

The County Agent

A publication of the National Association of County Agricultural Agents

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President's Corner - Congratulations and Seats at the Table

Time sure flies when you're having fun.... or as deadlines approach. My time as President seems to have dissolved into thin air. There is much more I had hoped to accomplish but I am proud of our achievements this year.

Congratulations to all the 2022 winners! From DSA, AA, Search for Excellence, Communications and Posters, we highlight many categories for members to showcase superior programming. Not only do these awards help strengthen your dossier, some also money in your pocket. If you submitted for awards, don't stop. If you didn't submit anything, its time to start. If you do the work, take the next step, and apply to be recognized for the efforts. Even if you don't win the prize, we all win by seeing better ways of helping our clients!

We will soon host our first face-to-face AM-PIC since 2019 but it feels much longer than two years. The last two conferences did teach us that going virtual is an option even if its not the preferred method. I thank the last two Presidents for leading us through those challenges. What did you think of the virtual meetings? Should we consider hosting face-to-face most years but every 5th year being virtual? Hybrids are cost-preventative but maybe we can find other options. Share your thoughts with Regional Directors so the Board knows what our members want.

This year we added the Dan Kluchinski Memorial Award to help strengthen leadership abilities for early-career agents. This award was endowed through a generous private donation. Hopefully, others will see benefits of supporting Extension agents through similar donations.

The motto for Mississippi Extension is "Extending knowledge. Changing lives". To me, this means learning or trying something new and changing how we do things to receive a better outcome. I hope



2022 NACAA
President
Bill Burdine

NACAA members are willing to practice what we teach and consider changing some things as well. As the world, technology, budgets, job responsibilities, time requirements and other external factors are rapidly

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changing, maybe its time for us to look at the AM-PIC meeting format closely. Can we find easier, cheaper, more timely ways of completing our mission? I am not making specific recommendations here, but I believe the time has come to be more proactive and less reactive. We are Extension agents who teach change on a daily basis. Let's strive to be able in saying "Do as I do" and not just "Do as I say".

I look forward to seeing everyone in Florida when we go 'Beyond the Beaches'. Let's learn new things, network in the hallways, make new friendships, and have a blast at the beach party.

In my final closing, let me say that NACAA invites every agriculture-related agent to be involved. There is a place at the table for all, but it is up to you to claim your seat. Get involved and make NACAA better than it's ever been.

Thank you to everyone who has offered me encouraging words, suggestions, ideas, and advice over this past year.

Life Corner - Retirement

Retirement. A time to think about un-answered questions, to investigate, to figure out why some things are different while some are just a re-vamping of some ideas that are 100 plus years old.

A time to ask Questions: After driving the backroads of Vermont (and some in NH) for nearly 47 years: Why is the speedometer limit on most vehicles set for 120 - 140MPH when the speed limit on most interstates is set for 65 mph? Why is the speedometer limit on my truck at 120 MPH when it's a 4 cylinder, light duty 13 year old rust bucket and most of my driving is on hilly, curvey, snow covered, icy, often rut filled, narrow, "washboardy" dirt, narrow roads? Why do we have these 120 - 160 MPH speedometers when we are trying to save lives, insurance costs, energy, and much more? Even the top center of the speedometer is higher than the allowable speed limit and certainly above the limit of any sane person driving on those back roads? Some questions just go un-answered. Maybe it's time to get a new truck. The moral of the story: Ask some questions along the way. Extension Specialists/ County Agents are outstanding folks to ask agricultural questions (they may not have answers to all the questions but will try to answer most APPLICABLE questions.) NACAA provides a forum for Extension Agents to talk with peers across the country and ask some APPLICABLE timeless questions.

A Time to investigate: After spending decades in Farm Business Management and looking at what it cost to produce a hundred lbs. of milk, I decided it was time to look at Vermont's second highest agricultural industry - Maple Syrup. What does it cost to produce a gallon of maple syrup? After 12 years of investigating....I get the same answer as I did with dairy - It depends! Every farm is different but what makes it different? What is it that makes it viable? What makes it so unique and satisfying? What are the different and unique tools that farmers use to assist with that viability and what can Extension Agents teach to help with that decision making?

NACAA provides Extension Agents with tours, seminars, programs, and funds for scholarships so you can investigate farms and learn about tools they use to be profitable. Do this by attending the NACAA



*Life Member
Glen Rogers
2005 NACAA Past President*

Annual meetings, and involve yourself in leadership opportunities.

Retirement is a time to learn from the past. Read a century old book entitled "Making farms Pay". It's not just Cash flows, balance sheets, income statements, nor agronomic practices, nor animal husbandry. It all of it put together and much more. University Extension teaches it all and pulls it all together for farmers across the nation. NACAA is one forum Extension Agents can use to learn from each other.

