer now only produces models with LED light source bulbs); Amber wants to work with SRF Storage Tech Sam Perez to create an electronic preventative maintenance database for all of the SRF’s potato transfer equipment and two indoor compressors that he has been doing such a good job with maintaining for us; we need to identify potential replacement options for the SRF’s primary air compressor that’s responsible for governing all of the air and water pressure for our bins and lockers. Our existing one is starting to tell us that it’s not long for this world; we are also in need of replacing our electric Drexel forklift. The batteries no longer hold a full charge and the mast leaks a large amount of hydraulic fluid when raised, making it a significant safety risk. It was first purchased as military surplus at the inception of the SRF first opening its doors in 2006 and simply just isn’t worth putting any more money towards; I also plan to purchase two crew cab UTV’s for the station to start phasing out some of our older John Deere gators that have been falling apart and are getting difficult to maintain.

Key Areas of Concern and Challenges

Retirement of key field employees now and in the near future. AREO Steve Grimmenga retired in early spring of 2021, and we hired his replacement (Jamie Marks) soon thereafter. AREO Doug Klabunde announced his pending retirement for spring of 2022 and HARS Research Gardener/Storage Tech Tiffany Buchholz announced that she is planning to leave us in fall of 2022 to pursue starting her own business (she plans to leave us pending her upcoming 5-year WRS vested anniversary date comes up this fall). The spring/planting and harvest windows continue to be a struggle. With my transitioning out of the SRF and Tiffany and Amber having increased roles in field research, it has created an even larger labor gap (especially in the spring). Accountabilities in the lab, such as continued timely sampling of existing storage trials are already difficult to complete after Sam and Tiffany both start to transition back to their field roles each April (equipment operator and gardener/groundskeeper respectively) and support for storage evaluations is needed through the end of June. I feel that we can meet these needs with one more person dedicated to the SRF to help us bridge that gap (i.e., Storage/Field “utility” support technician that can support both storage and field projects depending on where they are needed most. Hiring and retention of qualified permanent employees are always a challenge in central Wisconsin’s Ag Industry, namely because of competition from neighboring larger farms that can always end up paying their employees more than what the UW is able to start them off at.

Kemp Natural Resources Station

2021 Annual Report

1. Notable Station Achievements

- Supported just over 3,900 user-days of diverse station activity and provided 2,490 person-nights of lodging.
- Generated outside donations, including:
 - \$10 thousand donation to implement the Hamilton Roddis Memorial Lecture Series; and
 - \$2 thousand in donations to support general station infrastructure improvements and programming.
- Completed several station improvement projects, including:
 - Painted the Lodge, Kitchen/Dining Hall, and Woodshed as a part of our exterior painting maintenance rotation;
 - Complete inside washdown of ceilings and log walls in the Lodge;
 - Installed the Jyme Lake boardwalk;
 - Installed all new plumbing lines, pressure tank, and water conditioning system in the Kitchen/Dining Hall;
 - Replaced water heater and resolved the chronic iron bacteria problem in the Office water system; and
 - Installed new rain gutters on the Office, Kitchen/Dining Hall, Woodshed, and Shop.

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

- **Outreach**
 - Conducted 2 outreach events as part of the Kemp Summer Outreach Series, which were limited due to COVID-19 restrictions. Both events were held outdoors, including the annual fungi education event with about 60 attendees and an evening talk about hazard trees, attracting about 20 attendees. Hosted 2 external outreach programs organized by UW-Madison and 2 external outreach programs organized by county and state agencies. In total, internal and external outreach activities provided for 689 person-nights of lodging;
 - Co-organized and implemented the ninth year of the *Science on Tap* outreach series. We held 8 virtual events attracting more than 600 people;
 - Continued a monthly radio program called *Field Notes* that airs on local public radio station WXPB. The program is a joint venture of Kemp and Trout Lake research stations, and it has been very well received. The WXPB listening audience is approximately 13,000 people weekly;
 - Organized the 2021 Hamilton Roddis Memorial Lecture presenting as key note speaker: Staying Relevant – How Can the Forest Industry Adapt to Changing Markets?; and
 - Prepared 2 issues of *Kemp's Point*, the semi-annual station newsletter that is distributed to over 900 households.
- **Instruction**
 - Supported 7 field classes involving 4 UW-Madison departments and one UW-System university. Provided 330 person-nights of instructional lodging.

- **Conferences/Workshops**

- Hosted 13 conferences & workshops with overnight lodging and 3 day-use only conferences & meetings;
- Provided 285 person-nights of conference related lodging; and
- Hosted 37 day-use only conference & meeting attendees.

3. Research

- Supported 33 research projects involving 29 principal investigators from 9 UW-Madison academic departments and 11 extramural universities/agencies;
- Provided 1,395 person-nights of research lodging;
- Attracted 7 new researchers to the station; and
- Although our numbers were smaller 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

- COVID-19 limitations on the number of day users and overnight guests continued to restrict revenue generation; however, we were pleased to see the increases from 2020.

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.

2021 Lancaster ARS Annual Report

1. Notable Station Achievements-

Continued normal Lancaster ARS activities and support throughout 2021 and the Covid-19 pandemic. As the pandemic continued, we had to adjust through out the year when different members of our staff needed to quarantine or take time off to care for family members due to Covid-19. We also had a permanent staff member that needed to take an extended time off to deal with another personal situation. This occurred during the summer and our most busy season. Thankfully the rest of our crew all contributed additionally to maintain all essential activities were taken care of and support was maintained for our station users. 2021 was a successful year for Lancaster ARS, but further proved the importance of a flexible employees that are engaged and willing to contribute as needed to ensure the success of their workplace.

