

RUTGERS UNIVERSITY EQUINE SCIENCE QUARTERLY



From Our Stable To Yours
Winter 2022

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**Rutgers Annual
Horse Management Seminar**
VIRTUAL 2022 Edition
Tuesdays @ 6:30 - 8:30 PM
Series of 3 evening webinars, join 1 or all 3!
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Meet The New Co-Chairs For The Rutgers University Board For Equine Advancement

The Rutgers University Board for Equine Advancement (RUBEA) recently elected the new Co-Chairs who will lead the board over the next four years.

RUBEA's mission is to assist the Rutgers Equine Science Center in its decisions regarding its equine teaching, research, and outreach; and to promote and support these activities through fund-raising and advocacy efforts.

Their vision is to be recognized as the advisory, advocacy, and fund-raising organization for the Rutgers Equine Science Center, meeting the financial needs for its sustenance and growth.

Membership on the board over the years was refined to emphasize individuals and organizations who impact the horse industry, not only in New Jersey but nationally and internationally, and have the desire

and wherewithal to assist the Equine Science Center in meeting its fund-raising goals.

Exiting Co-Chairs Dr. Amy Butewicz and Mr. Warren Zimmerman stepped down at November RUBEA meeting, where the new Co-Chairs Ms. Beth Gates and Mr. John Goedecke were inaugurated.

Since then Ms. Gates and Mr. Goedecke have been working to prepare to lead their first meeting as Co-Chairs in February, and to increase new board membership.

As it gets closer to February, the Equine Science Center decided to interview the new Co-Chairs so that it's constituents could get to know them.

They were more than happy to introduce themselves, let everyone know how they got involved with the Equine Science Center, and most

From The Clubhouse



**We look forward to
seeing everyone at our
first in-person event in
March with the
“Junior Breeders
Livestock Symposium”!**

Dear Friends,

Happy 2022 to you all. I certainly was glad to see 2021 end and hope for all of us that we see some light at the end of the pandemic tunnel in the coming year. I truly miss seeing everyone in person but the Center continues to host successful education programs virtually.

*I would like to take this opportunity to introduce you all to the two new co-chairs of the Rutgers University Board for Equine Advancement (RUBEA) – Beth Gates and John Goedecke. Both Beth and John have had careers in banking, budgeting and finance, and I look forward to their leadership on the board. To learn more about our new Co-Chairs, take a look at **Page 1**.*

I also want to recognize and thank Dr. Amy Butewicz and Warren Zimmerman who co-chaired RUBEA for the past four years. Under their leadership RUBEA crafted a new business plan, a RUBEA Strategic Plan, revised by-laws, and several successful fundraising campaigns. Amy and Warren have two years remaining as board members, and can participate in RUBEA activities as long as they wish as Chair Emeriti.

On November 11, Veterans Day, we hosted a successful virtual “Evening of Science and Celebration”. Our keynote speaker Dr. Sarah White-Springer presented, “The Mighty Mitochondria: the Importance of Muscle Health for Optimal Equine Performance.” Thanks Dr. White-Springer!

The “Evening of Science and Celebration” event also featured presentations of two annual awards. The Center’s “Spirit of the Horse” award was received by Assemblyman

Ronald S. Dancer; and the Gold Medal Horse Farm Award, given by the Center and the New Jersey Department of Agriculture to a farm that practices environmental stewardship, was received by Topline Farm in Alexandria Township. To view the recording from the event, please go to:

<https://go.rutgers.edu/Evening2021Recording>

Ph. D. candidate Ellen Rankins continues to receive accolades, and on January 11 received the Wilbur M. Runk award from Rutgers Cooperative Extension. This is a monetary award for a Ph.D. student working with an Extension Specialist. I am very proud to be able to mentor this outstanding woman with my colleague Ken McKeever. Way to go Ellen!

*Speaking of Ellen, she is continuing her research for the Equine Assisted Services for veterans with PTSD. She is still recruiting veterans, male, ages 18-75 who faced combat, both with and without PTSD. We also need non-veteran control males to pair match with the veterans. Please contact Ellen at **Rutgerseaat@njaes.rutgers.edu** to participate in this wonderful study.*

*For our first event of the year, we are going virtual for the Horse Management Seminar series. The series will consist of three consecutive Tuesday evenings, February 8, 15, and 22 from 6:30-8:30 PM. For more information, take-a-way messages from our speakers, and to learn how to register, visit our “From the Lab” section on **Page 6**.*

*Dr. Jennifer Weinert-Nelson, USDA-ARS Post-Doc and former Rutgers Ph.D. Student; and Dr. Carey Williams, Extension Specialist in Equine Management, have finished a Fact Sheet on “Crabgrass Integration in New Jersey Horse Pastures” with some wonderful information for anyone with a pasture. Take a look on **Page 13** for a preview, and a link to the whole thing!*

*Finally, join the Center as we celebrate the over 36 years of service to Rutgers Cooperative Extension and the equine community by 4-H Agent Ms. Carol Ward. I had the honor of interviewing her for this story and can’t wait to tell you all about her dedication to both the equine and 4-H community. Take a look at **Page 14** for the full story. We wish the best of luck to you Carol, thanks for the many years of service and memories!*

We hope to host you all in person at two events later this spring. The Junior Breeders Livestock Symposium in March, and Ag Field Day at Rutgers Day in April. For more details take a look at the next page! We can’t wait to see you all there!