Retirement is a time with the grandkids and recreation. My retirement recreation passion was to Downhill ski – my goal was teach the grandkids how to downhill ski. Seemed like a great idea but my last pair of skis I bought was from 1960 that had leather straps holding my work boots in place. The next pair I bought was in 2017. I was able to keep up with the grandkids until they decided to do a "tuck" down a "black diamond trail". (At 70, a fake knee, plenty of arthritis, glasses, overweight - I'm sticking to the "green" and "blue" trails!) The moral of the story is: Keep going but take some time with the kids along the way. Include the family in the NACAA AM/PICs. Our "kids" still remember: Seattle, Hersey, Fargo, Little Rock, Colorado Springs, Charleston and many more. The impact on them was huge and now their children are on similar educational tours.

Retirement is a time to go back to farming on the old farmstead from 1797. However, take some time to implement those things you've been teaching for decades. Do a business plan, write some goals, take soil samples, do plenty of budgeting, find a market. As NACAA taught me: "Failing to plan is a plan that will fail." Be frugal, but buy new when appropriate "Make money on the borrowed money", If the money cost 6% to borrow, make 13%. Always "have a backup plan" – "don't lock the back door", continue to explore options. "Don't spend your last dollar" and "have an exit strategy". These tools we've all learned many a time thanks to teachers, colleagues, farmers, parents, and others but thanks most to NACAA – our front line colleagues from across the nation.

Retirement is a time to continue to give back to the community. Share your strengths with others. Continue to work with others, and even write a few grants. Volunteer on committees, be it community or farm organizations, continue to be a leader. NACAA teaches you those skills, lets you work on those skills, and will reward you while using those skills. Continue to challenge and enrich the mind. As a result, that home town blacksmith shop lot was purchased, a museum was built, historical programs are being conducted and others are being restored while learning about our history and future potential.

A key part of our success in Extension is NACAA involvement. NACAA provides so many learning, teaching and leadership opportunities. Learn from our past leaders who instilled that in the next generation. The mission of NACAA: "...is to further the professional improvement of its members, communication and cooperation among all extension educators and provide for enhancement of the image of extension and the development of personal growth opportunities for extension professionals." NACAA also gives us lifelong skills we can continue with in retirement.

Don't rest in retirement. "You rest – You rust." Keep moving, keep learning, keep helping others, keep right on teaching, keep searching for new challenges. The satisfaction is real and the trip is wild.



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NACAA Scholarship Experiences 2021-2022

Within this edition of *The County Agent*, are reprints of Educational Experience Reports which each previous award winner has submitted to the NACAA Scholarship Committee. These reports are from within the last 12 months and are quite impressive in regards to the educational value each individual/group experienced. On average, approximately \$18,000-\$20,000 per year is awarded to NACAA members for scholarship purposes.

If you would like to make a donation to the NACAA Educational Foundation, you can do so via credit card on the NACAA website (www.nacaa.com - bottom left hand corner - Donate button), or you can send a check made payable to the NACAA Educational Foundation, and mail to NACAA, 6584 W. Duroc Road, Maroa, IL 61756.

Enjoy reading about the exciting opportunities many of our NACAA members had from receiving funding from the NACAA Educational Foundation.

NACAA Scholarship Educational Experience Report

Sergio Arispe

Livestock & Rangeland Field Faculty—Malheur County Oregon State University Extension Service

“Cooperative extension work is the most successful adult education movement in all history of education. It has become great because of its effectiveness growing from wide scope and sound organization.”

Oregon State College Extension Service
Director Frank L. Ballard (1945-1961)

Since 1916, the NACAA has been at the forefront of public education through the Cooperative Extension Service. After 50 years of the Extension Service in Oregon, the Oregon State College Extension Director at the time,

Frank L. Ballard, made a bold claim that cooperative extension was not just a successful adult education movement, but “the” most successful adult education movement in the history of education. Since then, NACAA has provided thriving opportunities for tens of thousands of members. If you attend an NACAA Annual Meeting and Professional Improvement Conference (AM-PIC), you will experience countless opportunities to ensure cooperative extension continues evolving while driving impact across diverse populations among the US and its territories.

I attended my first NACAA AM-PIC—Sioux Falls, SD—in my second year with Oregon State University. At first, I felt overwhelmed with all the unknown acronyms, committees, councils, and seminars that were each unique to the NACAA. Thankfully, I was enrolled in the “First-Timers” program whereby our association strategically onboarded members attending their first AM-PIC. All the sessions were helpful, but the scholarship fund was most helpful to me because I didn’t have a clue that I could get professional development funds beyond my own university.

Did you know that the NACAA Educational Foundation administers a scholarship fund that distributes thousands of dollars in scholarships to members? During the scholarship session I learned about the value of vesting. For example, just \$60 would make me eligible to then receive up to \$1,000 for professional development or extension programming; if I gave \$100 it would double. At the time, I didn’t know how I would use the scholarship (or when), but I decided to jump in. Little did I know that that decision would have an impact on my current work abroad in Spain.

In 2019, I was reviewing the scientific literature related to cattle grazing behavior when I came across several articles from authors in northern Spain dealing with similar agricultural and ecological challenges that we experience in my region, namely, fire and grazing management. I sent an email to an author inquiring about opportunities to collaborate, which led to fruitful conversations about public education and applied research. We Zoomed several times before I received an invitation to spend a year-long sabbatical as an international outreach/extension and research scholar within the Veterinary College at the University of León.

