**NE1941 – Annual Meeting**

**ZOOM – August 18-19, 2020**

Attendance: Mike Westendorf (Rutgers), Masoud Hashimi (UMASS), Jennifer Weinert (Rutgers), Krishona Martinson (UMN), Danielle Smarsh (PSU), Laura Kenny (PSU), Amy Burk (UMD), Carey Williams (Rutgers), Mieke Holder (UKY), Carissa Wickens (UFL), Lori Warren (UFL), Amy Biddle (UDE), Robert Causey (UME), Hannah Lochner (UMN), Paul Siciliano (NCSU), Robin Brumfield (Rutgers)(day 1), Mark Rieger (UDEL), Director of Project (day 2), Bob Coleman (UK) (day 2), Karyn Malinowski (Rutgers)(day 2)

**Tuesday, Aug. 18**

Plans for 2021: Hosted by Masoud at UMASS, Aug. 17-18, 2021 (Tues. / Wed.)

**State Reports:**

Paul Siciliano (NCSU)

* Evaluating forage oats and crabgrass as a means to extend the grazing season. Ten horses were placed on approximately 0.5 acre. After approximately 1 week the project was discontinued due to horses refusing to eat the forage oats. The crabgrass is well established and currently being grazed. The crabgrass project should wrap up in mid-October.
* The second focus area deals with using GPS mapping to evaluate methods aimed at improving uniformity of grazing. The current project will begin this week and aims to evaluate the effect of animal density on uniformity of grazing.

Masoud Hashimi (UMASS)

**Grants**

* A two-year project was funded by MassDEP entitled “Implementation, Remediation, and Education of Selected Best Management Practices to Minimize the Environmental Impact of Two Equine Operations.” The scope of services including implementation of various BMPs such as excluding animals from water sources, improving manure management through aerated composting systems, mud management by installing gutters and French drains, installing sacrifice areas.
* A three-year project was funded by Northeast SARE to research several methods of extending grazing season in New England. In this project researchers and extension educators will collaborate to reach out to animal operations and assist them with pasture management and how different scenarios of extending grazing season fits in their operation.

**Educational training**

* In-person workshop on pasture management (2019), Westhampton, MA (28)
* In-person workshop on pasture management (2019), Big E Exposition, MA (250)
* Webinar presentation on manure and mud management (65).
* Webinar series (6 presentations) in regards to extending grazing season in New England (920 in total)

Amy Biddle (UDEL)

Sustainable Agriculture…Research, Teaching, Extension

At the University of Delaware the Webb Farm serves as a demonstration farm for multispecies (horse, sheep, beef cattle) sustainable pasture and manure management. Winrow composting of manure and vegetative wastes provides a sustainable top-dressed fertilizer for pastures. Pastures are managed using multispecies rotation, proper stocking rates, mowing, and compost fertilization. The UD Webb Farm provides educational experiences for undergraduate classes, interns, and UD Extension workshops.

Laura Kenny and Danielle Smarsh (Penn State)

**Team Members:** Our team consists of extension specialist Danielle Smarsh, extension educator Laura Kenny, and extension associate Bethany Bickel. The team just hired a second extension educator, Brittani Kirkland, who will be based outside Pittsburgh and will start this October.

**Equine Environmental Stewardship Short Couse:** This is one of our flagship courses focusing on pasture and manure management, plus drainage issues. We had to cancel it in fall 2019 due to low interest, and for fall 2020 we are going virtual. We will host a 4-week series, meeting once a week in the evenings over Zoom. An asynchronous online course is also in the early stages of development and will be ready in 2021.

**Train the Trainer:** We have had a Penn State/NRCS partnership for 3 years to help field staff gain confidence in working with horse farm owners. We run a similar Horses 101 course with PA Dept of Ag, and recently combined efforts to create an on-demand webinar series “Understanding Horse Farms.” We delivered a similar presentation for the Delaware Watershed Initiative funded by William Penn Foundation. We are currently working on an Ag 101 online course providing equine content that is very similar to what we use in the Horses 101 course.