Hiring of a new, permanent Office Manager at Lancaster ARS. Since August 2020 when our long-time previous Office Manager retired, we have been operating on an interim basis with assistance from the Spooner ARS Office Manager operating in a remote format. This summer we were able to restart the hiring process and bring on Becky Oglesby as a permanent employee working on site. Even though it may seem like a simple accomplishment, it has created many benefits with having that position on site after operating for 18 months in a remote capacity.

Return to a “more normal” operation and capacities. In 2021 Lancaster ARS was able to start returning to some of our regular activities that had been paused during the Covid-19 pandemic. During the summer we were able to carry out a new breeding project for the beef herd for Dr. Brian Kirkpatrick of the Animal and Dairy Science Department that included new reproductive procedures by staff from Dr. Milo Wiltbank’s lab. Also, we were able to host a pest management field day this fall with several researchers and host a class visit from UW Platteville. These may seem like small things, but after a year with so many limits they were very appreciated and welcomed!

2. Outreach/Instruction Activities-

The second half of 2021 allowed for Lancaster ARS to return to a limited amount of in person outreach and instruction. On September 22 we hosted our first in person field day since the beginning of the pandemic. Several agronomy pest management topics were covered by CALS staff from 3 different departments. About 40 producers and industry professionals attended for the program that included viewing different agronomic plots on the station.

We also hosted a class of 25 students from UW Platteville that were studying different agriculture crops that could be used for biofuels. The class was taught by Dr. Pamela Tas of UW Platteville that has performed a research project at Lancaster ARS on Pennycress varieties to determine their potential as a biofuel source. Her work is part of a regional committee and has been continuing for the last few years. As part of the visit the class also learned about general information and other research projects at Lancaster ARS.

3. Summary of Research Activity –

Agronomic Crop Projects – 40 total projects including areas of corn, soybeans, forages, small grains, cover crops, soil conservation, and fertility. 12 different faculty members from 7 different departments.

Beef Cattle and Grazing Projects – 7 total projects including cow/calf genetics, cow/calf reproduction, nutrition, pasture weed management, and grazing plant species performance. 3 different faculty members from 3 different departments including a researcher from the USDA DFRC.

Key Changes in 2021 –

Managing employees during the evolving Covid-19 pandemic. Ever changing and updating rules and conditions made 2021 another difficult year for employee management. Changing guidelines, risk of being exposed, contracting Covid, etc. left managing our research station crew a complex duty. Not knowing when 1 or more employees might need to have time off made accomplishing tasks on a timely schedule more difficult and stressful. The dedicated Lancaster ARS crew members help minimize problems, but there is always the unknown with what the labor availability will be for each day. The stress is shared by the employees individually as well with not knowing when family members might need care or children need supervision for virtual schooling from home besides their own personal wellbeing and health.

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 continued 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. 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.

4. Goals for the Coming Year –

Reestablish regular Lancaster activities such as field days, class visits, and other public events with added safety as we continue through the Covid-19 pandemic. Last fall started the return of public events, but continued emphasis to resume that part of our mission that has been paused over the last 2 years.

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.

Increase facility and grounds maintenance performed by Lancaster ARS crew to pre-pandemic levels. With limited summer seasonal labor over the past 2 years, we have delayed some maintenance and repair projects for our agricultural buildings and pasture fencing. Our hope is to be

able to hire our normal amount of summer labor to allow us to return replacing pasture fences and other minor building repairs that our crew normally handles on our own. With some aging facilities we try to keep a regular maintenance and improvement schedule. Our labor limitations recently have made it hard to keep up on our normal schedule.

5. 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. For several years we have been trying to get approval to take down and remove these structures. Multiple rounds of inspections and questions have taken place, but with no progress to move forward. Maintenance has been minimal as these structures have been expected to be demolished by now. At some point delayed action will 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 one 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 contoured fields. There is continued increase of agronomic projects looking for larger plot areas that we are not able to accommodate. There are 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 for 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 2021 Annual Report

2021 Notable Station Achievements

- Contributed towards a successful 5th CALS AAALAC accreditation.
- For the first time since 2007, staff at MARS successfully acquired their American Association of Laboratory Animal Science (AALAS) Assistant Laboratory Animal Technician (ALAT) certification. Four MARS ACT staff received certification. This was a result of the course being held online and staff given the ability on worktime to participate in the 15-week course.
- MARS underwent a Farmers Assuring Responsible Management (FARM) Environmental Stewardship (ES) evaluation to establish a baseline use of GHG as a measure of carbon footprint at the farm level. This evaluation is to be repeated, annually.
- The MARS dairy program was awarded a 4th National Dairy Quality Award. NDQA awards producers with the most elite milk quality.
- WiFi roaming infrastructure was upgraded to connect all buildings, pastures, and outlying areas for seamless connectivity and improved speed.
- Upgrades to equipment included the retrofit of the corn planter with precision technology and functionality, and precision equipment to update the research plot drill. Upgrades to some of the equipment were cost-shared with USDA.
- Transitioned agronomic and soil research from the south campus to the north campus.
- Hosted an installation demo of a weather station, as part of MSU's Enviro -Weather Network with other ARS stations.
- Continued to maintain several acres of pastureland (40 ac) and cropland (10 ac) under criteria for organic certification.

