

Agricultural Research Stations
Annual Report
For Calendar Year 2016
March 17, 2017

Agricultural Research Stations
Executive Summary
Calendar Year 2016
March 17, 2017

The Agricultural Research Station (ARS) annual report for 2016 is composed of 12 reports from the 11 research stations and the campus greenhouses. The station managers were asked to report on activity in the following areas:

- Notable station achievement
- Outreach/Instruction Activities
- Research Activity
- Change
- Goals for the Coming Year:
- Areas of Concern and Challenges:

In terms of station achievements, some notable highlights include:

Arlington

- The Blaine Dairy manure project and pit abandonments are nearly completed. One pit abandonment and some site work will be finished in spring. After this the DNR can reissue the WPDES Permit for the station which has been expired since 2013. This was a major effort by our staff to empty the old lagoon and keep the dairy operating while the new lagoon was constructed, despite very wet weather.
- We hosted Log-A-Load For Kids Charitable Harvest in conjunction with the Great Lakes Timber Professionals Association. Approximately 430 children from four local schools participated and learned about the timber industry. Fifty acres of completed forestry research studies were removed, which is the first step to returning it to crop production.
- We started to integrate technology with the addition of an RTK base station, purchased SMS AgLeader software, and a sprayer controller. Station field boundaries were re-mapped for the first time in almost 15 years.

Hancock

- In 2016, the Hancock Agricultural Research Station celebrated the first 100 years. We celebrated this milestone by releasing the book "*2016 Hancock Agricultural Research Station- Celebrating 100 years of the Wisconsin Idea*". The book was financed by the Wisconsin Potato and Vegetable Growers Association (WPVGA) and the Field Day was financed by WPVGA and the Midwest Food Processors Association.
- HARS was directly responsible for six field potato variety development projects (Navarro and Fishler as PI). These projects generated a research income of

\$91,800. These grants supported 0.5 FTE of a staff (Sam Perez), two summer students (Joseph Nord and Jackie Detlor) and LTE (Sonia Castillo).

- 2016 was a year of important developments for the Hancock ARS Potato and Vegetable Storage Research Facility. Whereas the Station as a whole celebrated a Centennial, as SRF we celebrated a decade of service to research and have consolidated out industry outreach and services.
- In 2016, we rolled out a new "box bin" program in two of our bulk bins that is already helping research for processing chip and russet varieties with Potatoes USA and McCain's Foods, and one for a fresh market project (J. Endelman). This mid-scale level includes pressure bruise evaluation that is difficult to secure in bulk bins.

Kemp

- Completed construction of the Connor Forestry Center through the generous donation of \$867,000 from Mary and Dudley Pierce. Worked closely with the donors, ARS & CALS Administration, Sustainable Resources Institute, and external parties to complete this turnkey project outside of the State building process for ½ the cost in ½ the time.
- Installed an innovative and cost-effective solution to improve broadband connectivity by establishing a wireless link between Kemp Station and the Woodruff water tower. Completely re-engineered the station's communication tower with service to the Station, increasing speed from 1.5Mbps to 100Mbps;

Lancaster

- Management of the Long Term Crop Rotation Study area on station as we enter the 50th year of its existence. This is the 2nd oldest crop rotation study in the US. It has included many different research projects and has provided a resource to crop researchers to perform a variety of projects and collaborations within and outside of the UW.

Marshfield

- Milk Quality – Foremost Farms USA awards MARS with a third consecutive year Superior milk quality award. The National Mastitis Council along with Hoards Dairyman awarded the station with a prestigious Platinum National Milk Quality Award.
- No-till and cover crop research and demonstration – we continued to implement more ways of tracking the performance of crops under these practices; such as soil temperature and moisture. While it's often perceived that no-till and cover crops lead to colder/wetter soils, our data show that is not the case. We have demonstrated that proper equipment setup is the key to overcoming these obstacles. Our station continued to solidify itself as the recognized leader in the practices in Central Wisconsin. The Marathon County Conservation, Planning, and Zoning Department (CPZ) has offered to partner with us in this effort.

Noer

The majority of research from the department of Plant Pathology focused on developing sustainable turf grass management programs for use both in golf course and home lawn settings that limit the risk posed by traditional pesticide usage. The research is developing disease-management programs that golf courses can use to reduce environmental impact by decreasing the overall amount of active ingredient used by over 75% compared to a conventional program. This project is expanding to begin to include these options for Lawn and landscape operators.

- ARS completed the grow-in of 25 research plots with various grass mixtures for future research plots.
- Renovated and established 3 new bentgrass fairway plots for future use.
- Renovated 4 research plots converting them to fine fescue plots for new research on fine fescue fairway turf. These are the first fairway fine fescue plots established at the OJ Noer

Peninsular

- In collaboration with Christelle Gudeot (Entomology) we completed a pest management study evaluating efficacy of selected organic insecticide control programs for spotted wing drosophila in tart cherry. Rotational pest management programs were assessed to control this pest while preventing over reliance on spinosad and thus limiting potential resistance to IRAC class 5 insecticides. This invasive insect has recently disrupted IPM efforts, resulted in control failures, crop loss and has the potential to economically devastate cherry growing in Wisconsin.
- Coordinated commercial apple and cherry scouting program covering 240 cherry & 180 apple acres (eight producers involved) involved, produced over 100 seasonal pest reports. Responded to over 100 fruit crop information requests (phone calls, email, etc.) from outside of Door and Kewaunee.

Rhineland

The research impacts of RARS are best quantified through the seed that is produced on the farm, rather than through the trials conducted there. Seed potatoes from RARS contributed to the following 2016–2017 publications and presentations by the research group of Assistant Professor Jeffrey Endelman, from the Dept. of Horticulture:

- Endelman JB, Schmitz Carley CA, Douches DS, Coombs JJ, Bizimungu B, De Jong WS, Haynes KG, Holm DG, Miller JC, Novy RG, Palta JP, Parish DL, Porter DA, Sathuvalli VR, Thompson AL, Yencho GC (in press) Pedigree reconstruction with genome-wide markers in potato. *American Journal of Potato Research*, doi: 10.1007/s12230-016-9556-y

- Endelman JB. Genome-wide prediction of complex traits in tetraploid potato: Empirical results and implications for breeding. 100th Annual Meeting of the Potato Association of America. Aug. 1, 2016, Grand Rapids, MI.
- One new red variety originally developed at RARS was released to growers in 2016: W8405-1R, which has very high yield and smooth skin.

Spoooner

- Dispersal of the dairy sheep flock occurred on October 13, 2016. Strong buyer competition for the sheep was an indication that the dairy sheep developed by the UW-Madison program were well thought of by sheep dairies across the country. The successful online auction was conducted by Equity Cooperative Livestock Sales Association of Baraboo, WI, which allowed over 70 potential buyers to participate from throughout the U.S. without leaving their homes. All but two of the sheep offered for sale had an estimated breeding value for milk yield, and it was obvious from the prices paid that buyers were paying close attention to these estimates of genetic value. A total of 338 sheep were sold in 62 lots with a sale average of \$517/head

West Madison

- We had a smooth transition after Tom's Retirement as the staff all pitched in to assist Janet with meeting the needs of all the station's users and campus clientele.
- To expand outreach to areas beyond the station, we hosted a booth with UW-Extension/WPT during Garden Expo to promote the latest garden knowledge and share information one-to-one with the public. During summer, we also staffed a booth at Farm Technology Days promoting our station and applied horticulture specifically; 228 folks stopped by and interacted with the interns at these events. Countless thousands learned about the station via the website, radio, and TV coverage. Lisa Johnson with Dane Co. Extension joined host Larry Meiller on WPR's 'Garden Talk...' to promote WMARS and ARS at large over public radio. Further, Janet Hedtcke appeared on Channel 3's 'News 3 This Morning' to promote the station and a vineyard field day in September.

In the other report categories there were several noteworthy comments in the individual station reports.

Concerns and Changes:

Keeping the stations performing at an efficient and successful level while continuing to deal with the challenges of old facilities, outdated technologies and fewer resources. Losing access to state maintenance dollars for repair of roofs, roads and building exteriors will challenge ARS. A number of critical ARS facilities are fifty or more years old (some are original structures that were present when the station originated) and they are showing their age. A few of the more pressing maintenance concerns include:

- The Arlington feed mill was built in the late 1960s. While still functioning, it is showing its age. The pneumatic feed transfer system has caused two customers to purchase commercial feed due to excess fines in the diet. A solution will have to be found about how feasible it will be to replace the current structure.
- The Arlington Repair Shop dates to the early 1960s and is unable to accommodate the size of modern agricultural machinery and equipment.
- Animal facilities at Arlington are in need of update, maintenance and increased feed storage.
- Station maintenance projects on the Kemp Station, whose buildings date back to the 1920s, include replacing roofs and replacing decayed structural logs. In addition, we need to address the upcoming cost associated with Kemp Road resurfacing.
- The West Madison Vision Committee identified several pressing needs for the station including clean and accessible drinking water, an adequate number of restrooms with showers and lockers for station workers, break facilities for station workers, and adequate workspace and storage facilities for research and support staff

Our ability to recruit and hire quality staff at the relatively low established pay rates is a growing concern. We were unable to offer competitive wages during several recent recruitments and were unable to hire the most qualified of the candidates we reviewed. We have also been unable to retain some staff who left to take much higher paying jobs.

There were several significant staffing changes that took place this past year. They were as follows:

- Tom Wright, the superintendent at West Madison, retired.
- Tom Schwab, superintendent at OJ Noer, retired
- Ron Skoyen, DFRC dairy herd manager, retired
- Bill Meyer, assistant superintendent at Lancaster, resigned
- Kim Meyer, assistant superintendent at Arlington, resigned (beginning of 2017)

We were able to fill the Vice-Skoyen and Schwab positions. At Lancaster and West Madison, these positions remain open as ARS explores how to re-fill these positions. Short-term staffing plans have been implemented to fill the void until longer term plans are implemented.

Summary of Research Projects and Outreach Activity:

The following tables list a summary of research projects and estimate of station visitors. Reporting of research projects has improved and we show that over 1200 research projects were conducted on our stations and campus greenhouses. The stations continue to carry out many outreach activities with over 25,000 people attending field days, workshops, and tours of our stations in 2016.