The Province of León, in the Autonomous Community of Castilla y León, is like Malheur County in southeastern Oregon. It is at the same latitude, altitude, and produces similar agricultural commodities. Livestock producers and natural resource managers in Malheur County and Castilla y León are facing similar challenges related to wildfires, invasive plants, drought, and social pressures. Fortunately, my vesting in the NACAA Scholarship allowed me to be eligible for \$1,000 to put towards short-, medium-, and long-term goals for extension and research programming in León, Spain.

Short-term goals

While in northern Spain the 2022 calendar year, I am: 1) improving video production skills for more efficient video production capacity and capability, 2) increasing professional relationships with international university and industry partners, and 3) providing time to develop innovative ways to teach extension curriculum through a virtual online platform—3DVista. For my short-term research outcomes, I am: 1) improving professional networks by collaborating with an interdisciplinary team at two Spanish universities, 2) improving my Spanish skillset related to research in animal and rangeland science, and 3) improving my skills to train sensor data with observed animal behavior data.

Extension and Applied Research Activities

During my time in Spain, I've engaged with ecology, computer science, and animal science outreach and research faculty at two universities—the University of León and the University of Salamanca. We are working with the Spanish Avileña Breed Association to determine cattle grazing behavior using GPS and GPS+Accelerometer units while applying machine learning to sensor data. Data will be cleaned, processed, and visualized using algorithms integrated into AnimalTracker, a published R Package in the CRAN Library developed by the research team (Figure 1).



Figure 1: Validating the AnimalTracker R Package to clean and visualize cattle behavior.

The Avileña Breed Association, and their cattle producers, are interested in learning the dynamics between grazing location and behavior compared with changes in plant characteristics over time (Figure 2). To determine animal behavior, we've placed GPS and GPS+Accelerometer cow collars on Avileña cows. We will use the data collected to validate the AnimalTracker R package, as well as create a new platform to immediately clean and visualize sensor data.



Figure 2: Conducting livestock grazing applied research for the Avileña Breed Association in Spain.

Takeaways from my International Opportunity

The NACAA Scholarship provides vested members with money towards extension and/or professional development. These funds allowed me to engage in extension and applied research in northern Spain, which is helping engage the Extension Service in global crises. Fully vesting in the Scholarship Fund provides members with the opportunity to professionally develop as public educators and to positively impact our communities nationwide. Here are outcomes from my international experience with the help of the NACAA Scholarship Fund. Thanks to the support of the NACAA Scholarship Fund, this international experience has allowed me to:

- Expand my understanding of how and why other countries collaborate
- Improve my Spanish technical vocabulary
- Experience outreach/extension programming in Spain
- Create an international outreach/extension network
- Develop contacts for possible extension and/or applied research projects to address global crises

Conclusion

Sharing small successes with one another can help us form new networks and/or gain new skills to broaden our overall Extension Service impact across the US and its territories. What would it look like if you vested in the NACAA Scholarship Fund, evolved professionally, and then shared what you learned with other members and agricultural producers? Hopefully it would help move us toward truly becoming the greatest adult education movement of our time.

Panama Market Study Tour Educational Experience Report

By: **Tiffanee Boone & Eileen Coite**, North Carolina State University Extension



The Panama Market Study Tour included a memorable, educational opportunity for NACAA members to learn about the diverse agricultural industry of Panama, including its impact on the United States and the world. Participants were warmly welcomed and given the opportunity to learn history, geography, and facts about Panamanian life and culture. Agricultural experiences during the tour included fruit and vegetable production, livestock, equine and poultry, along with wildlife, and tourism. On-farm research, management, and marketing of agricultural commodities were key components of the tour.

The tour began and ended in Panama City, including a walking tour with historical sites and facts dating back to the late 1500s. There were many interesting facts about Panamanian culture and cuisine, including how locals eat a lot of fried food, particularly fried plantains. Seafood is a common dish, along with many local fruits and vegetables, such as pineapple, bananas, coconut, and mango. Summer in Panama spans from December through



February, and are the driest months. Temperatures don't vary significantly throughout the year. The main difference is rainfall, which increases in March and lasts through November. October is traditionally the wettest month and February is their driest. The abundance of rain during the winter months is needed to fill up the canal, and for the many crops produced.

We were able to tour the Panama Canal locks system on Gatun Lake, which is fed by the Chagres River. The canal is the same as



when it was finished in 1914. It is a gravity lock system, with 52M gallons of water total that drains into the ocean. The canal can accommodate 15K containers per ship. Shipment cost to travel through the canal can be from \$350K to \$1M. The day we visited, the canal generated \$2.4 M income. Ships passing through are 27m above sea level, are raised 54 feet in the locks at a rate of 39" per minute, and it takes 12-14 hrs for ships to clear the locks. After our visit to the canal, we passed through the Continental Divide via the Gaillard cut, and traveled to Gamboa or "Monkey Island" to see rescued/relocated native monkeys, sloths, birds, bats, and turtles.