Outreach / Instruction Activities

- Following university guidelines for COVID-related restrictions specific to in-person gatherings and events, visitors were coming back to use the station facilities and resources. Twenty-six groups toured the north farm campus, totaling 362 visitors. Two of these groups toured in a virtual capacity. The auditorium at the south hosted 17 groups: approximately 315 people in attendance.
- General station tours comprised 38% of north visitors. About 31% of activities taking place on the north farm fell under the category of instruction.
- Utilized one ARS student intern and one Dairy Science student intern.
- Hosted four classes for the Mid State Technical College Agribusiness and Science Technology Program, specific to the dairy science curriculum.
- Hosted fall pasture walk highlighting the stockpile grazing study in collaboration with Marathon County.
- Hosted late-summer statewide grazing team (G-Team) pasture walk.
- Hosted team of USDA researchers and DFRC staff for field tours and to inform them on how to transition to the practices of no-till and cover crops in their field operations.
- Hosted faculty/planning team from the College of the Menomonee Nation (CMN) for discussion on how the CMN can organize, fund, and build an agricultural field research and demonstration program.

Summary of Research activity

- 55 field research trials covering 86.2 acres with 15 PIs from UW, USDA, and industry – including 3 scientists who have not previously worked at MARS.
- Facilitated the feed efficiency research for a funded DIH collaborative grad student, Kaylee Riesgraf. Kaylee's study is an investigation of the effects of neonatal and pre-weaning stressors on heifer feed efficiency. Included are two nutritional studies at MARS.

- Supported the work for 8 UW Department of Animal and Dairy Science graduate students with their research studies. Support ranged from general assistance, data collection, data management, and troubleshooting technology transfer and cameras.
- Fifteen animal research projects, involving 8 PI's from UW, USDA, and the Marshfield Medical Research Institute.
- Developed three-way partnership with Discovery Farms and Marathon County to install two multi-year water monitoring stations on Marathon County dairy farms.
- Renovated 40 acres of production pasture to increase our capacity to accommodate replicated pasture trials.
- Two short term, high impact Dairy Innovation Hub (DIH) grants were awarded to PI's M. Akins and J. Cavadini. Work taking place at MARS includes exploration of a cocktail forage mix in cow rations and refinement of dairy forage rotations with cool season annual grasses (both in the priority area of stewarding land and water resources).

Key Changes in 2021

- The UW Soils and Forage Analysis Laboratory officially closes (services relocated to the WI State Lab of Hygiene). With this close of a CALS program, MARS has assisted SFAL with exiting their program from the south CALS office building. Continuation of services such as internet availability, weather reporting, groundskeeping, mail reception, etc. will be handled by MARS. Building maintenance and use will be fully managed by MARS.
- Significant acreage at the south campus will change hands. The City of Marshfield is expected to make the purchase of 125 acres in 2022. Agronomic studies have been moved from the south campus to the north farm campus. Land was leased near the north farm to accommodate one soil science study. A new clover nursery was built for H. Riday at the north farm.
- Wayne Coblenz, USDA DFRC Research Leader, retired in December. Wayne was an advocate for farm funding and key to allocating funds for significant upgrades, improvements, and repairs to federal buildings at the MARS/USDA farm site and procurement of equipment. RL leadership has changed. Interim authority has moved to Eric Young, and Dennis Hancock. MARS does not anticipate a disruption in funding.

Goals for the Coming Year

- Acquire a new research trial TMR mixer for research feed efficiency nutrition work.
- Implement baleage in diets with greater success with the purchase of a baleage bale processor. Baleage has become a staple of MARS forage production.
- Repurpose fans, once used at the south campus greenhouse, in the cow barn to improve ventilation in pens 94 and 96.
- Rewrite the Job Hazard Assessment in an editable format for easier reference and updating.
- Install FRP board in milking parlor to eliminate need to paint.
- Work with FPM to construct a permanent repair for damaged and cratered barn posts in the 2004 built UW heifer barn.
- Pursue solar power at MARS north.
- Install last quadrant of textured rubber flooring in the cow barn.
- Repurpose the 60' x 200' manure storage pad (use negated by the reconfiguration of the manure separation system in 2019). Fully cover the concrete pad and add an end wall. This would serve as a machine storage structure and would improve manure storage capacity and the consistency of the manure.

- Seek new land lease options to make up for expected lost production land at MARS south campus – this includes further exploring the possibility of being gifted land if the opportunity arises and developing a plan for how additional land could be best used to improve our program over the long-term.
- MARS is being proactive about preparations to move their physical presence from the south campus to the north. This is to include a move of the spray rinsate building, built at MARS south and unused for the intended purpose, to the north. MARS must determine how to store seed and chemicals at the north as currently no structure exists to suit those storage needs.
- Continue improving wireless data infrastructure to improve data transfer rates, eliminate network collisions, and widen the range of access.

Areas of Concern and Challenges

- Lack of administrative building, including temporary student housing, internal meeting space, and a public meeting space.
- Farm structures, and facilities are in need of repair and replacement. Components such as overhead doors, canvas on hoop structures, degrading wood barn posts, broken concrete, and flaking paint are just a couple examples of repair.
- Wear, tear, and high frequency use of equipment is a main culprit in the need to replace or refurbish key pieces of equipment. Equipment in need of attention include the main Meyer TMR mixer (used 6 hours/day, 7 days/week), H&S slurry manure spreader, Dion forage chopper, and Versa silo bagger.
- Rising labor costs will take a bite out of MARS' budget. Primary sources of income include milk revenue and heifer per diem. Milk revenue fluctuates and is an unpredictable and uncontrollable revenue stream. Heifer numbers are expected to settle to 450. More research means greater labor needs. As MARS is 150 miles from campus, CALS researchers depend on MARS labor for facilitation of trials and collection of data.
- Making fiscally sound decisions to protect profit margins by insuring milk or buying milk futures contracts.
- A shrinking land base with the eventual loss of the south farmland and no guarantee that land will be replaced near the north farm.
- Consider how the eventual (alleged) closing of Stratford ProVision Partners grain facilities may affect MARS long-term and conduct a cost analysis of how building our own small scale grain storage and drying facility may improve the overall efficiency and cost of operation.