**Farm Visits:** these continue to be popular in Pennsylvania. Typically, they are in-person; post-COVID several Zoom farm visits have been attempted with varying success. We have also gotten back into in-person farm visits post-COVID, with masking and social distancing procedures in place.

**On-Farm Programs:** Typically, these are done during the summer, and due to COVID all had to be cancelled. Hoping to resume in 2021.

**Horse Health:** Horse health and nutrition is one of two main focuses of our equine team’s focuses, the other being environmental stewardship/pasture & manure management. We continue to do work educating the public about parasite resistance and managing parasites, and there is high interest in PA. One in-person workshop was completed last fall, and several were planned for 2020, but were cancelled due to COVID. An online workshop is in the works for fall 2020, and an asynchronous online course is almost done and set to launch later this year. We held a horse health symposium in January, and plan for January 2021 to have an online multi-week series to replace the one-day in person event. An online horse hay workshop will be held this October to replace a cancelled in-person workshop that was supposed to be held earlier this year. Finally, we have increased our development of online content this year.

**Lunch and Learn Webinars:** Below is a list of recent webinars we have conducted, with the live attendance number. Those highlighted relate directly to the NE-1941 mission.

Penn State Webinars:

• The Right Bit for the Occasion: 22

• What to Consider Before Breeding Your Mare: 4

• Not Your Grandma’s Metamucil: Dietary Fiber for your Horse: 24

• Rotational Grazing for Horse Farms: 14

• Virtual Horse Pasture Consult: 57

• Besides Riding: Exercising Your Horse from the Ground: 22

• Equine Diet and Exercise During COVID-19: 36

• Joint webinar with county Conservation District: Nutrition and Pasture Management

**Involvement at Large Events:** Luckily, Horse World Expo happened in the early spring this year, so we helped organize and run a seminar room and had a booth with information for horse owners. We provided a webinar on rotational grazing for the virtual Ag Progress Days.

**Hay Testing SARE Pre-Proposal:** We just submitted a pre-proposal for a project exploring “increasing forage analysis practices by hay producers and equine farm owners.” It will involve an online survey about hay buying practices, forage testing on 80 farms (hay producers and horse farms), and an educational outreach component.

**Ongoing and future projects:** Just like everyone else, we are planning virtual events only through winter 2021. We are taking many of our traditional in-person events and making them online. We are continuing to educate the public through webinars, our Facebook page, quarterly newsletters, and infographics.

Krishona Martinson (UMN)

**Hand-Held NIRS**

To evaluate the potential for handheld NIR technology for use on-farm, as well as in research settings. Specific goals included to determine if estimates of nutritional composition are:

–Comparable to those estimated by benchtop NIR and wet chemistry methods

–Capable of reflecting differences in maturity and identify different cultivars among samples

–To optimize sampling methodology

We determined that the unit could accurately predict moisture, dry matter, CP, NDF, TDN, NEL, NEM, NEG, IVTD48, VDFD48, ME lb, ME kg, and TDN 1X. Unfortunately, the unit could not accurately predict NDFD48 and NFC. We are currently validating the unit with fresh alfalfa sampled in 2020.

**Equine Carcass Composting**

The goals of this research project are to…

* Demonstrate the ability to successfully compost equine carcasses during both summer and winter months
* Document concentrations of sodium pentobarbital throughout the composting process
* Educate horse owners and professionals on the process and benefits of equine carcass composting to encourage adoption

To accomplish this, 4 horses were chemically euthanized and composted from September 26, 2019 to April 30, 2020 (“Winter”) and an additional 4 horses were chemically euthanized and composted starting on May 1, 2020 (“Summer”). The summer composting trial is ongoing. During the winter composting period, we found that piles reached >130F within the first few days. As temperatures declined, piles were turned around week 7 and piles reheated to >130F almost immediately after turning. Based on temperature and MN statute, piles were considered "composted" within 10 weeks (however, the trial continued for 7 months). Carcass degradation scores collected at the time of pile tuning (d 50) and after 7 months (d 217) confirmed horses could be successfully composted. Although euthanasia solution was detected at d 50 and d 217, amounts were significantly decreased from d 50 to d 217.