Research Projects and PI's using Ag Research Stations
Cropping Year 2016
Compiled by Dwight Mueller
3/2/17

Station	Field Crop Research	Fruit Crop Research	Animal Research	Natural Resources/ Turfgrass	Campus PI's	Total PI's
ARLINGTON	329		28		45	47
HANCOCK	141				36	39
USDFRC	40		10			
KEMP				69**	31	51
LANCASTER	35		7		16	16
MARSHFIELD	70		9		15	18
OJ NOER				52	5	6
PENINSULAR	3	12			3	6
RHINELANDER	2				2	2
SPOONER	10	3	2		6	11
WEST MADISON	57	9	16	8	27	27
GREENHOUSES*	250 - 450				75	75
TOTALS	937 - 11037	24	72	129	261	298

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

**Projects: DNR = 8, UW Non-CALS = 12, UW CALS = 30, Federal = 3, Other UW System = 6,
Other = 10

2016 TOURS/SEMINARS ON AG RESEARCH STATIONS
 Compiled by Jane Cahoon
 2/7/17

Station	<u>Field Days</u>	<u>Tours</u>	<u>Instruction</u>	<u>Seminars/ Meetings</u>	<u># of People attending</u>
ARLINGTON	3	130	7	52	8000
HANCOCK	6	25		40	1480
USDFRC		10			500
KEMP		10	12	44	5185
LANCASTER	3	12	2	5	550
MARSHFIELD	1	35		122	6250
OJ NOER	3	4		3	460
PENINSULAR	1	5	2	4	751
RHINELANDER	1	5	1	5	500
SPOONER	2	6	2	3	500
WEST MADISON	5	10	33	45	3480
GREENHOUSES		2	2	4	375
TOTALS	25	254	61	327	28031

Individual Research Station Reports

Arlington Agricultural Research Station 2016 Annual Report

1. Notable station achievements:

The Blaine Dairy manure project and pit abandonments are nearly completed. One pit abandonment and some site work will be finished in spring. After this the DNR can reissue the WPDES Permit for the station which has been expired since 2013. This was a major effort by our staff to empty the old lagoon and keep the dairy operating while the new lagoon was constructed, despite very wet weather.

Crop yields were outstanding and the animal units were content with the feed we harvested. We developed SOPs for harvesting forage for Blaine Dairy, which were useful for harvesting consistent, high quality forage.

We hosted Log A Load For Kids Charitable Harvest in conjunction with the Great Lakes Timber Professionals Association. Approximately 430 children from four local schools participated and learned about the timber industry. Fifty acres of completed forestry research studies were removed, which is the first step to returning it to crop production.

We started to integrate technology with the addition of an RTK base station, purchased SMS AgLeader software, and a sprayer controller. Station field boundaries were re-mapped for the first time in almost 15 years.

We hired five new employees in 2016 and were fully staffed for part of the summer. Unfortunately, we lost three employees and went into 2017 down two positions. The new TREMS system is useful and will help us going forward.

2. Number of research projects:

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

26+ animal research projects with 10 PIs supported

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

3. Change:

Several research technicians and professor positions were filled. This brought new users to the station along with the learning curve of getting started. We strive to give extra assistance so that the researchers can be effective and problems can be avoided.

The majority of our budget (~88%) is generated by services and feed we provide to researchers or crop sales. Much is provided at or near cost. That makes us vulnerable to market swings as well as management decisions by the researchers or unit managers, who are also under intense pressure with budget cuts. We have the equipment and staff to provide the lowest cost feed and services when we can utilize it across all enterprises. Cuts or decreases in use in one area will lead to cost increases for others.

4. **Station goals for the coming year**

We will be hosting two additional major events. Columbia County Moo Day Brunch on June 17 could have up to 2000 attendees and the North American Manure Expo on August 22-23 could have 1000. Both events take months of planning and the station has to be in top condition to show off what we do.

Several major land projects including: Brush and stump removal from the forestry studies that were recently cleared; completion of the Blaine Dairy site work; removal of subsoil material by the gravel quarry; reconstruction of waterways by the Dairy and Horticulture.

Fill the open Assistant Superintendent position so we provide a high level of timely service to researchers and stay in compliance for nutrient and manure management.

Educate and adjust to the Food Safety Modernization Act and Veterinary Feed Directive requirements for Feed Mills that went into effect in January.

5. **Areas of concern and challenges**

Low wages and no recent wage increases make it difficult to recruit and retain the most qualified employees. There are many employment opportunities in the Madison area.

The station does not have a large enough land base to support the research projects, raise crops for feed, and apply animal manure. The quantity of animal manure produced exceeds the current land capacity for sustainable application while supporting research. Soil test phosphorus levels on many fields are increasing into a range where applications will be limited. We have manure application agreements with several neighboring farmers. We also cash rent or have crop purchase agreements on approximately 400 acres. This is costing over \$130,000 per year. Competition for land is intense because of several large dairy and grain operations in the immediate area.

Existing forage bunkers can only hold three of the four alfalfa cuttings and there is not enough space to place the needed number of feed bags. The bunkers were constructed in a wet area and tile drainage for leachate was incorrectly installed. It was also noted by the DNR that bag sites must be rotated and rested so a site can only be used every third year. More bunkers or a concrete feed pad with runoff collection is needed. Storage buildings for straw, hay, and equipment are also needed.

It is a challenge to keep safety programs and training up to date, especially with personnel from academic departments. Safety is not a top priority for the departments and often falls back onto ARS for compliance.

The feed mill was built in the late 1960s. While still functioning, it is showing its age. The pneumatic feed transfer system has caused two customers to purchase commercial feed due to excess fines in the diet. A solution will have to be found about how feasible it will be to replace the current structure.

US Dairy Forage Research Center 2016 Annual Report

Leading the world in integrated dairy forage systems research

Number of Research Projects:

During 2016 we supported 3 USDA ARS researchers and 9 collaborating researchers. These researchers performed 10 dairy research trials in various areas in support of the DFRC vision. We also had 6 ARS researchers collaborating with 27 agronomic researchers in 40 field trials. This is an increase in dairy animal trials and a slight decrease in agronomic trials compared to 2015. The collaborating scientist were from within UW and other institutions from around the world.

Researchers continue to emphasize new opportunities for increasing the efficient and effective use of our land and financial resources. This includes double cropping summer annuals and utilizing forages that require less water and fewer added nutrients. Our dairy researchers will be concentrating on the best ways to utilize these crops to improve the efficiency of milk production.

Outreach:

DFRC hosted 10 groups for a total of approximately 130 people. This was a very diverse group of people varying in age from local 4th graders to established foreign farm groups. We had Chinese students, Sauk County Institute of Leadership attendees, Brazilian, Korean and Hungarian visitors. Sauk Prairie High School brought out 3 groups from their *Down on the Farm Program*. A local private school brought out 4th and 5th grade students to see where their food originated. We also had an industry group bring employees out for some hands on training and to see how research is performed.

Challenges:

DFRC, along with the whole milk production industry, faced the challenges of lower milk prices and tightening labor markets. We struggled to fully staff the facility for several months and saw performance and moral suffer due to the increased work load on the rest of the people. This was a good experience in team building and proved to management that our people are capable of stepping up when needed.

Goals:

DFRC is working on bringing herd performance levels back to industry leading levels, mainly milk production and pregnancy rates. We will be using our genomic information to increase the genetic level of our herd with selective culling and mating. We will also be working on employee retention and, through training, increasing the knowledge and performance of our team. Completing a review of our farm SOPs and getting in place a more accurate system of tracking our adherence to these protocols.

Walnut Street Greenhouses

2016 Annual Report

Encompasses:

- Walnut Street Greenhouse
- King Hall (Soil Science) greenhouse
- 2 greenhouses at West Madison station
- Eagle Heights research field

Staffed by:

- 2 full-time managers
- 1 full-time horticultural technician
- 1-2 LTE's

Serves:

- **Campus-wide facility**
- **~80 UW faculty, ~50 active at a given time**
- **~230 users and ~150 projects at any given time**
(Federal and campus researchers, emeritus faculty, visiting scientists, technicians, post docs, graduate and undergraduate students.)
- ≥ 12 departments
- ≥ 5 additional organizations/groups
(Lakeshore nature preserve, GLBRC, WI Energy Institute, etc.)

1. Notable Station Achievements:

The Walnut Street Greenhouses have relentlessly improved the facilities in both large and small ways.

Major Improvements:

- None

Smaller Projects:

1. Brought a new growth chamber online- a gift from USDA-7K
2. Redid the floors in King Hall 3 and 4- This completes this project- 20K
3. Worked with Stephanie Klutz to conduct a water conservation study
4. Conducted an LED vs conventional HPS lighting study
5. Conducted a processed cow manure as a plant medium study with Zong Wei in BSE
6. Revamped our Percival growth chamber from T-12 to T-8 fluorescent lighting
7. Revised the greenhouse orientation that is given to 65-90 new greenhouse workers every year
8. Visited the Danforth Center in Saint Louis to learn about Plant Phenotyping
9. Working with UW-Safety we devised a better way to store and recycle out spent HID light bulbs.
10. Conducted a lengthy trial to improve switch grass growing techniques in the greenhouse for the Jiang lab.



11. Working with Jill Mahoy in the Kaepler lab we improved growing techniques for their inbred corn
12. Shared a student intern with the Schoville lab
13. Used 225 hours of free labor from Dane county deferred prosecution

2. Outreach/Instruction Activities:

Tutored Elsa Laurer from Sarah Patterson's Hort 120 class-20 hours – taught greenhouse management

Hort 120 students (5) – 20 hours of service & instruction on greenhouse management. Deferred prosecution – worked with several individuals (50-100 hours each)

K-tour, College for Kids greenhouse tour

Tours for Eileen Nelson's short-course

Presented at annual Plant Care Workshop, 40 attendees

Facilitated campus blood drives in Microbiology building (153 units collected, CALS had third highest total for UW Madison groups)

3. Research Activity:

Currently, there are over 125 projects at Walnut Street, with another 19 at the West Madison greenhouses, and 6 at King Hall. In the spring, we anticipate at least another 10 projects at the Eagle

Heights research field. However, it must be noted that while we have as many as 150 projects utilizing our space at one time, projects may last a matter of a few weeks, months, or years. We estimate that somewhere between 250 and 450 projects utilize space at our station each year.

See the attached excel grid for more information on the depth, breadth and impact of these research projects.

4. Change Over Time:

The research greenhouses no longer have the capacity to satisfy the demands of the users. Often, researchers have to wait to be able to obtain greenhouse space and sometimes the quality of space is not the quality that researchers desire.

5. Goals for Coming Year:

Work with the greenhouse renovation committee to produce a design for a greenhouse that will meet the needs of plant researchers for the next 50 years. Other lesser goals include using a spectrophotometer to determine the quality of natural light coming through the various roof materials at our greenhouses- This will be important if we renovate our greenhouses. Conduct corn fertilizer frequency trials to determine best management practices for corn growth in controlled environments. Bring four new pesticides 'on board'- Magus, Tetra Curb, Marengo and Mural. Test two different brands of LED lights for plant growth effectiveness. Construct a centralized fertilization system at the King Hall Greenhouse. Revise and improve my presentation for the plant care workshop. Conduct CO₂ readings at West Madison to determine if the plants are getting adequate CO₂. Continue with the light quantity trials to determine how much light in the winter will give optimal growth. Encourage our horticultural technician to take courses to improve her interpersonal skills. Plan a trip with other greenhouse campus managers to visit a rooftop greenhouse at UW Milwaukee.