2021 O.J. Noer Turfgrass Research Facility Achievement Report

1. Accomplishments

- After 12 years of the irrigation system being destroyed by a research project the repairs and renovation of the irrigation system around the Noer main building have been completed. This was a long time in coming but saved ARS the \$10,000 + dollars estimated of installing a new system.
- The staff at the Noer had a get it done attitude and even though one AERO position was never filled and a severe drought, the staff pulled together to keep the Noer and all the research plots maintained to a very high standard. My highest regards for the Noer ARS Staff!
- Over the Labor Day Weekend, the back flow preventer on the irrigation system failed. The system ran off and on for two days until I discovered the issue Labor Day Morning. Before the repair was done, the water hammer from those two days caused three water main breaks, two 2 ½ inch breaks and 25 other smaller leaks. The repairs were completed in house before the system was winterized in early November.
- One PHD project required a data collection procedure and timing. The change created a
- conflict with the bi-weekly topdressing program that 0.125" bentgrass requires. To facilitate the change, the topdressing on this project was moved to Saturday or Sunday for most of the season.
- The Noer continued to use Work Order system for repairs, project work and irrigation scheduling. The system has been working well. It has allowed ARS to keep a better record on the needs of the P.I.'s.
- As Covid-19 remains an issue the Noer and all its users remained vigilant and followed the UW policy as best as possible. As of this writing there have been no cases of Covid-19 with the users of the Noer.
- The 2020 pandemic magnified the staffing issues at the Noer. I was able to obtain an extra Toro Workman Mid-duty workman. To facilitate moving staff and users around the facility with riding lawn tractors.
- The Forestry Department needed an outdoor lab to conduct research with hazardous materials (heavy metals). Working with Forestry, UW Safety, ARS Director and Forestry Staff their project was conducted at the Noer. There was much pre-establishment planning this project and the project was conducted with minor issues.
- The creek that moves water through the property has had an erosion issue ever since the new road was installed, add to that past floods and it has become a real issue. Over the season we slowly have corrected the issue. With all the work done this past year hopefully in spring will see our success.
- Dr. David Hogg, emeritus, Entomology continued to manage two beehives on the west edge of the property. Often bees and turfgrass management are at odds. The winter of 2020-21 saw one of the hives die and it was re-established in the spring. Both hives was very successful in 2021. We are hoping they both survive the winter of 2021-22.
- Dr. Soldat did three drought studies using various products and maintenance practices to evaluate ways to lessen the water usage on turfgrass. Many of the treatments and borders are presently dead. The timing of the studies did not allow for time to renovate these plots before the end of the growing season. The renovation will take place in the spring with the goals to have them completely healed by early summer.
- This past year five plots were killed and re-seeded for new research plots. Plot B2 was to be re-seeded but a last minute changed to a sod laying project. the entire plot had all the sod stripped, graded, and prepared for sodding. ARS was charged with getting the sod to the plot and assisting in laying the sod. Plots C29 and C30 are bentgrass fairway plots that were killed and re-seeded for a future Plant Pathology Research project. A13 was re-seeded to an NTEP Fine Fescue multi-year project. C24 was re-seeded for a low maintenance lawn study using Kentucky bluegrass and low growing dicots. Plot B4 and C21 was renovated in 2020 by Soils

Science required major work to repair grade issues that would not accept mowing heights of 0.125 and 0.5 inches..

- The Noer continued to cooperate with the UW Police co K9 training at the Noer. UW Police did multiple K9 training sessions during the year. The K9 staff was present and active during the AmFam Senior Golf Championship.
- Began negotiations for a contractor to GPS locating of all vital irrigation components on property.

2. Outreach/instruction activities:

Due to the continuing Covid issue and the UW Guidelines the Noer has not returned to pre-covid activities. The past season there were six outside groups activities at the Noer. Each of these was held as an outdoor activity only. These included FFA groups, Garner Clubs and Service clubs.

In July the Wisconsin Turfgrass Association returned to the Noer for their Summer Field Day. They implemented a few changes to stay within the required Covid-19 protocols.

This fall the inaugural FSIC Turfgrass Course was offered on campus. Some of the classes were conducted in the classroom at the Noer. It was nice to see the facility being used for teaching once again.

3. Research Activity:

Soil Science

In 2021, the Soil Science program initiated new projects and continued several others at the OJ Noer Turfgrass Research Facility. Significantly, they concluded a four-year project that sought to develop a growth model for creeping bentgrass putting greens. A [scientific manuscript](#) was published on that topic this year, and the graduate student leading the project won two awards for her presentations on the topic at the Crop Science Society of American Annual Meetings in Salt Lake City. We also collaborated on a regional project with several other universities in the North Central Region focusing on organic options for crabgrass control. This project was highlighted at the annual Field Day in July. We also planted three new cultivar trials in 2021, these trials will provide information on the best suited varieties of turfgrass for Wisconsin for the next five years. Data was collected on a total of 27 Soil Science projects were hosted at the OJ Noer Facility, and summary reports can be found at the UW Turfgrass Program Website at www.turf.wisc.edu for many of these projects.

Plant Pathology

In 2021, the Plant Pathology program continued research on a number of different topics at the OJ Noer Turfgrass Research Facility. Research continued with the Smith-Kerns Dollar Spot Prediction Model and included projects to use it in a precision 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. Two national collaborative projects focused on dollar spot control were also initiated in 2021: one focused on the impacts of combined cultural practices on disease suppression and another focused on combining host resistance with biocontrol products to identify improved disease control strategies. In addition, the impacts of fungicide timing and water volume on snow mold control were also assessed. A total of 17 different research Plant Pathology research trials were conducted at the OJ Noer.