Outreach efforts have included field days (pre-COVID), YouTube videos, Facebook Lives, infographics, and website articles. More are planned as these first efforts included compost pile construction.

**Wednesday, Aug. 19**

Mark Rieger (UDEL), Director of Project

* Experiment Station is asking for more federal money. Legislation is out to give a little relief. $380M divided up by Experiment Stations.
* Trying to get Deans together in NE, talk about hiring freezes and manpower when some retire, work together with other institutions so students can take online classes, think about other ways we can collaborate, joint meetings, etc.
* University enrollment is around a 10% decrease, getting creative in delivery options. Keep anything post-COVID? Take some investments like instructional design and learning materials.
* Extension online courses have been great and will keep that model.

Robert Causey (Univ. Maine)

**Mortality composting** - experience with two real world emergency euthanasia's in Maine showed that farms may need to maintain a store of shavings to serve as bedding for mortality composting. On an impermeable surface this seems particularly important based on experience at UF where noxious fluid accumulated at the bottom of the pile on a concrete slab.

**Pasture as a carbon sink** - there may be an opportunity for research/extension/teaching projects on developing awareness of the ability of pasture to sequester carbon. NC State has a pasture ecology class that addresses this issue. A carbon audit may be the first step. NRCS has grants for carbon sequestration. Could this be the basis of an NE-SARE grant (perhaps multi-species)?

**Demographic of horse teaching and research herds at members institutions** - Age structure of horse herds varied according to need. At NC State they tried to sell animals by their mid-teens so the animal still had value. Others kept an older horse herd for teaching and/or age related research. When older horses were euthanized for medical reasons it was used as a teaching opportunity, such as anatomy lab. Most universities appeared to have a relationship with horse rescues, and some universities did not own the horses they used for research, returning them to the owner (usually, but not always a horse rescue such as the SRF).

Amy Burk (Maryland)

The following manuscripts were submitted and under various stages of review:

* Effects of grazing muzzles on behavior and physiological stress of individually housed miniature horses., Davis et al. 2020. Appl. Anim. Behav. Sci.
* Effects of grazing muzzles on voluntary exercise and physiological stress of a miniature horse herd., Davis et al. 2020. Appl. Anim. Behav. Sci.
* Relative traffic tolerance of warm-season turfgrasses and suitability for grazing by equine. Jaqueth et al. 2020. J. Equine Vet. Sci.
* We created 12 monthly pasture management tips infographics to teach horse owners
* We held a weekly webinar series in May and June of 2020 which featured 6 pasture management related topics. We had 184 online participants and currently 321 view of the archived webinars on YouTube

We had a grant funded:

* Implementing rotational grazing practices on livestock operations in Maryland, $78,076, 3 years. NE SARE. Dr. Amanda Grev, P.I.

Proposed projects for 2020-2021 include:

* Implementing rotational grazing on livestock farms grant project
* Conducting a follow-up study with ponies on the effects of grazing muzzles on horse well-being and behavior.

Proposed outreach projects for 2020-2021 include:

* Exploring new funding model for the equine rotational grazing site
* Hosting Maryland Horse Month in October 2020 with webinars geared towards environmental stewardship
* Working with industry partners to develop a centralized equine resource website

Mike Westendorf (Rutgers)

Planning to complete a survey to determine factors that equine producers use when making environmental decisions

* Format:
  + Online focus groups with equine producers and technical service providers
  + Qualtrix survey e-mailed to equine producers in the State of New Jersey
* Focus areas:
  + State regulations
  + Manure management
  + Streams and waterbodies on-farm
  + Soil erosion and pasture management
  + Mortality

Carissa Wickens (Univ. Florida)

**Abstracts:**

Vasco, A.C., K. Brinkley-Bissinger, V.R. Paschoal, J.M. Bobel, L.K. Warren, C.L. Wickens. 2020. Fecal pH, dry matter, and volatile fatty acids of horses grazing legume-grass mixed pastures. Accepted for presentation at the American Society of Animal Science Annual Meeting. Virtual Meeting, July 19-23.