6. Areas of Concern and Challenges:

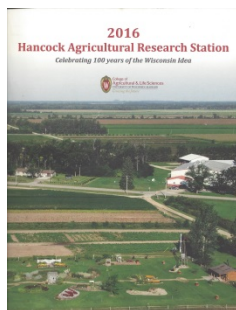
As mentioned above in the change section, we struggle to provide enough space and the quality of space that researchers need. We are also challenged by having to maintain a large number of air- conditioners, fans, motors, maintenance machines and vehicles with a very small budget. It would be ideal to be able to hire a trained electrician/mechanic to handle electrical and mechanical repairs in-house. Our current staff maintains and repairs what they are able to, but some items need more technical expertise, and Physical Plant tradesmen are often very expensive when called. This position would not need to be a full-time position.

Hancock Agricultural Research Station (HARS) 2016 Annual Report (Year of Hancock ARS Centennial)

Staff: Felix Navarro- Superintendent, Troy Fishler- Storage Research Manager, Paul Sytsma, Ag Project Supervisor, Sue Reinert, Office Manager, Amber Gotch- Research Specialist. Farm Equipment Operators: Douglas Klabunde, David Peterson, Jerome Pierce, Steven Grimmenga and Sam Perez. Gardeners: Janice Dukelow and Nancy Miller (previously Gilberts-K). Research Gardener (Navarro): Sonia Castillo. Summer Students (Navarro): Joseph Nord and Jackie Detlor, Tyler Burrows (irrigation). Waushara Co. Master Gardeners volunteers (Peggy Morgan, J. Loberg, A. Lebouton, K. Witt, M. Zwicky, D. Semrow, J. Shaffer, K. Rincon, P. Sperle and L. Hellikson).

Notable station achievements:

In 2016, the Hancock Agricultural Research Station celebrated the first 100 years. We celebrated this milestone by releasing the book “2016 Hancock Agricultural Research Station- Celebrating 100 years of the Wisconsin Idea” This book was authored by Justin Isherwood, Felix Navarro, Russell Groves, Jeff Wyman with contributions from Lynn Isherwood, Mimi Broeske, Amanda Gevens, Deana Knuteson, Matthew Ruark, T.A. Black, Fred Bliss, Tom Guth, Tamas Houlihan, Ken Kmiecik, Chuck Kostichka, Mallika Nocco, J.M. Norman, Dave Patrykus, Linda Rather, John Schoenemann, Dennis Schultz, Sue Reinert, Heidi Zoerb, foreworded by Dean Kathryn Vandenbosch. This book was released at a Centennial Field Day on July 28, 2016. The book was financed by the Wisconsin Potato and Vegetable Growers Association (WPVGA) and the Field Day was financed by WPVGA and the Midwest Food Processors Association.



WI Legislature recognizes Hancock ARS for Centennial



In July 28th Senators Julie Lassa & Scott Krug presented Dean Vandenbosch with a Citation of Commendation from the WI Legislature 2016 to commemorate HARS Centennial.

- HARS continues to fulfill the mission of effectively supporting faculty and staff led research. We hired Jerome Pierce as a Lead Irrigator prior to the summer season. Jerry had a good transition to this role, learning to manage irrigation with an irrigation scheduler. HARS supported field and storage crop projects for 36 research groups who conducted 160 field research projects in 110 acres. This includes 20 field projects that were directly linked to the industry. The total income generated by field research project was \$64,500 and 30.8% of this was generated by projects directly related to our industry partners.

- HARS was directly responsible for six field potato variety development projects (Navarro and Fishler as PI). These projects generated a research income of \$91,800. These grants supported 0.5 FTE of a staff (Sam Perez), two summer students (Joseph Nord and Jackie Detlor) and LTE (Sonia Castillo).
- In 2016, researchers continued to develop proximal and remote sensing including hyperspectral applications to improve throughput in trait evaluations on soybeans and potato.
- The WPVGA decided to increase checkoff dollars to further support potato research and hopefully secure maintenance funding for the Potato and Vegetable Storage Research Facility.
- In FY16 HARS executed and balanced a fund 101 budget of \$477,877.
- In addition, HARS secured UW CALS Facility Committee, Hatch-Capital grants and Industry gifts totaling \$60,000 to improve temperature and humidity controls of the Potato Grading Shed which will help potato research. WPVGA Associate Division Association gifts of \$3,000 were allocated to the Potato Grading Shed project.
- C-linear irrigation system expansion for \$15,661. Amanda Gevens (Plant Pathology) contributed \$5,000.
- Contributions from researchers (Gevens, Endelman, Colquhoun, Groves, and Navarro) to HARS development projects totaled \$13,700. Joe Lauer program donated \$1,200 as corn seed.
- Including the \$3,000 donated by WPVGA Associated Division, HARS received donations from industry partners in 2016 for \$105,822. These include CASE IH nine tractors, a loader, a corn planter, a disk harrow, combine and two combine heads. This program was previously estimated as \$75,000 value. Amvac fumigant and CPS application: \$14,630; Dr. Amanda Gevens and the Vegetable Team secured \$8,928 of agrochemical products donations from companies including Syngenta, BASF, Dupont, FMC-UPI-Cheminova, MANA, Loveland, Valent, Gowan, Helena-Kalo, Nufarm-Aceto Agrochemicals, Drexel, and UCPA. Nelson's Vegetable Store Systems Inc. donated to the Storage Research Facility \$3,557 as sprout inhibitors, applications and other products; and Granny's Grennery donated \$707 as plants and materials for the garden.



Potato and Vegetable Storage Research Facility

2016 was a year of important developments for the Hancock ARS Potato and Vegetable Storage Research Facility. Whereas the Station as a whole celebrated a Centennial, as SRF we celebrated a decade of service to research and have consolidated out industry outreach and

services. In the last two years, the SRF has thoroughly reviewed its budget operations; as an enterprise, we carry a structural deficit due to the maintenance of the facility. This year this structural deficit was \$28,000, primarily the result of several “big ticket” equipment replacements, including main compressor, 4 bin variable frequency fan drives, 6 bin humidity sensors. We hope that this structural deficit will be addressed in the frame of the new resources that the WPVGA will be investing as a product of increased checkoff dollars.

Improved Capacity:

Box-Bins In 2016, we rolled out a new box bin program in **two of our bulk bins** that is already helping research for processing chip and russet varieties with Potatoes USA and McCain’s Foods, and one for a fresh market project (J. Endelman). This mid-scale level includes pressure bruise evaluation that is difficult to secure in bulk bins. All will continue using this capacity in 2017.

Grading Shed Temp and Moisture Controls: We are also improving capacity at the grading shed to temporarily storing potato projects waiting to be graded or shipped and also to store non-research potatoes and possibly seeds; this will make it a more efficient use of the SRF.

Equipment Acquisition or Renovation: new processing lab computer (plus monitor and mount) for light box; upgraded the gearbox for the incline belt on the big red piler to prevent it from shutting down when too much weight is on it; replaced four bin variable frequency fan drives and six bin humidity sensors.

Research, Validation and Fee for Service Projects Supported

Bulk Bins: USPB (Now Potatoes USA): two bins- Manistee and Snowden; **J.R. Simplot Plant Sciences:** three bins of Y9 Atlantic; **Mortenson Brothers Farm:** one bin of Parsnip.
Potatoes USA: 13 box bins and processing, McCain’s Foods: 2 box bins (processing),
Endelman: 8 box bins and fresh market evaluations.

Research Projects in Lockers including processing: Navarro: Wisconsin Variety Trial, Nitrogen and Deficit Irrigation Trials, SNAC (Previously USPB/SFA trial), **CALYXT** Ranger Russet evaluations, **Agres** Superior Trial (grading and processing), **Biological Applied Research Trials** (Jim Driver, North Carolina), **Grounded Research** Trial (Alvin Winslow-ME).
Lockers Use: Endelman (3 lockers, storing), Colquhoun (0.5 lockers, storing), Navarro (3 lockers, storing + processing), Palta (<1, storing), Gevens (>1 storing).

Fee for service Lab: Mortenson Farms, RPE. Insurance Contractors: Ken Roberts (IAI), Vern Anderson-AgTrust, Jim Radke, Jim Helgeson (IAI), Mike Rohde (IAI). Our fee for service lab processed a total of 700 YSI sugar samples and 198 test fries throughout the 2015-2016 storage season. These numbers translated to just under \$36,000 worth of revenue.

Outreach/instruction activities:

Field Days, Tours and Meetings: We hosted 25 tours including **Six Field Days**/SRF Open Houses and tours attended by some 840 people. In addition, the A.R. Albert and Villetta Hawley-Albert Horticultural Garden continue to attract visitors for self-guided tours. Our Gavin Weiss Public Events Facility hosted 31 meetings for a total of 546 people. We estimate that the number of visitors to HARS who participated in field days, tours or meetings were above 1,600.

Electronic Media: We maintained our Hancock website and a facebook portal. Our facebook portal was visited by 50-700 people weekly depending on posting content. In the occasion of the Centennial events we were given ample coverage notably the September 23 University Communications video: <http://news.wisc.edu/you-say-potato-i-say-potential/> that reached thousands of web visitors. In June 30, UW Communications released the video: Planting research potato plots <https://www.youtube.com/watch?v=wMr3etli0SU>

Newspapers and Magazine releases:

Wisconsin State Farmer: 100 years of Research:

<http://www.wisfarmer.com/story/news/2016/08/03/100-years-research/87985320/>

Wisconsin Ag Connection: <http://www.wisconsinagconnection.com/story-state.php?id=767&yr=2016>,

Potato Grower Magazine: <http://www.potatogrower.com/2016/07/wis-research-station-celebrates-centennial>,

Badger Common'tater: <http://wisconsinpotatoes.com/badger-commontater-news/soaking-two-field-days-centennial-celebration/>,

Colorful Entrance Garden: www.rotarybotanicalgardens.org/colorful-entrance-garden/

Agriview: http://www.agriview.com/news/crop/hancock-station-celebrates-years/article_a3f32073-103d-5e2c-b8b2-6b32ca6da3dc.html

2017 Goals:

- Consolidation of overall station field and SRF performance level observed in 2016, to do our part to satisfy researchers' needs.
- Have a healthy and safe (accident free) year for the staff.
- Complete the insulation of the grading shed to protect new grader, extend grading capacity beyond October or November, temporarily store research projects, store revenue generating potatoes and seeds.
- Modify an irrigation system to provide precision irrigation zones within subfields as Reinke is scheduled to make this technology available this spring.
- Maintain or increase support received from the industry, research grants and researchers.
- Continue to optimize the SRF's laboratory protocols in order to increase throughput and minimize data errors.
- Obtain commitment from WPVGA to provide an annual SRF maintenance fund. This commitment was recently recognized by the WPVGA at our last Storage Research Advisory Committee meeting.
- Erect a Multi-Use tarp house to protect the potato bin pilers/bin unloading equipment and store excess potato crates/macrobins by bringing current structure from Spooner ARS.
- Continue to grow the box bin program into a revenue-generating one by identifying new customers and steadily increasing the number of contracted storage box bins each year.
- Improve software capacity for image and data management at the SRF and adapt Potatoes USA potato variety database management by adding SRF data to the database.