Forestry

Dr. Townsend's Graduate student Kate Wilson installed a research program where her group built test area to monitor the uptake of heavy metals in Tall Fescue turf. Contained turf plants and water containment system was installed in an attempt to contain any heavy metals and water runoff.

4. Station goals for the coming year

- Update the Noer Protocols
- Continue hosting Golf Channel and UW Police Incident Command during the AM Fam Senior Championship. Making changes as needed to improve to event.
- Work with AmFam to facilitate work with the Touring Pros as they attend the event
- Work with Entomology on 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

- Due to the raise in pricing of fertilizers work diligent with the Fertilizer dealers to again obtain fertilizer donations for the needs of the Noer plots
- 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 in grave disrepair. The challenge will be to 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 2021 growing season there was budgeted two AREO six-month staff members at 25-30 hours per week, one of these positions was never filled. Even with an extensive recruitment campaign the Noer cannot find candidates. 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.
- The past year the Noer equipment had multiple breakdowns. Continuing to get equipment donations will be a key component of the Noer success.
- Turfgrass maintenance equipment is in very short supply due to parts supply chain shortages. Continuing to work hard with Toro and Reinders for the loan of a Greens mower and Heavy Duty Workman could be a challenge.
- Unfortunately, the John Deere Dealer that donated the 9009a large area mower was sold to a company in North Carolina. Getting a donation of this size will be a challenge with new players and direction.
- 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 they pass through the Noer.

Peninsular Agricultural Research Station – 2021

January 6, 2022

Superintendent: Rebecca Wiepz

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 include the 2014 Apple Rootstock, 2015 Organic Apple Rootstock, and 2017 High Density Tart Cherry plantings. The halfway summary for the 2014 Apple Rootstock study was published in the Journal of the American Pomological Society (J.A. Cline, et. al. (2021). Early Performance of 'Honeycrisp' Apple Trees on Several Size-Controlling Rootstocks in the 2014 NC-140 Rootstock Trial. Journal of the American Pomological Society. 75(4). 189-202). Yield data was also collected for the first time from a complementary study at the Station which investigates the impacts of irrigation on tart cherry establishment using a subset of the Michigan State University tart cherry rootstocks being tested in the 2017 High Density Tart Cherry planting.

Connections continue to be made between the Station PI and researchers at UW Madison, UW Extension, College of Menominee Nation, DNR, and Door County Soil and Water. Plans are in place to initiate multiple collaborative projects over the coming seasons. Additionally, a new Itasca vineyard was established to provide a uniform block of an in-demand variety for future research projects.

Station agronomic and forages research was enhanced through collaboration with extension and other entities. With the purchase of a new corn planter, this area of research will continue to grow at PARS in the coming years.

The monitoring program for Spotted Wing Drosophila throughout Door and Kewaunee counties continued along with discussion of future research and management strategies for this invasive pest. Despite intense integrated pest management, many growers still experience control failures and crop loss. SWD continues to have the potential to economically devastate cherry and small fruit production in Wisconsin.

The United States Potato Genebank supplied 7249 germplasm units in 2021 to 176 domestic recipients in 39 states and 8 foreign recipients in 7 countries. These went to support efforts in anthropology, breeding, genetics, home gardeners, pathology, physiology, entomology, and education.

Outreach/Instruction Activities

- Virtual presentation to Green Bay Retired Men's Club – approximately 50 attendees
- Orchard and Vineyard walk with UW Madison speakers for area producers - 57 attendees
- Station tour for Peninsula Planters Garden Club – 6 attendees
- Station tour for Door County Conservation Committee – 10 attendees
- Forages Field Day hosted by Jamie Patton – 15 attendees
- Promoting Pollinators event held for public – 43 attendees with speakers from PARS, NRCS, Extension, Pheasants forever, US Fish and Wildlife, and DC Soil and Water
- DePere Garden Club tour – 13 attendees
- Provided 19 weekly seasonal PARS webpage *Commercial Fruit Pest Updates* for apple & cherry producers

- Coordinated commercial apple and cherry scouting program covering 225 cherry & 250 apple acres (six producers) and delivered over 100 seasonal pest reports

Research Activity

- 2 Tart cherry: 1 PARS, 1 PARS/Horticulture
- 2 Apple: 2 PARS/Horticulture
- 1 Small grain: 1 Agronomy
- 4 Forages: 4 Extension/Dairy Sciences
- 3 Corn: 1 Extension/Agronomy, 1 Extension/UW Organic Collaborative, 1 Extension/NRCS

Change

The Station hired a new Equipment Technician in May of 2021, and he has become a valued member of the team at PARS.

Station Goals for the Coming Year

- Turn discussions and collaborations from 2020 and 2021 into active research on the Station.
- 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.
- Provide support for graduate student project in viticulture spray management.
- Work with fruit pathologist to investigate rising incidence of trunk disease in apples.
- Continue efforts with Entomology faculty testing economically viable pest management strategies to control Spotted Wing Drosophila.
- Incorporate small and perennial grain research into field day with Agronomy faculty.
- Eliminate plantings that are no longer relevant and replace them with plantings that can benefit future research.
- Seek funds for forestry and invasive species projects on Station.
- Conduct more outreach and Station tours for the general public and area producers.