Our next tour was to a fresh packing pineapple farm. We were told that Panama grows the sweetest pineapple in the world, and we certainly agreed



after tasting it! The farm staffs 50-100 employees, depending on the season, and labor is hard to find. Using a chlorinated water bath, pineapples are graded on the farm and again at a processing shed. 40-50,000 kg of the best fruits are packed vertically and air shipped overseas to Europe within 24 hours, bringing \$1 per fruit vs. \$.25

if shipped via the ocean. The farm rotates with soybeans during a two year break to rest the soil. The farm plants the MD2 gold variety, which was developed by Dole and Del Monte. The 120 hectare farm plants one acre per week, and 25 thousand plants are harvested weekly, using ethylene. 100K plants are grown per acre on 60 acres of clay soil. It takes thirteen months to harvest from planting. Two key employees on the farm are chosen to hand plant the pineapples. Drones are used to manage and count plants. The farm also grows mandarin oranges, lime, plantains, passion fruit, pepper, mango, star fruit, and achoate fruit.

We transitioned from pineapple to chickens, and traveled to an organic broiler farm. We saw 20 weeks old birds that would be marketed to China. The farm's goal is to have 85% uniformity at 18 weeks of age. The farm also raises laying hens, and after 90 weeks of laying, hens are sold for meat. The farm uses rice hulls for bedding, which is abundant in Panama due to rice production. While at the farm, we were able to sample Sancocho, which is Panama's national (chicken) soup.



We visited the National Institute of Agriculture, a public institution who partners with the Ministry of Agriculture, supporting local communities. With 200 graduates per year, food produced on site is used for the students. The organic farm uses crop rotation and other alternative methods of management. We toured the garden and greenhouse area and saw the following crops: cilantro, culantro, sweet peppers, potatoes, yams, coffee, yucca/cassava, corn, rice, tomatoes, celery, onion, cocoa, parsley, oregano,



lemon grass, cucumbers, papaya, plantain, soursop, ginger, repellent plants, such as marigolds, dragon fruit, and various herbs.

Midweek, we visited a beef cattle farm where in the summer, they are able to put 1.5 cattle per hectare and 2 cattle per hectare in the winter.



They have a 1000 hectare farm with 1500 head. They use the Brahman and Simbra (Simmental/Brahman cross) breeds and Miura bulls, which are black and tan. Their pasture is full of Gammagrass and they wean calves at 7 months of age. Cattle are sold at 1000-1200 lb. finished weight at 30 months all year round. Their ten horses are Paso Fino cross (gaited) with Quarter horse and Arabian.

Then we visited a dairy farm called Motta Brothers. It is a family farm with 100 employees and 310 Gyr and Holstein cows. They have 2 milking shifts of 3 groups. One shift is from 1-10 am and the other is from 2-11 pm. The high producing cows give 12 liters of milk per milking and they have 20 milking stalls. This farm also uses rice hulls for bedding in covered pens. They sell the male calves for \$50-\$60 on day 4. There are 8 cowboys that fix fences. They feed a mixed ration of hay, corn, soybeans, and molasses. The grasses they use are brassicas, panicum, and mixed warm season grasses. The cows produce 8-12 liters of milk per milking. 3.75 liters equals a gallon. The companies Bulback and Estrella buy their milk.



The next day, we visited a vegetable and cacao farm, and a horse farm in the Bugaba and Cerro Punta mountain

areas. This is in the western part of the country and it was colder and windy due to the higher elevation. They grow a lot of onions on the side of the mountain and this area is known as the bread bowl because of all the vegetables grown there. We had a cacao (chocolate) visit at a lodge for lunch and learned that it takes 2-3 weeks to air dry cacao beans before roasting.



After that, we visited Haras Cerro Punta Horse racing farm, which was established in 1978 with imported stallions from the United States. They have 375 horses total, 75 of which are stallions. They feed kecuia grass from Austria. There were some Fresian horses, but most were a mix breed of Thoroughbred and Arabian. The tour guide of the farm was very interested in nitrogen fixing trees. Black locust and honey locust trees were discussed, as well as, Autumn olive shrub, which can be invasive.



The next day, we went on a coffee tour at Don Pepe Estate in Boquete. Coffee trees need lots of water to grow. The biggest coffee buyers in the world are Korea, the United States, and Germany. Many countries have government influence and rules, but Panama has a free market with private companies. There are 7 different coffee varieties grown at Don Pepe Estate. There are 4 things that affect coffee; the region, the variety, the process, and roasting. The gold medal winning Geisha variety is the most expensive in the world at \$5000 per kilo! Birds are welcome because they



don't eat coffee, but eat insects. Coffee is good for the environment, by putting in deep roots to prevent erosion. We saw a castor bean tree that contains resin, which is very poisonous, but are grown because of nitrogen fixation and shade. Rats and insects die after they eat part of it, which is important since they are the biggest pests of coffee.