Kemp Natural Resources Station

2016 Annual Report

1. Notable Station Achievements

- Supported 7,200 user-days of diverse station activity and provided 4,100 person-nights of lodging, an *8% increase over 2015*;
- Generated over \$925 thousand in donations, including:
 - Completed construction of the Connor Forestry Center through the generous donation of \$867,000 from Mary and Dudley Pierce. Worked closely with the donors, ARS & CALS Administration, Sustainable Resources Institute, and external parties to complete this turnkey project outside of the State building process for ½ the cost in ½ the time;
 - a \$10k donation to implement the Hamilton Roddis Memorial Lecture Series; and
 - an additional \$48 thousand in undesignated donations to support general station infrastructure improvements and programming.
- Completed several station improvement projects, including:
 - Installed an innovative and cost-effective solution to improve broadband connectivity by establishing a wireless link between Kemp Station and the Woodruff water tower. Completely re-engineered the station's communication tower with service to the Station, increasing speed from 1.5Mbps to 100 Mbps;
 - Re-roofed and remodeled the white house after Tom Steele's departure;
 - Received lab modernization grant to upgrade the shop area;
 - Upgraded to commercial refrigerators in Mead Residence Hall;
 - Installed new fire alarm systems in the Lodge;
 - Replaced and improved Lodge bed layout; and
 - Completed over \$5k in improvements to station roads and parking areas.

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

- **Outreach**
 - Conducted 13 outreach events as part of the Kemp Summer Outreach Series, attracting 308 attendees; this included 5 events in partnership with the Minocqua Public Library. Also, hosted 4 external outreach programs organized by 4 different groups, providing 188 person-nights of outreach lodging;
 - Co-organized and implemented the fourth year of the Science On Tap outreach series (10 events), attracting 1,400 people. Events included a very successful day-long Geology Field Tour;
 - Developed and implemented a monthly radio program called Field Notes that airs on local public radio station WXHR. Program is a joint venture of the Kemp and Trout Lake research stations and it has been very well received;
 - Hosted 3 separate environmental field days for 195 local grade school students;
 - Organized the 2016 Hamilton Roddis Memorial Lecture, attracting 650 people; and
 - Prepared 2 issues of *Kemp's Point*, the semi-annual station newsletter that is distributed to over 800 households.
- **Instruction**

- Supported 12 field classes, involving 5 UW-Madison departments and 3 UW System universities. Provided 1,072 person-nights of instructional lodging.

- **Conferences/Workshops**

- Hosted 17 conferences & workshops, providing 328 person-nights of lodging.

3. Research

- Supported 47 research projects, involving 39 principal investigators from 7 UW-Madison academic departments and 14 extramural universities/agencies;
- Added the category of “Research Lab Retreat.” Hosted 3 lab retreats, during which contribution to 20 UW-Madison research projects was made;
- Provided 2,440 person-nights of research lodging, up 8% from 2015;
- Attracted 6 new researchers to the station; and
- Facilitated an incredibly 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

- Hired Gary Dalka as the new Facilities Maintenance Specialist-Advanced in a Fixed-term Finite Position;
- Saw the retirement of Tom Steele, Kemp Station’s long-time Superintendent after 25 years of exceptional service;
- Implemented the superintendent transition to Scott Bowe; and
- Began picking up 100% of Lynne Dalka’s (Custodian) salary on station 136 funds.

5. Goals for the Coming Year

- Maintain record-high levels of research, instruction, outreach and conference/workshop activity;
- Complete the furnishing and landscaping of the station’s new Connor Forestry Center;
- Continue to build relationships with Kemp Station personnel, ARS administration, and community partners as the new station superintendent;
- Implement multi-year maintenance plan for Kemp Station buildings and infrastructure;
- Develop and implement a strategy to optimize the use of the new Connor Forestry Center;
- Develop Parking strategies and infrastructure to service the new Connor Forestry Center;
- Convert Mead conference room to two bedrooms to increase sleeping capacity;
- Develop Kemp Station’s relationships of current and new researchers and users; and
- Develop Kemp Station’s relationships of current and new donors.

6. Areas of Concern & Challenges

- Avoiding the field station death spiral. Kemp substantially increased its lodging fees in March 2015 and again in January 2016. Researchers have told us we have now hit the tipping point, where they are considering no-cost alternatives such as nearby UW Trout Lake. Another proposed fee increase could drive away Kemp users;
- Address \$150k in station maintenance projects, including replacing roofs, replacing decayed structural logs, painting buildings, and replacing sliding patio doors; and
- Address the upcoming cost associated with Kemp Road resurfacing.

UW Lancaster Agricultural Research Station – Report by Arin Crooks

1. Notable Station Achievements –

- a. Providing unbiased research and results in an University setting for producers of the Driftless Region along the Mississippi River including Wisconsin, Illinois, Iowa, and Minnesota. (Lancaster ARS is the only University research station located in the Driftless Region.) Cover crop research at Lancaster provided information for a series of two field days that the different impacts and opportunities that cover crops can provide to Southwest Wisconsin. Two different research projects and a demonstration plot allowed over 100 attendees to see live and growing examples of the topics presented for the programs.
- b. Management of the Long Term Crop Rotation Study area on station as we enter the 50th year of its existence. This is the 2nd oldest crop rotation study in the US. It has included many different research projects and has provided a resource to crop researchers to perform a variety of projects and collaborations within and outside of the UW. Additionally, the crop rotation study continues to be a part of a “Cropping Systems Coordinated Agricultural Project Field Research Network” and has multiple fact sheets and presentations available on their website. (www.sustainablecorn.org)
- c. Providing continued grazing and commercial beef cow/calf research for the Wisconsin Beef Industry. The commercial beef herd and management intensive grazing activities allows researchers and extension staff to utilize the resources of the station for research and outreach functions. During 2016 Lancaster’s beef herd produced research animals that were utilized by two different Animal Science graduate students to complete their graduate degree research. Six different articles were written and are in the process of being submitted for publication as a result of this work. The Lancaster ARS facilities and equipment were photographed by UWEX for creating printed handouts and a display about safe livestock transporting for the Wisconsin Farm Technology Days and other public events.

2. Outreach/Instruction Activities Hosted –

- a. UWEX & Michael Fields Institute Cover Crops Field Days (August & November) 110 people
- b. UW Silvopasture Field Day – 20 people
- c. UW Platteville Crop Production and Beef Production class tours – 70 people
- d. Lancaster High School Agriculture Class Visit – 25 people
- e. Various other smaller tours and visits

3. Number of Research Projects – (See attached page for project list)

- a. Agronomic Crop Projects - 28 total projects including areas of corn, soybeans, forages, small grains, cover crops, soil conservation, and fertility.)
- b. Beef Cattle and Grazing Projects – 8 total projects including cow/calf genetics, cow/calf reproduction, feedlot animal performance, animal welfare during heat stress, silvopasture, and grazing plant species performance.

4. Changes:

- a. 2016 showed continued interest in larger plot areas from agronomic researchers and expanded interest in alternate crop species and management techniques. In 2016 we

began grazing for the silvopasture research project that includes over 25 acres of pasture and wooded areas. Also we planted research plots for Valentin Picasso Risso working with intermediate wheatgrass. These plots will include grazing and mechanical harvest of the crops while including 13 and 18 acres for different segments of the research (31 acres total.) In addition to larger plot sizes, the alternative management required for these projects have specialized needs for facilities and labor.

- b. Increased cooperation of UW Madison researchers with staff from other universities and private industry to meet the needs of the Lancaster ARS user groups. With the numbers of UW Madison research faculty shrinking it has been harder for them to create and carry out the management of certain research project areas that the Lancaster ARS user groups are interested in. This has caused the Lancaster ARS management to be resourceful in using our strong relationships with area individuals to help provide research ideas and even some management of research projects at Lancaster ARS. Examples include faculty from UW-Platteville and other private individuals. A collaborating researcher from UW Madison is always recruited to form a collaboration for the research project.

5. Goals for the coming year –

- a. Cooperate with ARS and CALS Administration to identify the needs of crops related researchers and the station for the skills and qualifications of someone to replace Bill Meyer. Bill was our former Assistant Superintendent and oversaw the crop activities and assisted with station management at overall Lancaster ARS. The decision has been made to delay a permanent hiring until after the upcoming growing season in hopes to gather more accurate information to aid in making the best decision possible.
- b. Hire new quality staff members to allow our crew to function at a more regular level to replace two permanent staff members that have retired and left the station in the fall of 2016. Our remaining staff members have made additional efforts to cover the station's labor and management needs. This has been successful for the short term, but will be difficult to sustain long term.
- c. Support existing research and facilitate new research for the future. Interact with new Agronomy researchers to incorporate Lancaster ARS as they build their programs. This will be challenging with our interim crops management plan, but we will do our best to still provide quality work and be a valued resource for our researchers.
- d. Continue to act as liaisons with the local agriculture community to share their educational needs with UW staff. Work with UW staff to find out what opportunities we can assist them with to carry out their research and outreach activities.
- e. Work with local and state UW Extension staff as they transition through their budget cuts and new staffing plan. We have always maintained close working relationships with many of the state specialists and the surrounding county agriculture agents. The current plans will drastically change our working relationship and cooperative arrangements for carrying out station outreach through our programs and serving our local agriculture community.

6. Areas of concern and challenges –

- a. Maintaining station performance with reduced staff levels and returning our staff to previous numbers. With one permanent crew member and one of our management

positions vacant we are stretching to cover all needed areas currently. It is a concern that we don't discourage any interest from researchers if top notch support isn't able to be continued.

- b. Being able to adequately train new staff in 2017. We are operating with 6 permanent staff and will be hiring 6 new staff at Lancaster ARS for this spring and summer between new full time staff and summer interns. With our interim arrangements for crop management, our most experienced crops crew member will be taking on the management duties. This leaves our other crops crew member with only 1 year of experience at the station to take on the lead operator duties. Success can be attained, but it will require flexibility and dedication from old and new staff both to realize this success.
- c. Maintaining aging facilities with reduced support and limited budgets. We have many buildings that are 50+ years old and are requiring added maintenance. With the suspension of other state support for building maintenance and a reduced station budget we will need to find ways to perform needed minimum maintenance on some facilities until we can recruit assistance for performing larger maintenance and repairs that are needed.
- d. Maintaining research interest with decreased number of research faculty. Faculty numbers continue to decrease and eventually that will limit the amount of interest and ability in performing research at all of the ag research stations. The lack of hiring of new faculty and especially those interested in applied research is a concern for multiple departments that we work with.