Areas of Concern and Challenges

Challenges arising from the pandemic continue to inhibit some functions of the Station. Even with a full staff, we are not capable of filling every request for tours, outreach, and education that we receive. By cooperating with the USDA, we hope to accommodate more of these requests while also providing a more in-depth tour experience at the station. Additionally, we are still dealing with the lack of a fruit extension specialist in the county. Our previous County Agent acted as our primary contact with the Master Gardeners and homeowners, leaving the responsibility for managing both of those groups now largely on Station staff. Our previous Agent was also diligent about utilizing the Station for research and outreach. While tree fruit production is relatively small when compared with many other industries, it is still a vital component of the economy and growing with the popularity of the local food movement. We are concerned that the lack of a local fruit extension contact is shortsighted and detrimental to agricultural knowledge and production.

Rhineland Agricultural Research Station (RARS) 2021 Station Report

Notable Achievements

1. Potato breeding populations developed at the Rhineland station were used in two 2021 publications illustrating a new method for genetic mapping in multiparental, tetraploid populations:

Zheng C, Amadeu RR, Muñoz PR, Endelman JB (2021) Haplotype reconstruction in connected tetraploid F1 populations *Genetics* 219(2). doi:10.1093/genetics/iyab106

Amadeu RR, Muñoz PR, Zheng C, Endelman JB (2021) QTL mapping in outbred tetraploid (and diploid) diallel populations. *Genetics* 219(3). doi:10.1093/genetics/iyab124

2. The dual-purpose russet variety W13A11229-1rus was accepted as an invention by WARF based on interest from commercial partners. It was first selected as a single plant in 2014 at RARS, and in 2021 we provided 600 lbs. of seed to cooperators in the public and private sector for trialing.

3. Based on its commercial potential for the fresh market, the potato variety W13008-1rus was accepted for foundation seed production by the Wisconsin SpudPro committee in November 2021. This variety was first selected as a single plant at RARS in 2014.

4. Based on its strong performance in small plots with the National Chip Processing Trial, the chipping variety W15125-4 was accepted for elite testing on commercial farms by the Potatoes USA National Chip Program. This variety was first selected as a single plant in 2016 at RARS.

5. The 2020-21 storage season was the first bulk bin storage evaluation of Plover Russet at the Hancock Storage Research Facility. The variety performed exceptionally well in terms of minimal tuber decay at the bottom of the pile after 8 months.

6. Certified seed acreage continued to increase for the varieties Hodag and Red Prairie in 2021. Plover Russet and Lakeview Russet are fairly new, and growers are still learning the strengths and weaknesses of these varieties.

7. One highlight of the 2021 season was the debut of a new “mid-density” genotyping platform for potato. This has allowed the breeding program to make genomic predictions at the FY2 stage for the first time. Predictions for total yield, specific gravity, fry color, and vine maturity, based on data from nearly 1000 clones across 6 years at the Hancock Research Station (HARS), were used to augment the traditional visual selection that occurs during the FY2 harvest in Rhineland.

8. In collaboration with HARS and BSE, we are working to develop and validate a new method for image-based measurement of chip quality. Project results will be presented at the WPVGA Grower Education Conference February 8-10, 2022.

9. 2021 was the second year of biweekly flights of a UAV equipped with a multispectral camera at RARS. Images will be used to select for above-ground traits, such as early row closure and flowering, that are correlated with early tuber development.

10. All 16 advanced clones entered into the UW Seed Certification summer field inspection were 100% disease-free and received Foundation status.

11. WPVGA Associate Division grant recipient, awarded 7 new pivot tires.

12. The Station received in-kind donations totaling \$6,436 in the form of labor, equipment, product, and materials.

13. All research objectives were met despite the challenges posed by the COVID-19 pandemic and staff out due to injury.

Outreach/Instruction Activities

1. In cooperation with MSU, an EnviroWeather Station was added to RARS and deployed in October 2021.
<https://enviroweather.msu.edu/>
2. “The New Frontiers of Potato Tech” story was featured in Spring 2021 issue of UW-Madison’s *Grow Magazine*.
<https://grow.cals.wisc.edu/departments/features/the-new-frontiers-of-potato-tech>
3. “WI Leads in Chipping Potatoes” was the featured article in the March 2021 issue of the *Badger Common’Tater*.
https://issuu.com/bctater/docs/2103_standard
4. *WXPR* story by Ben Meyer “One in 100,000 breeders in Rhinelander seek the next commercial potato variety” aired September 30, 2021 and story can be viewed on their website. <https://www.wxpr.org/2021-09-30/one-in-100-000-breeders-in-rhinelander-seek-the-next-commercial-potato-variety>
5. Educational tour Prentice High School gardening group – 24 participants
6. Continue to update RARS website and Facebook page. <https://rhinelander.ars.wisc.edu/> and <https://www.facebook.com/Rhinelander-Agricultural-Research-Station-101222018420765>

Change

1. There were 2 retirements at RARS in 2021. This loss of institutional knowledge created some temporary challenges as these critical positions were posted, filled, and the new staff trained.
2. Worked with ARS management to find ways to absorb the pandemic induced 30K budget reduction.
3. Recognized the importance of having certified organic acreage available for research, and identified 11.2 acres that are either low productivity for potatoes or not needed.
4. Had fabricated an automated pot/flat filler with a chemical hopper that can evenly distribute fertilizer per pot. Due to the pandemic the delivery of the unit was delayed however it came in time to test it out on the last 500 trays. The filler will significantly reduce the number of staff and time needed to fill and apply a slow release fertilizer to 52K 4” pots.
5. Reconfigured and renamed the Tower fields. Low spots were discounted and new field boundaries established. This opens the possibility for a 4 yr. rotation.
6. After the completion of our new access road and sanitation area late fall 2020, we obtained signage to transition the flow of traffic away from on-farm to the outer Station perimeters. The sanitation station is set up as a one-way in and one-way out, with the concept to significantly lessen the potential to spread disease.
7. Securing supplies or equipment for field and greenhouse operations was definitely a challenge in 2021.