The steps to processing coffee beans are planting, growing, picking, floating, peeling, washing, and drying. We learned to always buy whole beans and grind your own coffee. If the cherries float, they are not good because it means insects have eaten the beans out of it. The locals jokingly call Folgers coffee floaters because it is ground and not pure coffee beans. It has branches, leaves, coffee cherries, and insects in it. They are then sorted by size, shape, color, density, and defects. The coffee cherries are used for tea, which have more antioxidants than grapes. Then we judged the coffee based off smell and taste. We evaluated body (heaviness), acidity, flavor (chocolate, cinnamon, citrus), and aftertaste. We tried 5 varieties: Caturra, Bourbon, Paca Mara, Java, and Geisha.



We have learned so much from this study tour that we are able to bring back and use for our Extension work. We thank you so much for this scholarship that is able to make us better people and more educated Agents for NACAA!

Ohio Sheep Producers Tour Montana

Mark Badertscher, OSU Extension Educator-Hardin County

Hardin County – Three Hardin County people joined an Ohio Sheep Improvement Association and Ohio Farm Bureau Sheep and Agriculture Tour of Montana in September. Local sheep producers Dave Burkhart, Nancy Wilcox, and OSU Extension Agriculture and Natural Resources Educator Mark Badertscher joined a group of 21 sheep producers, sheep industry personnel, and both current and retired OSU Extension Educators on a ten-day trip to Montana to study sheep production methods and marketing techniques. In addition to touring sheep ranches, the group also stopped at various other agricultural production sites and related industry visits, ranging from a wool warehouse, the Montana Ram and Ewe Sale, beef cattle ranches, a vineyard, a meat processing plant, a wool clothing store, Montana State University sheep facilities and wool lab, a distillery, and a wool fiber mill. The trip left the Columbus airport on September 13 and returned on September 22.

Sheep ranches visited on the trip included the Pilster Ranch, which runs approximately 1700 head of sheep and 300 head of Angus cows; the 5-H Ranch, which has 2400 commercial ewes in their range lambing operation and 160 purebred Corriedale ewes in shed lambing; Hollenbeck



Henry Hollenbeck explains the ration fed to his lambs while preparing them for market. He along with his wife Sara, founded High Five Meats in 2015 to sell their own line of beef, lamb, and goat products.



A Peruvian shepherd leads a large group of sheep down the mountain with the help of his working dogs on the Helle Ranch Summer Range after the season's first snowfall of six inches.

Ranch, which runs 350 to 400 cows and averages about 2500 mother ewes that will lamb out every year. The owner, Henry Hollenbeck also serves as a broker for another 30,000 to 40,000 lambs per year. Finally, the group toured Helle's Rambouillet Ranch, which is home of the Duckworth Wool Company sheep flock. While at the Helle Ranch, the group traveled up into the mountains in 4-wheel drive vans to see the Helle Ranch Summer Range.

Other agricultural production farms and industry visits while in Montana included the Center of the Nation Wool Warehouse, which is one of the four largest wool marketing warehouses in the U.S. The group visited the Montana Ram and Ewe Sale three times to see sale sorting, and both sales of rams and ewes offered by various ranchers on consignment. Here the group also attended Montana State University Extension educational presentations with other sheep producers. They traveled to the Tongue River Vineyard to see how wine was made from the grower's grapes, apples, pears, cherries, raspberries, elderberries, and other fruits.

The group toured the Cowboy Meat Company, which is a vertically integrated meat processing plant owned by one of the ranches visited. They learned about how wool is marketed in the form of 100% Made-in-USA Merino wool clothing company at the Duckworth Store. The travels took

the group to the Montana State University to tour both the sheep facilities and wool lab to experience Extension research. The group also visited the Dry Hills Distillery – a farm to bottle distillery making 100% premium potato vodka, flavored vodka, gin, and specialty crafted wheat whiskey. Finally, participants on the tour learned about fiber mill operation and marketing by visiting the Montana Wool Barn.

Cities visited on the tour included Billings, Miles City, Alzada, Forsyth, Molt, Dillon, Four Corners, Cardwell, Butte, Ennis, and Bozeman. Tourist sites visited included Range Riders Museum, Museum of the Rockies, Butte City Underground Tour, and the World Museum of Mining as part of this trip before flying back from Montana to Ohio. This Montana Sheep and Agriculture Study Tour was organized by the Ohio Sheep Improvement Association

and the Ohio Farm Bureau. Upon returning from this trip, Extension Educator Mark Badertscher plans to do presentations at local agricultural meetings and county lamb banquets, along with other service clubs and organizations in his county.

Other related educational trips that this Educator has participated include Sheep and Agriculture Study Tours of the United Kingdom and Ireland, California, and Argentina. Each year he leads sheep production and marketing tours for local producers as well as those in adjacent counties to see sheep operations throughout the state of Ohio. This fall, he also led an educational sheep production and marketing tour to Indiana. His local Hardin County Sheep Improvement Association has been participating in similar educational tours since the early 1990s each fall.

2021-2022 NACAA Scholarship Recipient Educational Experience Report

*Leah Fronk, Extension Educator, Horticulture
Penn State Extension*

As an MS student at Penn State University and Horticulture Extension Educator of the same institution, I am honored and thankful to receive scholarship monies from NACAA. I will use the scholarship to pay tuition for the Fall 2021 semester. During this semester I took 2 classes in-person at Penn State. Plant Disease Diagnosis (PPATH 502) and Microbes and Plants (PPEM 405) proved to be challenging and rewarding courses.