Research activity in 2015 (36 Research Projects, 19 Researchers)

- **Ken Albrecht**
 - Kura clover establishment
 - Kura living mulch experiments w/ drought resistant corn and lines of sorghum
 - White clover nursery evaluation on persistence
- **Francisco Arriaga**
 - Use of cover crops to alleviate soil compaction after corn silage
 - Interaction of N rates, gypsum and tillage for corn grain
 - Corn stover harvest levels and nitrogen application rates
- **Chris Baxter**
 - Effects of carbon based fertilizer on alfalfa yield and quality (2 different projects)
- **John Grabber**
 - Effects of using various rates of prohexadione on alfalfa interseeded in corn silage
- **David Huset**
 - Effects of aphanomyces on select alfalfa varieties
- **Carrie Laboski**
 - N – timing study
 - N-timing study on winter wheat
 - Low fertility field

- Rotation study
- **John Mochon**
 - Oat variety trial
 - Barley variety trial
- **Mark Renz**
 - Factors affecting alfalfa establishment after growing winter wheat
- **Mark Rickenbach, Eric Kruger, Dan Schaefer, and Rhonda Gildersleeve(Diane Mayerfeld)**
 - Silvo-pasture project
- **Heathcliffe Riday**
 - Red clover nursery evaluation
 - Red clover nursery establishment
- **Matt Ruark**
 - Cover crop study
- **Damon Smith**
 - Race 2 aphanomyces resistance of alfalfa
- **Dan Undersander**
 - Alfalfa variety trials
 - Race 3 aphanomyces resistance of alfalfa
 - Variable thickness of line wrapping plastic on alfalfa big square baleage feed quality
 - Variable thickness of line wrapping plastic on low moisture alfalfa round bale feed quality
- **Valentin Picasso-Risso**
 - Establishment and management of intermediate wheatgrass in field crop areas
 - Establishment and management of intermediate wheatgrass in pasture areas
- **Brian Kirkpatrick**
 - Estrus Synchronization and reproductive techniques with beef cows to produce offspring with increased ovulation rate (twinning)
 - Production and rearing of replacement breeding animals for reproductive performance that contain a gene for major increase in ovulation rate (twinning)
- **Dan Schaefer**
 - Feedlot finishing of beef steers

Marshfield Agricultural Research Station

2016 Achievements

1. Notable achievements

- No-till and cover crop research and demonstration – we continued to implement more ways of tracking the performance of crops under these practices; such as soil temperature and moisture. While it's often perceived that no-till and cover crops lead to colder/wetter soils, our data show that is not the case. We have demonstrated that proper equipment setup is the key to overcoming these obstacles. Our station continued to solidify itself as the recognized leader in the practices in Central Wisconsin. The Marathon County Conservation, Planning, and Zoning Department (CPZ) has offered to partner with us in this effort.
- Managed grazing – as part of our effort to demonstrate soil health-building practices, the station has also established itself as a demonstrator of managed grazing. We have partnered with the Marathon County CPZ to establish trials and demonstration areas to be used for pasture walks and other demonstration purposes. The County and the WI River Graziers Network have expressed the need for the University to support the practice of managed grazing.
- Milk Quality – Foremost Farms USA awards MARS with a third consecutive year Superior milk quality award. The National Mastitis Council along with Hoards Dairyman awarded the station with a prestigious Platinum National Milk Quality Award.
- Provided work / education opportunities for 12 students. Two students were on research related internships (CCA and ARS), 5 students from local schools worked in a volunteer capacity, two college students and two high school student workers provided needed labor.
- Purchased 81 acres of land that had been under a 5 year rental agreement.

2. Outreach and instruction activities

- Central WI No-tillers, Post Planting Meeting – 40+ attendees
- UWEX Fall Grazing Conference – 35 attendees
- Minnesota Forage Council Tour – 25 attendees
- Instructed classes for the Mid-State Tech College Farm Operator class on courses in cattle health, calf management, and field crops
- Hosted visiting GEA scientist, Teddy Ekhurutomwen, for three days with interests in learning about calf care and heifer management in the UW system
- MARS facility was a training site for a USDA APHIS food animal diseases diagnostician exercise.
- Schools and college students made up 55% of visitors at MARS
- The MARS North Farm Campus hosted 35 tours bringing a total of 655 visitors to the farm. The Russell F. Johannes Auditorium, located at on the MARS South Campus, accommodated 36 groups totaling 3750 event attendees.

3. Research activity

- 60 field trials total
- 49.8 acres on trial
- 9 ACUC approved animal research protocols

- 18 total PIs
- UW, USDA-ARS, and collaborative scientists contributed to 11 peer-reviewed articles resulting from work at the MARS station. Publications related to milk quality (3), nutrient application (3), forages/forage digestibility (4), and ruminant reproduction (1).

4. Change

- The combination of the station budget crunches and tighter profit margins add a significant challenge to managing the operation. This is not much different than the situation that neighboring farms find themselves in. While it is a challenge, it could cause us to be more relevant to neighboring farms than we've ever seemed before. While we have been successful in demonstrating best management practices such as no-till and cover crops, we must have the flexibility to demonstrate other non-conventional practices that could reduce inputs and improve profitability such as conventional crop genetics and managed grazing of livestock.
- Changes to the Case school tractor lease program require MARS to be creative and seek equipment through other sources. A partnership with Swiderski Equipment Company will help meet immediate equipment needs for field operation and work around the station farm.

5. Goals for next year

- Continue to build partnership with Marathon County CPZ and other related agencies to demonstrate soil health-building practices; focus on reducing inputs, minimizing environmental impacts, maintaining productivity, and improving profitability
- Continue expanding grazing research program in response to support from the County and from researchers (Brink, Coblentz, Akins, Silva, Picasso)
- Establish research trials and demonstration projects observing perennial grasses as dairy forages as an alternative to strictly alfalfa – perennial grasses have better agronomic traits, maintain quality longer than alfalfa, and can produce similar quality as well-managed alfalfa if managed properly
- Manage a 25% loss in heifer herd population determining impacts to inputs, labor and budget
- Manage various building or renovation projects at MARS. Expected are the construction of a stretched fabric hay storage building (40' x 96'), ventilation changes to the transition calf barn and USDA calving barn, and insulation to the roof of the dairy cow barn.
- Coordinate an effort to raise money to build either an admin building or visitors pavilion in the name of Thomas R. Drendel. MARS will convene a task force from the Marshfield and Central Wisconsin community to determine a project goal and establish how to fundraise for the effort. This will be a multi-year goal
- MARS will enter into a formal teaching relationship with Mid State Technical College.

6. Areas of Concern or Challenges

- Loss of income from heifer reduction
- Inadequate and aging tractors and field equipment
- Gain support to evolve the scope of station practices to meet established mission and objectives of the UW and Marshfield ARS.

2016OJ NOER ANNUAL REPORT

1. **Notable station achievements:**

- Plant Pathology and Soil continue to fine tune potassium fertilizer recommendations for golf course managers based on a long-term research trial. In fact, large reductions in potassium applications are being made across the U.S. based partly on this work. Presently they are investigating the interaction of potassium and the incidence of snow mold on various turfgrass varieties.
- Soil Science continues to investigate the efficacy of Defendor Herbicide by Dow as a Reduced Risk Herbicide for dandelion control and various other weeds.
- Soil Science continues its work with the National Turfgrass Evaluation Program (NTEP) through on going Fine Fescue trial and Kentucky Bluegrass Trail. This past fall they began a long term NTEP demonstration with Perennial Ryegrass.
- The majority of research from the department of Plant Pathology focused on developing sustainable turfgrass management programs for use both in golf course and home lawn settings that limit the risk posed by traditional pesticide usage. The research is developing disease-management programs that golf courses can use to reduce environmental impact by decreasing the overall amount of active ingredient used by over 75% compared to a conventional program. This project is expanding to begin to include these options for Lawn and landscape operators.
- Plant Pathology continues testing reduced-risk weed management programs for lawns that use only reduced-risk or low-toxicity products to help improve the sustainability of Wisconsin lawn care while still maintaining their attractiveness and functionality.
- Plant Pathology is studying the effect of different forms of nitrogen and various rates impacts the incidence of dollar spot on putting greens. This is a multiple year study and has shown some promise.
- With the focus at the OJ Noer on Sustainability Plant Pathology began a three year study on the Soil Phytobiome. This project is attempting to quantify the side effects pesticide are having on the Soil Pytobiome.

Accomplishments

- ARS completed the grow-in of 25 research plots with various grass mixtures for future research plots.
- Renovated and established 3 new bentgrass fairway plots for future use.
- Renovated 4 research plots converting them to fine fescue plots for new research on fine fescue fairway turf. These are the first fairway fine fescue plots established at the OJ Noer
- Began the first irrigation overhaul to attempt to improve the efficiency of the bentgrass irrigation system

2. Outreach/instruction activities:

- WTA Summer Field Day – 290 attendees
- Grandparents University – 50 attendees
- DeForest Park Department Tour – 18 attendees
- Madison area Landscape Architects – 13 attendees
- Lawn maintenance segment for local CBS Affiliate

3. Research Activity:

Listed Below

4. Change:

Plant Pathology maintains a diagnostic lab at OJ Noer, with a lab manager who is extremely helpful in assisting to acquire supplies and equipment needed to run the facility. The station superintendent used to be tasked with procuring all donations of equipment, seed, fertilizer, pesticides and other supplies that are used by the departments and the farm in general. It's nice to have more help procuring these donations.

5. Station goals for the coming year

- Update plant material and landscape around the main building
- Work with Dr. Williamson of maintenance of 'Operation Pollinator' demonstration
- Secure funding for a new cold storage building
- Continue to procure donations of seed, fertilizer, pesticide and as many additional supplies as possible
- Pursue acquisition of new or better research and maintenance equipment, large area mower, topdressing brush
- Expand the irrigation system audit and define areas that need improvement
- Continue to expand our pesticide safety policies and safety data sheet compliance
- Continue to assist researchers to install as many new projects as possible
- Work with Golf Channel when they stage their broadcast location at the OJ Noer for the American Family Championship (Senior PGA)
- Become actively involved with Dane County and the City of Madison as they embark on a two year project to re-construct County Highway M and disturb the OJ Noer Facility
- Create an outreach program to show the value of turfgrass in the local area with seminars to various groups like, Kiawana, Rotary to name a few.

6. Areas of concern and challenges

- Researchers used to financially contribute more towards operations and needed equipment at the facility, but with budget cuts, they are less able than earlier years to do so. A historical Noer spreadsheet showing this trend is available.