Research

1. Bioenergy – 3 Pls

To better understand how yield limiting factors interact on marginal vs. productive soils the Great Lakes BioEnergy Research Center (GLBRC) established six experimental plot sites on low productivity marginal soils. The sites are established on a latitudinal transect, with three sites each in Michigan and Wisconsin. Seven crop systems were established at each site and an experimental check consisting of the existing vegetation. At each of the 6 marginal land sites they established 4 replicate blocks planted to perennial crop systems each split with and without fertilizer. Measurements will be determined by the science needs of specific research areas, but at a minimum productivity and soil analyses will be used to parameterize and test their C/N/Productivity model (EPIC) as well as upgrade productivity projections for GLBRC econometric modeling efforts.

- Same as 2020, researchers continue to attempt to drought stress switchgrass via rainout shelters at each plot. Seems to be working and many samples in the queue for testing. Showing yield differences between outside and under shelter. Continue to gather the same environmental/weather data via two weather stations and several sets of soil moisture/temperature sensors in the switchgrass plots primarily.

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 consisting of *Populus* and *Salix* hybrids were established that together comprise the Northwoods Phytoremediation Demonstration and Education Center.

Areas of Concern or 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. Securing applied research interest without jeopardizing the integrity of the potato breeding program, a limited growing season, and decreased number of research faculty.
3. Finding labor that is skilled and able to do the physical component of small plot research is worrisome.
4. Precipitation for the period of Jan 2021-Oct 2021 was 1.97" below normal. Average high temperature between June 2021-Oct 2021 was 2.4°F above normal. If irrigation seepage ponds do not recharge before the FY22 growing season, RARS may have water availability issues.
5. Need to expand reliable high speed internet.
6. It is a challenge to keep staff morale high during the pandemic, times of low staffing, and uncertain budget.
7. Conduct more outreach and Station tours once COVID restrictions are lifted.

Station Goals for 2022

1. Return to more normal levels of research, instruction, and outreach activity.
2. Efficaciously complete RARS mission supporting existing and facilitating new research.
3. Increase awareness of RARS role in potato variety development and the WI Potato Industry utilizing social media, our website, and event avenues.
4. Procure in-kind donations to offset operational supply costs.
5. Continue to work on determining opportunities for improving operational efficiency.
6. Continue to build on-farm sustainability for long-term success.
7. Introduce the topic of Emotional Intelligence to RARS staff to improve teamwork, comradery, and open communication.

Spooner Ag Research Station

2021 Report

Phil Holman, Superintendent

Notable station achievements:

The Spooner Ag Research Station (SARS) hosted 25 agronomic or horticulture research trials for 13 different principal investigators. Seven of these are new trials started in 2021. Being located four hours from Madison, 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, forage triticale 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 soybeans, boron products/rates on alfalfa and corn after cover crops. Soybeans had two additional management trials with dates of planting and artificial intelligence management decision making. Three fields are maintained for organic crop research. The Seed 2 Kitchen vegetable trials and winter wheat variety trial were projects on the organically managed fields.

The Seed to Kitchen project was downsized when the person hired for the summer took a different job elsewhere. We did still have melon trials in a CAT tunnel and outside, a squash trials, organic potato trial and seedstock production and a carrot variety trial. We are also utilizing the former sheep milk freezer as a cooler for a squash storage trial that is still ongoing. 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, two part-time TE's and the Master Gardeners still maintained a beautiful demonstration garden this summer.

A new weather station was installed as part of an ARS wide network of weather stations. Weather station data will be available to station staff and researchers to make crop and pest management decisions.

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 many of these activities were not held. The UW-Extension Ag Agent and the Master Gardeners initiated some ZOOM meetings on horticultural topics that featured the Spooner Ag Research Station Demonstration Garden and trials. The Twilight Garden Tour and some small group outside activities were still held in the summer of 2021. I am on the state Certified Crop Advisor Board and hosted a state board meeting in October and gave the other board members a tour of the research field locations.

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, Early Cover Crop Seeding into 30" and 60" row Corn

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

Carrie Laboski, Soil Science, Soybean Yield Response to pH Level (pH plot area)

Carrie Laboski, Soil Science, Viresco Digester Sludge Byproduct Fertilizer Value Trial

Carrie Laboski, Soil Science, Lime-Time Lime Rate of Effectiveness Evaluation Trial.

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

Yoana Newman, UW-EX Forage Specialist UW-River Falls, Triticale Forage Production Variety Trial

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

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

Local Business, Cucumber Oil Seed Production Yield trial

Changes:

- The Station Program Assistant mainly worked remotely much of the year and she also covered Program Assistant needs for the Lancaster Ag Research Station during an interim period.
- UW-Extension Agriculture Agent also worked remotely until July which reduced the visitor traffic to the station office and garden.
- Continued removal the hybrid poplar area to increase row crop acres.

Station goals for the coming year

- Hopefully COVID changes and restrictions are less in 2022.
- 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

Areas of concern and challenges

- Guessing what is next ?? life after COVID!