Vasco, A.C., A.M.A. Esquivel, E. Seals, F.Q. da Rosa, M.O. Wallau, L.K Warren, C.L. Wickens. 2020. Grazing behavior of horses managed on legume-grass mixed pastures. Accepted for presentation at the American Society of Animal Science Annual Meeting. Virtual Meeting, July 19-23.

Rivera-Melendez, F.P., M. Lusk, C. Wickens, J. Hinton, S. Bollin. 2020. Hillsborough County horse owners learn about manure management and benefits of composting. Accepted for presentation at the National Association of County Agricultural Agents Conference, Virginia Beach, VA. (Rescheduled to September 29-October 1 due to COVID-19).

**Trade publications:**

Vasco C., and C. Wickens. 2019. Importance of forage and forage testing. The Florida Horse (December issue):40-42. Available at: https://issuu.com/floridahorse/docs/fh\_dec2019

**Multi-media presentations:**

Hiney, K., C. Wickens, C. Williams, K. Martinson, B. Greene. 2019. Pasture peculiarities: The story of Florida, New Jersey, Minnesota, and Arizona. Extension Horse Tack Box Talk. Recorded December 19. Available at: https://podcasts.apple.com/us/podcast/pasture-peculiarities-story-florida-new-jersey-minnesota/id1492355719?i=1000460212446 109 downloads.

**Infographics:**

Created a series of 13 infographics on best management practices for equine operations with emphasis on appropriate manure management, composting of horse manure/stall waste, and water resource protection guidelines.

**Extension and Outreach Presentations:**

Wickens, C. 2020. Managing manure on equine operations through composting. Louisiana State University, Ag Center Webinar. Delivered April 22 via Zoom. 14 live webinar participants. Available at: https://youtu.be/pyOWCiGlnf8 (Oral). 14 YouTube views. 187 Facebook views.

Wickens, C. 2020. Characterizing the impact of manure management practices on water quality: Composting at equine stock facilities project. Southwest Florida Water Management District Funded Project. Hernando County Ground Water Guardians Meeting. January 23, Brooksville, FL. (Oral)

Mieke Holder (Univ. Kentucky)

**Projects in progress:**

* Species comparison project evaluating environmental impact of feces from horses and cattle fed similar diets (sample collection phase)
* Trace mineral supplementation: Effects on environmental impact characteristics of manure (data analysis almost complete)
* Aerated compost facility for the small horse farm owner

**Publications:**

Published: (Sustainability: Sustainability in the equine industry section)

Ashley L. Fowler, Mieke Brümmer-Holder, and Karl A. Dawson. Dietary Trace Mineral Level and Source Affect Fecal Bacterial Mineral Incorporation and Mineral Leaching Potential of Equine Feces. Sustainability: 2019, 11, 7107; doi:10.3390/su11247107

Submitted: (Sustainability: Sustainability in the equine industry section)

Ashley L. Fowler, Mieke Brummer-Holder, and Karl A. Dawson. Trace mineral leaching from equine compost

Accepted Abstract (Poster): World Sustainability Forum (September 15th – 17th, 2020)

A.L. Fowler, M. Brummer-Holder, and K.A. Dawson. A comparison of mineral leaching from equine feces and equine-sourced compost

**Summary:**

* Feeding higher levels of trace minerals did result in higher fecal trace mineral concentrations compared to a control diet. Amount of trace mineral leached from these fecal samples were higher, but percentage of total mineral available to leach was similar across low and high treatments.
* Fecal bacterial mineral incorporation was negatively associated with mineral leaching, and may be an avenue to further evaluate.
* Correlations between leached minerals indicate that one mineral may affect the mobility of another.
* Composting the same fecal material did not change the patterns of leaching observed, but did reduce overall amount of leaching observed.
* This study confirms in a controlled environment that composting does reduce leaching of trace minerals.