2016 Project Master List

Last updated: 5-8-16

Title of Project	Project Leader	Plot #s
\$ Spot (Fairway)	Koch	B-26,32
Nitrogen Ron	Koch	B-9
Preventative control of Pythium blight	Koch	C-23,24
Anthracnose	Koch	A-52, Pleasant View
Seasonal disease control - putting green	Koch	B-16
Early Season \$ spot	Koch	B-24
Dollar Spot Curative	Koch	B-13
Brown patch	Koch	A-46,47
Kentucky bluegrass rust study	Koch	A-36,37,38,42,43
\$ Spot Green	Koch	B-7
Reduced Risk Disease Control	Koch	A-54
\$ Spot Probability & Qol \$ Spot	Koch	A-55
Potassium Snowmold	Koch	C-31
Leaf Spot	Koch	Pine Hills
Water Quality	Koch	B-10
Reduced risk weed control, EIQ	Koch	A-26
\$ spot model fungicide test	Koch	B-22

Rust fungicide trial	Koch	C-3
Summer patch	Koch	A-59
Phytobiome test	Koch	C-29
Fairy ring	Koch	off site
Dow Herbicide Trial	Soldat	A-25
Biological Product Trial	Soldat	B-17
Biosolids Summer Patch	Soldat	C-26
Low Input Turf	Soldat	A-11
Growth regulator evaluation	Soldat	B-20
Potassium Soil Test Calibration	Soldat	B-6
Home lawn species and management trial	Soldat	A-6,7
Rain Shelter Drought Management	Soldat	X-16,17,18,19,20,21
Organic Fertilizer Trial	Soldat	D-11
NTEP Kentucky Bluegrass	Soldat	D-22,23,24,26,27
NTEP Fine Fescue	Soldat	A-12,18
NTEP Bentgrass	Soldat	B-21
Sports Turf Grass Selection	Soldat	B-18
Zoysia Buffalograss seed timing	Soldat	D-21
DOT roadside mixtures	Soldat/Renz	D-28
Spring Valley Fertilizer Trial	Soldat	D-10
Compaction	Soldat/Renz	C-25
Helena Fertilizer Evaluation	Soldat	D-18,19

PGR	Soldat	A-57,58
Cutworms	Williamson	B-27
Bruce Co Establishment	Schwab	C-1,2
Heritage Seed Demo 2014	Schwab	A-5
Regal Elm Shade	Schwab	X-2,3,6,7
Pollinator Demo	Schwab	A-1,15,16,17
My Holiday	Schweiger	C-4
Poa Control	Schweiger	C-6
Carbon Sequestration	Jackson	D17,20

Peninsular Agricultural Research Station - 2016

4312 Hwy 42 North, Sturgeon Bay, WI 54235-9620

Notable station achievements

As part of their service effort, the United States Potato Genebank supplied germplasm orders in 2016 to 221 domestic recipients in 37 states and 16 foreign orders to 8 countries. These went to support efforts in breeding, genetics, home gardeners, pathology, physiology, entomology, taxonomy and education. Regarding research, Genebank supported faculty produced 20 referred scientific journal publications in the past year.

Second year research data collection in unsprayed northern wine grape trials at Peninsular have helped determine susceptibility of eight cultivars to various diseases. Some of the findings confirm observations from commercial vineyards, but others are different from previously held assumptions. Plant Pathology graduate student, David Jones, received his M.S. degree this past year working on this project and recently moved on to Michigan State University to peruse a fruit extension career.

In collaboration with Christelle Gudeot (Entomology) we completed a pest management study evaluating efficacy of selected organic insecticide control programs for spotted wing drosophila in tart cherry. Rotational pest management programs were assessed to control this pest while preventing over reliance on spinosad and thus limiting potential resistance to IRAC class 5 insecticides. This invasive insect has recently disrupted IPM efforts, resulted in control failures, crop loss and has the potential to economically devastate cherry growing in Wisconsin.

Outreach/instruction activities

- Maintained half acre teaching vineyard for training of Northeast WI Technical College viticulture and enology students.
- Provided Station and Potato Gene Bank tour and lunch for Wisconsin Idea Seminar (44 participants).
- Presented research results at *WI Fresh Fruit & Vegetable Conference* (200 participants).
- Hosted Door County Master Gardeners annual plant sale (250 visitor/customers).
- Organized *Winter Cherry Season Review Meeting* for commercial producers (24 participants).
- Hosted and provided tours to the *Pulaski, Virginia 4-H youth group* (50 members).
- Hosted *UW Extension Fruit Team Vineyard Walk*, 4 UW-Madison presenters (35 participants).
- Presented *Early Summer Cherry Pest Update* as invited speaker at the Annual WI Cherry Growers Dinner (55 participants).
- Hosted *Door County Master Gardener Annual 'The Garden Door' Open House* and station tours (250 attendees).
- *Door and Kewaunee County Extension* station tour and informational meeting (20 participants).
- Provided over 20 weekly seasonal PARS webpage *Commercial Fruit Pest Updates* for apple, cherry & grape producers.
- Coordinated commercial apple and cherry scouting program covering 240 cherry & 180 apple acres (eight producers involved) involved, produced over 100 seasonal pest

reports. Responded to over 100 fruit crop information requests (phone calls, email, etc.) from outside of Door and Kewaunee.

Research Activity

- 5 Tart cherry: 1 Entomology, 1 Horticulture, 1 private contract, 2 PARS
- 4 Apple: 4 Horticulture/PARS
- 2 Grape: 2 Plant Pathology
- 17 Potato: NRSP-6: United States Potato Genebank
- 3 Small grain: 2 Agronomy

Change

We continue to struggle with the limited number of faculty PIs willing to carry out and fund projects at a remote facility. Many projects, once carried out and supported by campus faculty have been taken over by station academic staff (in some instances faculty remain coPI). Some have not been sustained, like processing vegetable and alternative crop trials, whereas others like serving as state coordinator for Multistate Research Activities like the NC140 Regional Rootstock Project have be transfer to station academic staff.

Station goals for the coming year

- We hope this year to be able to incorporate the long awaited, and lobbied for, contribution of funds from the USPG to offset partial station expenses associated with support of that project.
- Continue to encourage apple hard cider research collaboration with Aamyra Atucha in Horticulture and Nick Smith in Food Science. We are currently seeking grant funding to support maintenance of PARS apple cider variety trials and, as fruit production increases, seek support for laboratory juice quality and finished cider evaluations.
- Provide support for the next stage of Plant Pathology faculty disease susceptibility and management research trials for northern wine grapes. We will begin to test new reduced disease management strategies incorporating recent susceptibility and resistance findings.
- Continue efforts with Entomology faculty in efficacy testing economically viable pest management strategies of Spotted Wing Drosophila. This new introduced pest is capable of economically devastating cherry and other perennial fruit industries. We will also provide additional graduate student research project support and industry outreach efforts related to this pest.
- Encourage continued Horticulture faculty PI/coPI involvement in future rootstock research and grant funding efforts.
- Encourage new faculty small grain researcher, Valentin Picasso Risso, to expand perennial grain research trials.

Areas of Areas of concern and challenges

The continued reductions in state funding to the University System have trickled down to drastically affect the PARS budget for labor, supplies and maintenance. This has necessitated greater funding support from faculty sources for continued projects. Some budget funding reduction has been offset by a decrease in faculty and station staff projects requiring support. Other projects, once the domain of faculty, have been transfer to station research staff and have continued with funding sources secured through their efforts. A further strain on the PARS

budget, and ability to provide service, involves the relationship with the United States Potato Genebank. This project is a significant consumer of station infrastructure, equipment, and maintenance resources, but unlike other users, only provides a minor contribution to offset the accrued expense. Finally, there is the strain that comes with the increasing administrative effort needed in the securing of, and reliance on, multiple budget funding sources, which tend to be soft monies. This also raises concern regarding the long term sustainability of reliance on these types of funding sources.

Rhineland Agricultural Research Station (RARS)
2016 Annual Report

Notable station achievements:

- 1) The research impacts of RARS are best quantified through the seed that is produced on the farm, rather than through the trials conducted there. Seed potatoes from RARS contributed to the following 2016–2017 publications and presentations by the research group of Assistant Professor Jeffrey Endelman, from the Dept. of Horticulture:

Endelman JB, Schmitz Carley CA, Douches DS, Coombs JJ, Bizimungu B, De Jong WS, Haynes KG, Holm DG, Miller JC, Novy RG, Palta JP, Parish DL, Porter DA, Sathuvalli VR, Thompson AL, Yencho GC (in press) Pedigree reconstruction with genome-wide markers in potato. *American Journal of Potato Research*, doi: 10.1007/s12230-016-9556-y

- Dozens of potato breeding lines that were developed and maintained at RARS were critical to developing a new method for verifying and correcting pedigrees using DNA markers.

Endelman JB. Genome-wide prediction of complex traits in tetraploid potato: Empirical results and implications for breeding. 100th Annual Meeting of the Potato Association of America. Aug. 1, 2016, Grand Rapids, MI.

- This presentation used field trial data generated over several years to quantify the prediction accuracy for traits of untested breeding lines, based on DNA markers.

- 2) One new red variety originally developed at RARS was released to growers in 2016: W8405-1R, which has very high yield and smooth skin.
- 3) Chip processing varieties Pinnacle and Accumulator that were released a few years ago appear to be maintaining or gaining traction in the marketplace. In March 2016 the Spudpro committee chose the name 'Hodag' for W5955-1 in honor of the mythical creature from the Rhineland area. In a box bin trial at the Hancock Storage Research Facility, Hodag produced high quality chips in a late storage commercial processing run. For 2016-17 the variety is being stored in a 2000 cwt bin at the Hancock station.
- 4) The SPUDPRO industry advisory committee continue to evaluate several WI breeding lines through the certified seed program: W9576-11Y (yellow market category), W8893-1R and W8890-1R (red market category), and W9133-1rus and W9433-1rus (russet market category).

Outreach/instruction activities:

- 1) Coordinated and hosted a successful RARS field day July 14th. We had participants representing UW-Potato Breeding, UW-Plant Pathology, DATCP, Industry, UW-Entomology, and the WI Seed Certification Program. Insight FS sponsored our catered lunch.
- 2) RARS hosted two high school groups with 8-15 participants and the Oneida County Master Gardeners Club.
- 3) Hosted another successful "A Night on the Farm – Helping Fight Local Hunger" event September 16th. This event was in cooperation with the Wisconsin Potato and Vegetable Growers Association (WPVGA), Area Food Pantries, and Trigs Supermarket. The event drew The Wisconsin Spudmobile and over 100+ volunteers, who picked 6.5 tons of potatoes and donated additional non-perishable food items. Two local TV stations (WJFW and WAOW) covered the event. Trigs advised the event on the front page of their weekly sales flyer.