2021 West Madison ARS Annual Report

1. Notable 2021 Station Achievements

In 2021, the West Madison Agricultural Research Station (WMARS) was back to near full capacity amid the pandemic. Crop yields and quality were excellent despite early season drought stress and late season disease. Close cooperation continues among WMARS, OJ Noer, AARS, WSGH, and DFRC. The station met the multiple needs of researchers both on station and at the campus livestock units. Station facilities were improved on several fronts: FPM addressed issue of ice falling off the tin shed roofs by installing ice guards over two service doors; they also replaced the apron to the BSE building that was unsafe from years of heaving. Several service doors were repaired for the station users (Agronomy bathroom, Genetics/Hort, Pack shed, Dryer Facility, BSE's Machine Storage II). Electrical repairs were made to the pack shed walk-in cooler and to the agronomy seed dryer #5 (outdoor unit donated from Corteva), as well as, the inside seed dryer (new fuses). The original 30'x 100' mobile hoophouse (HH, built 2014) was relocated. A second 30' x 100' mobile HH was constructed in-field and new plastic skins were added to both HHs in Spring. Unfortunately, a strong windstorm in mid-December caused major damage to one HH and blew the roof off it and two other units (2 at WMARS, 1 at AARS).

2. Outreach Instruction/Activities

Grow magazine highlighted the organic acreage at several ARS in the Fall issue (cover story, 'Organically grown at UW' by A. Gurda, Fall 2021). The WM station's website and facebook page were updated with 2021 activities, data, and pictures. 769 folks used the station's conference room and outdoor space for tours and instruction (as well as an estimated 3,230 for self-guided tours). During the Fall Semester, we provided teaching support by hosting Forage Management and Utilization class for V. Picasso; on a weekly basis we cleaned/provided large farm equipment for BSE classes on campus as well as led a silage harvesting experience on station with twenty students. At least five other faculty relied on WM for their teaching needs on campus. WM hosted a CALS-ARS intern with Horticulture this year. We also hired 2 student interns to assist with the garden for the summer. Six Master Gardener Volunteers were able to contribute time to meet their 30-hr annual accreditation requirement. The Commercial Flower Growers of Wisconsin continued to rely on our garden plots (and greenhouse) to compare over 300 cultivars of several species, side-by-side; that collaboration was published in Country Folks Grower <https://cfcgrower.com/unique-partnership-produces-midwest-flower-trials/>. In November, a news story on Wisconsin grapes aired on local TV. In it, WMARS was on display as a TV crew interviewed Amaya Atucha on grapes while filming in and around the vineyards here [In Real Life: Winesconsin (link: [#Newsy](#) "A shifting climate is changing where wine grapes can grow, and conditions are ripe for Wisconsin to become the new wine country!").

3. Summary of Research Activities

Livestock feed ration needs for campus livestock were met, and included at least nine research projects in ANDISCI (*no response/acknowledgement from DCC for info despite 3 reminders*). We also managed 85 acres for plant research with 29 PIs with 49 field projects. Most of that acreage is utilized for plant breeding efforts. Annual crops being genetically improved included field and sweet corn, beets, carrots, and tomatoes. The 30 acres of certified organic land continues to have various agronomy and horticulture users, including variety trials of corn, small grains, and mixed veggies, the latter with and without hoophouses/tunnels; it also includes matching land rested in cover crops each season, as well as, soybeans and alfalfa in rotation with the research. Perennial research crops are also prevalent and include cold-hardy grapes with 225 non-fruit bearing and 336 fruit bearing this season. Raspberry research evaluating mulch to suppress spotted wing drosophila continued. Other perennial research included a hazelnut plantation that was expanded in late Fall (550 plants put in to date) by BSE and Bayfield Co. Extension to assess genetic potential and productivity. The station's crew delivered large hazelnut harvesting equipment to their on-farm research sites on several occasions and at times provided a 100 hp tractor for their hazelnut husking machine. A hemp trial was

established as was a sorghum trial evaluating cultivars for N-fixation capabilities. Kernza (perennial wheat grass) is established in two fields and seed collected from here will provide material for future research; an additional intermediate wheat grass trial was also established this fall. We also maintained pollinator habitat (perennial buffers, alfalfa, gardens) for ongoing bee research for Entomology and USDA researchers.

4. Key Change in 2021

Research was back to near full capacity despite the pandemic still going strong. David Rosol, veteran Ag Supervisor retired and Rodney Denu was hired as the new Ag Supervisor and ‘hit the ground running’. We are proactively responding to climate change: Planting and harvesting earlier, using more cover crops, using reduced tillage to conserve moisture and temper erosive rain events.

5. Goals for the Coming Year

1) Continue station’s standard of excellence for its users 2) try to maintain patience for chronic ‘no-sense-of-timer’s’ relying on our services 3) work on budget management to include leasing tractor and sharing equipment with other ARS units 4) transition acreage to organic; 5) continue to build soils with compost amendments to more fields.

6. Areas of Concern and Challenges

- *Space capacity (field, storage, facilities, parking) for new researchers and existing station users
- *CASE IH Big Red program large tractors (>200 HP) and most implements no longer available or not here throughout the season as needed – makes it hard for BSE faculty to plan their classes around transient equipment
- *Users leaving flags/non-degradable items in the field despite reminders to ‘leave no trace’, or using metal stakes to mark plots despite the clear ARS No Metal policy just because ‘it’s inconvenient’ not to.
- *communication –getting researchers to start planning in the fall for the following season’s land needs and realizing their labor capacity/constraints for their research projects
- *asphalt condition – parking lot patched but needs overhaul, agbag asphalt pad crumbling
- *CMF furnace condition is precarious
- *No WIFI access/infrastructure beyond HQ and SPAL buildings – DoIT can’t seem to develop a cost effective approach to beam the signal from the fiber optic line either at SPAL or HQ building to outbuildings
- *Annual freeze up issues with Dairy Cattle Center manure system – somehow need to enclose and add heat from barn’s system to exterior augers
- *Increasing the perennial crop landscape: 54% of acreage was either no-till or reduced till this season but strategic tillage is used to provide researchers an adequate seedbed for their plot planters or to recover from compaction