The objectives of Plant Disease Diagnosis were to increase knowledge of causes of plant disease, abiotic and biotic, learn different techniques and strategies to diagnose disease, and how to formulate a diagnosis report and disease

management. Special speakers were lined up for the course including Head Diagnostician Dr. Sara May of the Penn State Disease Clinic. A tour of Dr. May's lab was great opportunity to learn what types of samples are received and how samples are processed from receiving to



Leah Fronk

management recommendations to the customer. We learned that most samples are found to be abiotic in nature. Of those that are biotic, the majority are fungal pathogens. It is very common for disease samples to be in poor condition and no conclusion can be made. Throughout the course, Dr. May would bring samples to class for use in the microscopy lab. As a student, I made slides of the pathogen and compared them to compendiums and other scientific reference books to aid

in identification. Walking throughout campus, samples were taken of plants infected by nematodes, bacteria, fungi, and viruses. The instructor would guide us in using dissecting and compound microscopes (as appropriate), then lecture on the appropriate pathogen. Another interesting lab was phytophthora baiting with pears using pond water. While my sample did not show infection, other classmates' samples did, and it was very fascinating to view the oomycete under the microscope. Weekly scientific papers were a requirement of the class, and written summaries and verbal discussions were expected. Instead of a traditional final exam, the course gave the opportunity to present a webinar to Penn State Master Gardeners on a plant pathogen. I presented a webinar on *Botryosphaeria*, a common fungal pathogen that is found in many soils and infects many different plant species. There were approximately 150 people in attendance. Ultimately, I received an "A" grade in the class.

Microbes and Plants was a course that taught many of the same principles as Plant Disease Diagnosis (PPATH 502). However, the focus was not on the diagnosis, but rather disease cycles and how specific microbes work to infect plants. Plant health management strategies were taught not just for the United States, but globally. Many countries do not have access to products as we do, and there are strategies to be employed to mitigate plant disease in these cases. Contrary to PPATH 502, Microbes and Plants tested knowledge with a series of 4 mid-terms and 1 final exam. Students were expected to know the life cycles of diseases, identification of fungal fruiting structure, types of bacteria, and how viruses replicate. Hands-on labs were very interesting. An example of some of the labs completed included aphid and mechanical transmission of Zucchini Yellow Virus, prepared slides of fungal fruiting bodies, and nematode isolation. An ongoing project using mushrooms and bacterial streaking to test for bacterial blotch further reinforced bacterial culture techniques. Discussion on molecular techniques and other types of testing was introduced. Koch's postulates were discussed throughout time in the lab, and guest speakers on PCR, GMOs and CRISPR technology made a very well-rounded

experience. A group project that focused on international agriculture was completed by me and a classmate on Cassava Mosaic Virus and discussed how Extension in Kenya might educate farmers well on the disease and encourage them to use best management practices. Thankfully, I received an "A" in this class as well.

Both courses, some of the toughest I've taken thus far, were wonderful learning experiences. The knowledge of plant disease cycles and management strategies is helping me in my Extension programming. Learning how to read scientific literature and interpret it for farmers is of great importance in the career of a county agent. Both these classes helped me to gain confidence in reading papers. My Masters committee recommended I take these courses to strengthen my disease diagnosis skills. Since my master's project involves strawberry anthracnose, I have learned valuable lab techniques and ways to organize information that will help me as I complete my research and thesis. I am extremely thankful to NACAA for providing scholarship opportunities to county educators. Even though I receive a tuition discount as an employee, the NACAA scholarship relieved the burden even further, and I plan to pay it forward to the scholarship fund in donations/ auction participation in the future. I thank you sincerely for investing in the education of county agents!



Educational Experience Report- California Agribusiness Tour

Dr. Brittney Goodrich, Extension Specialist UC Davis

After more than two years of planning and postponing due to the pandemic, members of Alabama's Farm and Agribusiness Team were finally able to head to California in March 2022 for an agricultural tour of the northern region of the state. While the original itinerary had to be altered due to restrictions and access to locations allowing visitors, our initial plan was to be able to experience the diversity of agriculture in the region and to glean ideas for Alabama growers. What we didn't expect to see firsthand, however, was the number one discussion at every location and every producer we met- climate change. While climate change is discussed in Alabama and to some degree growers have had to adapt somewhat, in California, every operation has been impacted due to drought, or water regulations, or wildfires, or temperatures changes. Not only are these producers experiencing these climatic changes, but they are also having to constantly adapt their operations to be climate resilient. Although we expected to leave the state

having seen some amazingly diverse operations (which we did), we also left the state with an understanding of how devastating changes in the climate can be for our agricultural producers and how necessary it is for growers across the country to be prepared to adapt.