Change:**Change:**

Two new employees joined the breeding program as staff at the Rhinelander Research Station in 2016. Julie Braeger started in April 2016 as a Research Gardener to replace Edith Parker, who retired in March after 28 years at the Rhinelander Station. Julie has been able to hit the ground running based on her 25 years of experience in the Frito-Lay breeding program. The other new member of the team is Sam Eddy, who joined UW as an Agricultural Research Equipment Operator in July after more than 20 years as a public school teacher. Sam replaces Glen Herman, who died unexpectedly in May. All adapted to their new roles well, making significant contributions to improvements at RARS. Despite budget constraints and challenges, we managed to keep moving the research program forward, making improvements to the station and thinking of ways to make things better. We investigated new niches for innovation, brought new perspectives to several current protocols, and implemented several new ideas to reduce waste, simplify procedures or save time. Major improvements that lead to a successful year for enhancing the integrity of the breeding program included:

- 1) Added absorbent capillary mats and black plastic to all greenhouses with sand floors to improve water retention and reduce water stress for the plants.
- 2) The following infrastructural improvements were made to the greenhouses: (i) purchased appropriate fitting shade clothes for GHs 3 & 4, (ii) landscape fabric (for weed control) and new pea gravel (to replace sand floor) was added to GH4, (iii) added an environmental controller and backup alarm system to GH4 to replace the 5 thermostats system that existed, (iv) horizontal air fans (HAFs) were added to all greenhouses to provide additional circulation and flow of air to aid in the prevention of several serious plant diseases, (v) a new environmental controller was installed to our Willis storage to accurately regulate storage temperature and humidity as well as alarm when parameters are exceeded
- 3) We invested in several pieces of equipment in 2016: (i) a thermal printer to facilitate rapid and accurate printing of pot stakes and slip-on tags for crates in storage, (ii) tablets to facilitate electronic data capture in the field, which will reduce the time and errors associated with data entry, (iii) new dehydrator to aid seed extraction and a refrigerator to maintain true seed and crucial chemicals
- 4) Initiated a study measuring dormancy on all FY3+ breeding lines. Tuber dormancy is a key trait for all market categories, but it has not previously been tracked systematically in the breeding program.
- 5) Improved tactics in field to mitigate disease and improve soil health: (i) developed a new standard operating procedure (SOP) for handling all off-site material coming into RARS, (ii) continue to work with an agency to help us with soil sampling to identify problematic areas in the field and in-season petiole testing, (iii) employed more stringent rogueing strategies to maintain breeding program disease-free integrity

Goals for the Upcoming Year:

- 1) Efficaciously complete breeding goals set by PI and CALS to continue to strive for the creation of a world-class breeding program.
 - Continue to develop new varieties for all sectors of the potato industry, including russets for the fresh market and frozen processing, round whites for chip processing, reds, and yellows. Resource allocation targets for each market were met in the 2016 early generation trials. Our target allocation for FY1 and FY2 is 1/3 russets, 1/3 chips, and 1/3 reds and yellows. The total number of clones at each stage: there were nearly 50,000 clones in FY1, 1534 in FY2, and 197 in FY3.

- Continue to look at new and improved technologies to implement on-farm and in the greenhouses to assist with healthy crop management. Successfully employ all the necessary pieces to reliably introduce new technologies.
 - Continually reevaluate current operations to discover efficiencies to reduce waste, simplify procedures or save time.
- 2) Increase awareness of the Rhinelander Research station and the role it plays in potato variety development and the WI Potato Industry.
 - Host another well attended and highly promoted “A Night on the Farm – Helping Fight Local Hunger” event. Plan is to increase planted acres to draw more participants and to provide for additional area pantries.
 - Provide support of numerous research projects outside of the potato breeding program that are conducted on the Rhinelander station. Collaborators include other UW-Madison Departments and system Universities as well as the Department of Natural Resources.
 - Continue to promote facility tours and seminars.
 - Be resourceful in finding avenues to encourage the facility grounds as an ideal public gathering place for local events.
 - 3) Continue to make safety a priority (maintaining a safe work environment) by assuring 100% audit compliance and a leading example amongst ARS stations.
 - 4) Enhance our station sanitation program. Play an integral role with the enforcement of sanitation policies to all visitors, as well as trucks and implements moving to different fields. Stress the implications of poor sanitation and the significance of maintaining disease-free integrity.

Areas of Challenges and Concern

- 1) Keeping the station performing at an efficient and successful level while continuing to deal with the challenges of old facilities, outdated technologies, and less resources.
 - Over the last ten years the breeding program has been expanded beyond the round white category to include russet, red, yellow and specialty varieties so the workload continues to be considerable. RARS continues to utilize LTE and temporary assistance when necessary to facilitate the breeding program moving forward.

Spooner Ag Research Station

2016 Report

Phil Holman, Superintendent

1. Notable station achievements:

Noteworthy was the closure of the dairy sheep program and layoff of 2 full-time staff and 5 part-time staff.

Dispersal Sale Results, Spooner Agricultural Research Station (Summary By: Dave Thomas):

It was very sad to see 80 years of sheep research and outreach come to an end with the dispersal of the dairy sheep flock at the Spooner Agricultural Research Station of the University of Wisconsin-Madison (UW-Madison) on October 13, 2016. However, the strong buyer competition for the sheep was an indication that the dairy sheep developed by the UW-Madison program were well thought of by sheep dairies across the country. The successful online auction was conducted by Equity Cooperative Livestock Sales Association of Baraboo, WI, which allowed over 70 potential buyers to participate from throughout the U.S. without leaving their homes. All but two of the sheep offered for sale had an estimated breeding value for milk yield, and it was obvious from the prices paid that buyers were paying close attention to these estimates of genetic value. A total of 338 sheep were sold in 62 lots with a sale average of \$517/head.

Eight select ram lambs averaged \$1,522, and the high selling ram lamb went to Tom Clark, Old Chatham, NY for \$2,540. The high-selling ewe lot was a pair of high-production full sisters that had produced some outstanding ewes and rams in the flock. They sold for \$820/head to Jonathan Lightner, Jefferson, WI.

Sheep sold into the 10 states of Arkansas, Connecticut, Iowa, Indiana, Kansas, Missouri, Montana, New York, Ohio, and Wisconsin - 257 head (76%) went to out-of-state buyers, and 81 head (24%) stayed in Wisconsin.

Special Note: Sheep were owned by Spooner Ag Research Station, sale proceeds will be used to fund station activities and remaining staff to greatly reduce station 101 budget.

Research Publication Submissions:

Breed, hererosis, and non-genetic effects influencing lamb and ewe performance in a crossbred population of dairy sheep (T.W. Murphy, P.W. Holman, R.L. Burgett, M. Baldin, Y.M. Berger, and D.L. Thomas)

Estimates of genetic parameters and trends in a crossbred population of dairy sheep (T.W. Murphy, P.W. Holman, R.L. Burgett, M. Baldin, Y.M. Berger, and D.L. Thomas)

Unknown other publications but assume some from work with the following graduate students:

Spooner Ag Research Station impact with Graduate Students Progress

- Tom Murphy -- 2016 PhD Animal Science (Dave Thomas)
 - Dairy Sheep Genetics
 - Tom worked on developing Breeding Value Formulas and other genetic evaluation information from the SARS Dairy Sheep flock
 - Assistant Professor Sheep Production at Montana State start August 2016
- Adam Gaspar – 2016 PhD Agronomy (Shawn Conley)
 - 3 years of Spooner Site for Soybean Date of Planting study
 - started at Pioneer in late Fall of 2016
- Michel Baldin – 2016 PhD Animal Science from Penn State University
 - SARS Sheep Research Program Manager for 10 months
 - Starts position at Cargill Feeds somewhere in Ohio in late January 2017
- Matt Lemke – December 2016 M.S. Horticulture (Jed Colquhoun)
 - 2 years previous summer intern for SARS Demonstration Garden
 - Spooner Native
 - Will manage West Madison ARS Horticulture Research summer 2017
- Emily Petzel – Started M.S. fall 2016 in Animal Science at South Dakota State
 - 2015 CALS summer internship here
- Alexa Roscizewski -- 2016 CALS summer intern
 - looking into M.S. Animal Science somewhere to start in Fall of 2017

2. Outreach/instruction activities:

SARS hosts many groups and individual visitors. I lead some groups and frequently present information about SARS and SARS research to groups off station (# participants).

- Last Spooner Dairy Sheep Day (140) – presented on SARS 2017 future plans
- SARS host for UWEX Twilight Garden Meeting (200)
- Overview of SARS Pesticide Safety Equipment for Local UWEX PAT class (15)
- Sheep Production Tour for Spooner High School Animal Science class (20)
- Sawyer County Farm Bureau Spring Farm Tour (4)
- Barron High School FFA Tour (20)
- UW-River Falls Forages class for tour and research education
- Host Northwest Wisconsin UWEX Ag Agents (15) District Meeting and field tour of organic soybeans and other station trials
- Alma Lions Club Fall Tour Site (40) – overview of station while ate lunch in conference room
- Host site for area Tractor Safety training utilizing SARS tractors and implements, teach 1 hour (12)
- Articles for UWEX quarterly newsletter
- Numerous UWEX Ag Agent Meetings not associated with SARS but held here.
- House 2 Area UWEX Ag Agents for Burnett, Washburn and Sawyer Counties and 1 Area Natural Resources Agent that covers parts of 10 counties

TELEVISION STAR of “Around the Farm Table” – Wisconsin Public TV program shot on June 16, 2016 and aired on November 27, 2016 (<http://video.wpt.org/video/2365864611/>) (go 11:21 into it)

3. Research Activity:

Mike Casler, USDA Dairy Forage, Switchgrass Selection for Morphological Traits.

Mike Casler, USDA Dairy Forage, Switchgrass, Indiangrass & Big Bluestem Variety Trial

Mike Casler, USDA Dairy Forage, Switchgrass Variety Trial

Mike Casler, USDA Dairy Forage, Meadow Fescue Variety Trial

Erin Silva/Dan Undersander/Geoff Brink, Organic Grass Species and Variety Trial for Forage

Yonna Newman, UW-RF/UWEX, Forage Crabgrass Demonstration Plot

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

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

Monsanto Demo Strip Early (73-82 R.M.) Season Corn Variety Test

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

Conley/Gaspar, Agronomy, Soybean Date of Planting and Maturity Trial

Damon Smith, Plant Pathology, White Mold Evaluation of Short Season Soybean Breeding Lines

Lucia Gutierrez, Agronomy, Oats Variety and Breeding Line Trial

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

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

Mosaic Company, Boron/Potash Product Evaluation on Alfalfa Yield

Matt Ruark, Soil Science, Fall 2015 Seeded Cover Crop Impact on Corn Nitrogen Rates

Erin Silva, Plant Pathology, Organic Vegetable Variety Trials

Erin Silva & Julie Dawson, NOVIC Vegetable on-farm Testing

?? no researcher but still harvesting, High Tunnel Season Extension for Fall Bearing Raspberries

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

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

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

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

David Thomas, Animal Science, Genetic Development of Dairy Sheep

David Thomas, Animal Science, 2x vs. 1x milking in mid to late Lactation Dairy Sheep

David Thomas, Animal Science, Blood Sampling for Milk Gene Genetic Determination

- 4. Change:** Highlight significant trends or changes from previous years that are creating opportunities or challenges

ENDING of the DAIRY SHEEP PROGRAM and releasing most staff

- 5. Station goals for the coming year**

Increased Agronomic Research with investment in Agronomic Equipment and Facilities

New Horticulture Research Emphasis for Short Season Production in Northern Wisconsin

- 6. Areas of concern and challenges**

National, State and CALS Support for Scientific Research in Northern Wisconsin

2017 first growing season with major staff loss and no need for sheep forage and grain needs

2016 West Madison ARS Annual Report

The 2016 weather created many challenges including heat and frequent rain (30" in growing season, 38" annual) which led to high plant disease incidence, thin-skinned or rotten produce, rained-on hay, and severe compaction in the fields during silage harvest. Several property loss reports were filed with Risk Management for hail damage to crops, especially soybeans and vegetables; and to vehicles, roofs, several hoophouse structures, and 10 ag bags full of feed in September; two major wind storms that blew off the roofs on hoophouses, and lightning damage to the truck scale.