Carey Williams and Jennifer Weinert (Rutgers)

Rotational Grazing publication:

Williams, C. A., L. B. Kenny, J. R. Weinert, K. Sullivan, W. Meyer, and M. G. Robson. 2020. Effects of twenty-seven months of rotational vs. continuous grazing on horses and pasture condition. Transl. Anim. Sci. 4:1-17. doi: 10.1093/tas/txaa084

Weinert, J. R., A. Biddle, C. A. Williams. 2020. Fecal Microbiome of Horses Grazing Integrated Warm- and Cool-Season Grass Rotational Pasture Systems. ASAS abstract.

The objective of this study was to characterize shifts in the fecal microbiota of horses grazing different forage types within integrated cool- and warm-season grass (CSG; WSG) pasture systems and to explore relationships between forage nutrients and microbial composition. Eight mares grazed integrated rotational systems containing mixed CSG and one of two WSG: bermudagrass or crabgrass. Fecal samples were collected after 2-3 weeks grazing WSG, CSG, and following an orchardgrass hay diet (HAY). Forage nutrients were determined by near-infrared spectroscopy and analyzed by two-way ANOVA in SAS (v.9.4). Following DNA extraction, 16S rRNA gene sequence analysis was conducted in QIIME 2 (v.2020.2) with Kruskall-Wallis tests for alpha diversity, Spearman correlation with forage nutrients, and taxonomic assignment with Greengenes. A random forest classifier and regressor determined ability to predict forage type and nutrients based upon bacterial composition. Statistical significance was set at p ≤ 0.05. Forage water-soluble carbohydrates (WSC) were greatest in CSG and lowest in WSG; neutral detergent fiber (NDF) was greater in HAY than CSG or WSG. Species richness and evenness (Shannon Index) was greater in horses adapted to WSG vs. CSG or HAY and was correlated with WSC (rs = -0.49) and ethanol-soluble carbohydrates (ESCrs = -0.62). The random forest classifier resulted in model accuracy of 1.0 and identified amplicon sequence variants (ASV) most important in prediction of forage type. Sixteen ASV were from the order *Clostridiales* including *Lachnospiraceae, Ruminococcacceae, and Veillonellaceae* families and the genus *Coprococcus.* Other important taxa included *Prevotella spp., Streptococcus luteciae,* and *Fibrobacter succinogenes*. The regressor accurately predicted WSC (r2 = 0.95) and ESC (r2 = 0.84), but not NDF (r2 = 0.09). These results suggest that the equine hindgut microbiome is impacted by forage type and soluble carbohydrate content. However, further research is required to determine functional and physiological significance in grazing horses.

SARE grant results…

Summer re-growth of previously established Bermudagrass (BER) (in 2018) in the full pasture sections was poor and winter-kill was extensive. Re-seeding of BER sections (2019) also resulted in inadequate establishment even following repeated application of N fertilization and managing weeds with 2,4 D and mowing. Of the three sections planted with BER, one section had so little BER established that it was not possible to graze. The remaining two sections were evaluated and grazed, but prevalence of the planted BER was ≤ 60%. Only one rotation of each BER section was possible, as the delay in establishment resulted in inadequate re-growth for subsequent rotations prior to the onset of cooler temperatures at the end of the BER growing season window. ‘Quick n Big’ Crabgrass (CRB) was very easy to establish and grew enough to graze through mid-Sept. Ideal forage to bridge the ‘summer slump’ gap which is in mid-July through mid-Sept. The Sward Height, Herbage Mass and horse Carrying Capacity were greater during the summer slump months than the cool season sections and our cool-season control. However, later in the fall there were no differences in these measures. The establishment of the CRB was very easy and establishes quite quickly. Good forage for even inter-seeding into an existing cool-season pasture.

Grants to collaborate on:

NESARE? Mortality composting

Fall meetings/webinars

GPS tracking devices collaborative project