The group's first meeting with UC Davis personnel, Brittney Goodrich and Don Stewart, to discuss cost studies for California commodities was eye opening in just how expensive a basic part of agriculture could be for producers. Water, if you can access it, is an increasingly expensive input cost for growers. Given the drought conditions and tightening water regulations, a significant portion of variable costs for producing any crop in the region was water costs. In some instances, there are growers who are paying to truck in tankers of water, just to be able to produce a crop. Leaving this discussion and heading to the Sierra Foothills Research Center, the group continued to hear about climate concerns from Dustin Flavell, the Superintendent. While the 5,200 acre center is positioned so that the grazed pastures have relatively inexpensive gravity fed irrigation to irrigate, wildfires threaten the center almost yearly.

Cattle raised at the research station are moved across the property throughout the year based on ability to



The Sierra Foothills Research Center, located in Browns Valley, CA, serves primarily as a livestock research center.

traverse some of the terrain (even the personnel work cattle here on horseback), and the herd is split in case of a wildfire coming through they don't lose the entire herd.



Cattle herd at the Sierra Foothills Research Center is maintained at approximately 130 head.

The group also had an opportunity to visit with Dan Cummings, almond grower and chairman of the board of directors for Blue Diamond Almond. Mr. Cummings, having grown up in an almond producing family, continued the family farm after graduating from college. His understanding of the almond and tree nut industry expands beyond California into other regions of the world that are large producers of almonds, like Spain, and to high demand countries such as India and China. Like all other commodities in California, almond producers are facing



Mr. Cummings points out lack of almonds on trees in parts of the orchard due to late frosts.

production concerns with water scarcity and increased water regulations. California has some of the toughest regulations on water use in the nation as well as water rights in some regions. These restrictions, along with severe drought in the state have lead to some almond orchards being taken out and growers looking to alternative crops to plant. Other orchards have been hit by later than normal frosts resulting in reduced nut production on the trees.

After the almond orchard tour, the group visited Heitkam's Honey Bees, a commercial queen bee operation in the region. This operation raises thousands of queen bees annually to replace pollination hives for almond orchards. This type of livestock operation is part science, part art, to be able to time everything perfectly to ensure queens are removed and placed into hives before they hatch together. While not directly tied to large water requirements, this operation isn't immune to climate change. Bee forage in areas to support beehives when crops aren't blooming are starting to disappear. This lack of forage is taking a toll on their production. Moreover, hives lost each year, because of a number of issues, like pesticides, pests, etc, continue to increase.



The group were shown how queens were identified and removed from nucleus hives.



An example of cover crops planted between almond rows to provide bee forage throughout the season to help support bee populations when trees not in bloom.

After meeting with Heitkam's, our group was able to meet Luke Milliron, a UC Extension Orchards Advisor working with almond and walnut growers in the region. Unlike almond orchards in bloom, walnut bloom isn't as showy as almonds. And while there is quite a bit of production of walnut



in the region, they are secondary to almonds in terms of acres planted to walnut compared to almond. Luke and the growers that he advises have similar issues for tree nut crops as others throughout California, water and water

scarcity are big concerns for current production and future research needs for the crops.

The drive from Chico to the Salinas area took the group through Napa Valley where we had the chance to see vineyards in person, visit some of the local attractions, like Muir Woods, and also gave us the opportunity to visit one of the largest Farmers Markets in Marin County. This farmers market boasted over 200 vendors and even had parking for Chefs buying bulk.



Vineyards of Napa Valley. Miles of vineyards lined the roads while we drove through the area.



The group got to try fresh squeezed tangerine, grapefruit, and blood orange juice from a vendor at the Marin County Farmers Market.



Impressive views of the giant Sequoia trees at Muir Woods.

Our last stop was at the Taylor Farms processing facility in Hansen California, a processing facility that handles over 2,000 acres of produce a week at the one facility alone. The processing facility faces climate change pressure just as other growers do (water demands, produce availability, etc.), but it also must be able to adapt during the pandemic with supply chain issues, transportation

issues, and market changes. Moreover, Taylor Farms is also tasked with ensuring safety of all produce leaving the facility. The company is also focused on ensuring quality while also embracing sustainable sourcing of all products.



This agricultural tour, only possible through the NACAA scholarship program, provided each participant an opportunity to see a tremendous amount of agriculture in a state that can, at times, feel foreign to Alabama Extension. However, the opportunity to visit California made us each appreciate the diversity of the state's agriculture, and more importantly, to understand the urgency with which all growers across the nation need to be prepared to adapt with changing weather patterns if we are to continue to feed the country.

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Panama- A Different Perspective

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In early December 2021, I had the opportunity to travel with a group of extension professionals from all over the U.S. to Panama for an Agricultural Market Study Tour.

Panama is a country of diverse climates and ecosystems and therefore also has a variety of different agricultural offerings and ways to farm. This small country is also the gateway between the North and South American continents with the Panama Canal allowing 30-40 ships loaded with goods to pass through the locks each day. People are generally friendly and open, but nothing happens quickly in Panama, and it moves to an unfamiliar rhythm not typical to what we are accustomed to in the United States.

A country influenced by the different conquests, canal and railroad builders, traders, entrepreneurs, tourists, and the native people; Panama's culture adapts in their architecture, art, and food offerings. This was evident in our tour of Panama City, and throughout the communities we visited.