1. Notable station achievements

We had a smooth transition after Tom's Retirement as the staff all pitched in to assist Janet with meeting the needs of all the station's users and campus clientele. This included making 700, 900, 40 and 35 ton of haylage, corn silage, hay, and straw respectively. Approximately 17,500, 7,000, and 3,000 bu of corn grain, soybeans, and small grains was also produced on the station. We also aided in successfully establishing 1000s of alfalfa transplants with irrigation and mulching assistance to one researcher and 5,000 more plants were transplanted in the organic field and display gardens. Weed control across the station was improved by using a range of herbicide modes of action and cover crops. Upgrades and fabrication to an old, unused pneumatic spreader allowed us to mechanize the fertilization of grapes and small plots with high precision. Hundreds of trips to campus with the large straight trucks were successfully accomplished with no accidents/collisions. Furthermore, over 100 other trips with the livestock trailer safely handled 3,125 animals, mostly pigs and cattle for campus researchers.

Organic vegetable research including cover crops used about 13 acres of land; 3.5a of no-till soybeans (51 bu/a vs. 58 bu/a on conventional fields) and 12a alfalfa filled out the rest of the certified organic acreage. Organic tomatoes grown in the hoophouse yielded about 2x as much as the outdoor plants due to the longer growing season and drier foliage which prevented much of the disease that afflicted the outdoor tomatoes. Several varieties of wine grapes were marketed to local wineries and to Food Science for campus wine projects. Spotted wing drosophila research done on the station's raspberry and grapes was summarized in a peer-reviewed publication. In spite of high disease pressure and damaging storms this summer, 10 tons of produce were donated to local food bank network.

Outreach Instruction/Activities

As the City of Madison grows and expands, the location of West Madison ARS is ideally located for promoting "the Wisconsin Idea," reaching citizens curious about growing plants, plant societies committed to furthering their missions, and industry developing and experimenting with advances in plant breeding. Maintaining the gardens is essential because of the ripple effect for untold thousands in the community. With WMARS on the west edge of the city near the Beltline, it is easily accessible for visitors asking questions and obtaining information without having to go to the downtown UW Campus. We share information from the station in countless ways: providing direct assistance; matching visitor queries with the correct UW expert or service (i.e. Plant Disease Diagnostic Lab, Insect Diagnostic Lab, Soil and Plant Analysis Lab); hosting public field days; and maintaining/updating our website and facebook page.

Countless people of all ages were impacted by activities at West Madison ARS in 2016. Our website obtained over 11,000 viewer hits this year. The estimate of daily visitors strolling

through the gardens was 1000 people (on average 50 visitors/week; from May - September). We provided guided tours for several garden clubs. Further, the gardens hosted youth groups to over 130 people that included home schoolers, under-privileged teens, and *YouthWorks* missionaries, which promote instilling sound work ethic and community involvement amongst youth. Instructional activities numbered 33 and included apple and grape pruning, BSE and Farm Short Course classes, Active Learning Program ('Ropes' course), and the aforementioned youth training. Five field day events were offered at WMARS: Two vineyard walks; the Commercial Flower Growers of WI Field Day; the annual Horticultural Open House/Field Day; and the Organic Vegetable Research Showcase. Collectively, the station's field days, tours, instruction, and conference room users totaled 3,480 people that were exposed to WMARS in 2016.

To expand outreach to areas beyond the station, we hosted a booth with UW-Extension/WPT during Garden Expo to promote the latest garden knowledge and share information one-to-one with the public. During summer, we also staffed a booth at Farm Technology Days promoting our station and applied horticulture specifically; 228 folks stopped by and interacted with the interns at these events. Countless thousands learned about the station via the website, radio, and TV coverage. Lisa Johnson with Dane Co. Extension joined host Larry Meiller on WPR's 'Garden Talk...' to promote WMARS and ARS at large over public radio. Further, Janet Hedtcke appeared on Channel 3's 'News 3 This Morning' to promote the station and a vineyard field day in September.

2. Number of research projects

There was an estimated 57 field trials (from 28 PIs) and another 24 PIRF-less animal related projects/needs (17 PIs). Crop research included several vegetable breeding and variety trials (i.e. potatoes, sweet corn, carrots, beets, onions, tomatoes and many other veggies) on both organic and conventional ground. The primary research is for plant breeding/research nursery activities, which utilized 77 acres and was primarily on corn, small grains, but also some vegetables. Plant Pathology research included grapes and organic veggies. Fruit research is focused on local production of wine and table grapes to promote cold-hardy cultivars. West Madison maintains pollinator habitat for bumble bee and honey bee research, as well as, maintaining raspberries for trapping a newly discovered invasive pest, spotted wing drosophila. Irrigation services to research included weekly silo refilling all season for vegetable drip lines and sprinkler pipes used to water in transplants in four different fields for six weeks in early summer. Gun irrigation was used on corn nurseries in July. Indirectly, we provide various services such as growing, storing, hauling, handling feed (forage) to several livestock research projects at Charmany and on campus including the DCC, the Livestock Lab, Vet School, as well as livestock hauling for classes. Other projects include support of the Eagle Heights garden and the West Madison greenhouses (per L. Hummel's request). An interesting aromatic project at WM this summer was a mint distillation prototype operation by BSE staff. Other BSE faculty use the station to teach their students to build prototypes and to learn tractor and equipment operation via driving demos during chopping corn silage and fall tillage. Soils faculty used the station's soil pits to teach students on pedology. Finally, emergency repairs and equipment setup were provided to researchers to keep them on schedule.

3. Change

With Tom Schwab's retirement from OJ Noer, we will continue working to help Bruce Schweiger with facilities and grounds as he transitions into his new role as Superintendent there. For

example, we'll provide him with a soil/compost mix to redo sunken plots from long-term intensive tillage and to serve as a source of compost to topdress his turfgrass plots. We will also work with him to manage his biomass waste during the season and continue snow plowing/de-icing services in the off season.

This year we upgraded soil conditions on most of the station's acreage with custom lime application and manure, compost, and fertilizer applications per soil test recommendations. Crops, especially forages responded almost immediately and only three harvests were necessary on alfalfa fields instead of four.

Renewed effort on composting organic waste has been employed. First, the cost of production (equipment, labor, fuel) is being evaluated so that a more accurate selling price can be set. Second, to meet certified compost standards, temperature, moisture and turning data logs have been initiated to certify the compost has reached pathogen-killing temperatures (130-140°F for several weeks) and has adequate moisture and aeration for efficient microbial activity. Similarly, a renewed effort with the campus food waste program started with a meeting with campus because of far too many contaminants from metal, plastic bags, and paper waste being imported to the station. Screening the mature compost was experimented with in 2015 as a way to sort out contaminants but the unit is undersized and lacks a tumbler and the process is prohibitively slow especially with wet material. One improvement as a result of a Fall 2016 meeting with campus was identifying only 'clean streams' of organic material, i.e. that which had been pulped prior to delivery. More effort/education and improved signage is occurring on campus to prevent the non-degradable waste from entering the stream and contributing to an unsightly composting site at WMARS. New opportunities with greenhouse waste management will come as the nearly Wisconsin Crop Innovation Center comes online.

Also on the recycling front, ag plastic dumpsters were acquired to recycle agbag, dripline and hoophouse plastic, and more traditional recycling dumpsters were delivered from campus to recycle co-mingled glass, tin, aluminum and cardboard.

4. Goals for the coming year

- Continue to implement minimum tillage. We reduced fall chisel plowing by 55% from past 2 yrs and used vertical tillage to breakup corn stalks while we left soybean stubble undisturbed this fall. More no-till planting corn, soybeans, and alfalfa will be done as well.
- Successful production and research outcomes with good communication and planning
- Encourage a collegial environment for researchers/staff/students
- Keep promoting station with field days/outreach activities
- Engaging new researchers and embrace their out-of-the box, unusual or unique ideas
- Connect with unique partners to promote the station's presence and activities
- Demonstrate solutions to challenges that exist in society (recycling, food/feed production, safety)

5. Areas of concern and challenges

Finding the labor necessary for the intensive horticultural projects becomes challenging. Our permanent labor is spread thin among the wide diversity of projects and a large number of people to assist, often at spur of the moment. Five temporary employees (summer interns) staff the gardens and assist researchers at high demand times but this funding is not part of our 101 budget and is challenging to win. Likewise, handling the flurry of new, inexperienced student workers during the season becomes challenging in regards to traffic/parking, training on

equipment, and dealing with a non-stop stream of people in and out of the office building often requesting supplies or direction. Improved communication with advanced planning by researchers and annual station orientation for researchers will help improve coordination of equipment use, space, and labor.

Providing space for storing/curing perishable produce for each research team is increasingly difficult. Storage space for equipment and tools is also in high demand and is almost non-existent for many users.

Further, small-scale, intensive mixed vegetable plots call for a sundry of very specific implements; most of our line is old relics from the 1930's that cost us time and money to maintain. As the station attracts more horticultural researchers, a medium size tractor that could be used for planting and maintaining organic row crops (30" tire spacing) is in high demand from early spring to late fall. Our current tractor is 15 yrs old and is set at 36" row spacing making it exclusive to potatoes. The biggest uses of this size tractor include spraying, tilling, cultivating, tine weeding for vegetables, small grains, row crops and hilling & digging root crops on which at least seven CALS research programs rely.

We currently have one small garden tractor that is fit for very small jobs such as the garden beds or laying plastic mulch; it is used for hours or days at a time. At least eight research teams need this one tractor and when the soil conditions are fit, everyone tends to need it on various implements simultaneously and bottlenecks quickly develop which delay critical planting. If a repair is needed, it can negatively affect many researchers' plans. We need to find ways to share the cost of maintenance or purchase of more modern and safer equipment.

The compost operation continues but our current tractor for compost turning is beyond its useful life and need to be replaced soon. Furthermore, a shed over the compost rows would lessen the environmental impact by reducing runoff and leaching and allow for a more uniform, consistent end product.

Sharing labor and equipment across WMARS and AARS in 2016 was frustrating and less than 22% successful; the majority of scenarios had either negative or neutral outcomes (poor communication, delays in action, equipment/labor unavailable to both sites at once). Both sites have a high volume of research activity, and equipment and labor is needed at both sites simultaneously.