Having the Atlantic and Pacific Oceans on either side, we had nowhere near enough time to sample the full spectrum of equatorial seafood enjoyed best in ceviche (raw fish tossed with citrus and seasonings). Other popular dishes were local sea bass fried and served with "patacones" (a fried form of plantain), and paella with "langostinos" (a lobster-like crustacean).

Sancocho is a traditional home-cooked soup of Panama, typically made with chicken, yams, and "culantro" (similar in flavoring to cilantro). We were offered a taste by a poultry farmer with a small-scale organic operation. When asked why soup was eaten in the hot tropical climate, he said that it helped with rehydration, it fills bellies, and helps you to recover from a night of partying. Pullets are raised on his farm here to a certain weight, and with a diet to encourage the skin to be yellow, according to the request of the buyers whose market is largely the Asian restaurants in Panama City.

Our group also toured a pineapple plantation with a unique strategy to market high quality plant-ripened fruit

to specialty stores in Europe. This provided the farm with a higher margin of profit compared to shipping green pineapples to grocery stores by boat. They reduced waste by selling pineapples that were ready to be eaten (unable to be shipped long distances) to local markets. The farmer's goals were to be efficient and to produce the highest quality product, which was made clear by their implemented management techniques that also included soil health practices. Agritourism was an area that they wanted to expand in by inviting people out to the plantation, providing them a place to stay with "glamping" opportunities, a taste of the best pineapple they have ever eaten, and a cocktail bar and lounge highlighting pineapple and other fruit mixers where visitors could hangout and enjoy the views.

In Panama, the dairy industry is adapted to the different regions, and climate determines which breeds thrive in the area. Our group visited a dairy in the province of Chiriquí near the Pacific Ocean. These cows did not resemble the Holsteins or Jerseys that you would expect to see on farms in the US. These hot-climate cows called, "Girlando", a cross between the Holstein and the Gyr, a Brahman-like bovine with more dairy qualities, had long ears and extra skin to give them additional surface area to dissipate heat. Their skin secretes an oil to repel insects. The day we visited, it was 86°F with about 55% humidity, not unusual in a region that ranges 74-96°F on an annual basis. Grass grows year-round as well, and the cattle have to be able to withstand the climate, and move about efficiently from pasture to pasture while still maintaining high quality



Girlando cows quietly waiting to be milked on a dairy in Las Lajas, Panama.



Our Extension tour group touring Panama City in December 2021.

milk and component production (which is more similar to a Jersey versus Holstein).

As I was observing the cows, I noticed that they were not in any rush, and most were chewing their cud as they stood beneath shade cloth and sprinklers waiting to be milked. When they were asked to move ahead, they moved calmly, and were eager to enter the parlor. Prepping the cows to be milked was similar to the standard protocols here in the US; cleaning off the udder and teats, dipping and stripping, waiting the appropriate amount of time for milk letdown, and then wiping and attaching the machine to clean teats.

The milkers worked quietly in the parlor, and with purpose. I asked the manager what he believed made this dairy successful. He said the key is that the cows must be relaxed, and that the people handling the cows must be relaxed. He went on to explain that, to him, the common term “low stress handling” meant that the cows are stressed in some way, and therefore you are in fact, working in a manner to reduce the stress. The goal should be to work in a manner that allows the cows to be relaxed. Put another way, there should be no need to lower stress if they are already relaxed. He continued explaining that their dairy operation has good production goals, but they do not push the cows to the point of stress, believing the cows and the people will make you a profit if they are treated well.

Being immersed in a different and more relaxed culture for a week allowed me to take a step back, and reminded me that there are other ideals from which the U.S. dairy industry could benefit. If we could loosen our grip on the “more production at any cost” mentality, and focus more on working relaxed, the cows may stay in the herd longer and the employees and owners may stay in the job longer, and we can enjoy our profit regardless.

Traveling to higher elevations, the scenery and temperature changed, and so did crops grown. We saw people climbing up sloped mountainsides, picking and planting root vegetables by hand. We toured a coffee plantation, and learned about the different varieties and processing practices that went into high quality coffee production. We passed by grazing-based mountain dairy farms, where Holsteins, Jerseys and Swiss enjoyed the cool weather, and came off the slopes to be milked in outdoor parlors.

We also visited the National Institute of Agriculture, a type of agricultural technical school, where students could come to learn about ag practices and growing food in Panama. Access to good educational resources is a large barrier to many people in Panama, and agriculture is not a huge focus, so funding is limited. Regardless, the students who attend this institute often go on to study at other universities, and some take their skills back to home farms. This is also the headquarters for Panama’s national extension agent who carry out small research projects on the property’s acres.

Panama is so agriculturally diverse, and we had a slew of other stops along the tour. These included the Panama Canal, a cattle ranch, a horse farm, and an ecotourism tour which proudly displayed the variety of agriculture and wildlife Panama has to offer. Each experience gave another distinct perspective, and an appreciation for being in each unique place. I would encourage any extension agent to take advantage of NACAA’s scholarship opportunity to travel to not only learn other forms of agriculture, but the culture and people who define it.



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