*Best In Good Health,
Karyn*

PARTNERS



New Jersey Farm Bureau's primary purpose is to represent the overall interests and improve the financial well-being of farmers and our \$800 million industry. NJFB activities are supported through voluntary membership and annual dues. Members have access to:

- Staff assistance on farming issues and regulatory problems.
- Educational workshops on topical issues such as farm labor, wildlife damage, and zoning.
- Weekly updates on legislation news and regulations affecting all aspects of farming.

It pays to be a NJ Farm Bureau member! For a full list of membership levels and benefits, or to sign up, visit: www.njfb.org.



UMH Properties, Inc., is a real estate investment trust that owns and operates manufactured home communities in seven states throughout the northeast.

UMH has been in business since 1968, operating as a public company since 1985. Owning a portfolio of over 90 manufactured home communities, housing approximately 15,700 home sites.

In addition, owning over 810 acres of land for the development of new sites. It is our mission as a company to provide the best quality affordable home for the hard working residents of Pennsylvania.

UMH communities are perfect for residents of all ages, let us help up you find your dream home today.

For more information about UMH Properties, Inc., please visit: www.umh.com



The New Jersey Department of Agriculture (NJDA) is an agency which oversees programs that serve virtually all New Jersey citizens. One of the Department's major priorities is to promote, protect and serve the Garden State's diverse agriculture and agribusiness industries.

In addition to the programs we offer to support production agriculture, NJDA also manages programs that feed schoolchildren, distribute surplus federal foods to soup kitchens and pantries that serve our needy citizens, conserve precious soil and water resources, protect farmland from development and preserve it for future agricultural use, expand export markets for fresh and processed agricultural products, and promote our commercial fishing industry, and administer the complete program of agriculture, food and natural resource education, which includes the State FFA Association.

For more information about NJDA, please visit: www.nj.gov/agriculture



Boehringer Ingelheim Animal Health is the second largest animal health business in the world, with presence in more than 150 countries, and a significant presence in the United States, with more than 3,100 employees in places that include Georgia, Missouri, Iowa, Minnesota, New Jersey and Puerto Rico.

The lives of animals and humans are interconnected in deep and complex ways. We know that when animals are healthy, humans are healthier too. Across the globe, our 9,700 employees are dedicated to delivering value through innovation, thus enhancing the well-being of both. Respect for animals, humans and the environment guides us every day. We develop solutions and provide services to protect animals from disease and pain. We support our customers in taking care of the health of their animals and protect our communities against life- and society-threatening diseases.

For more information about Boehringer Ingelheim Animal Health, please visit: www.boehringer-ingelheim.us

UPCOMING 2022 EVENTS

Horse Management Seminar Recent Advances in Veterinary Medicine

Tuesday, February 8, 2022

This year we have gone VIRTUAL! Join us for 3 fun filled nights of learning from 6:30pm - 8:30pm.

<https://go.rutgers.edu/2022HMS>

Horse Management Seminar What's New in Equine Genetics and Health

Tuesday, February 15, 2022

This year we have gone VIRTUAL! Join us for 3 fun filled nights of learning from 6:30pm - 8:30pm.

<https://go.rutgers.edu/2022HMS>

Horse Management Seminar Recent Advances in Equine Nutrition

Tuesday, February 22, 2022

This year we have gone VIRTUAL! Join us for 3 fun filled nights of learning from 6:30pm - 8:30pm.

<https://go.rutgers.edu/2022HMS>

Junior Breeders Livestock Symposium

Saturday, March 26, 2022

This year's event will return to in-person from 9:00 a.m. to 3:00 p.m. The best part... IT'S FREE!

eppinger@njaes.rutgers.edu

For more events, visit our website @ esc.rutgers.edu

Meet The New Co-Chairs For RUBEA

Continued from Pg. 1

importantly, why it matters so much to them.

(The interview below was left in it's original format in order to better delineate answers.)

Equine Science Center (ESC): Please provide us with some of your background, i.e. where you grew up, attended school, etc.

Ms. Beth Gates (BG): I grew up in Ewing Township, NJ, along the Delaware River. My grandparents gave their four daughters each a building lot adjacent to their home, where the sisters all built their own homes.

I grew up in a household of five brothers surrounded by Aunts, Uncles, lots of cousins, and my grandmother and grandfather. My parents both had horses growing up, and they indulged my love of animals.

I attended Lycoming College with degrees in Business and German, and received an M.B.A. from Rutgers Newark.

Mr. John Goedecke (JG): While my parents are from Essex County, I grew up in Camp Hill PA, a community near Harrisburg. I attended St Joseph's University in Philadelphia and graduated with a BA in English.

After college I settled into work in New Jersey, my first set of jobs out of college included working as a riding instructor at Suburban Essex Equestrian Center in West Orange, NJ where I rode and taught for 5 years.

From there I began my career in banking and settled into the Bucks County / Princeton NJ area where I have been ever since.

ESC: What is your first memory of interacting with horses, or reason that you became interested in horses?



Ms. Beth Gates on Sugar Jet, (Pam Weidel's pony who helped her learn to ride) in her parents' back yard.

BG: I was born with horses on the brain. They are in my DNA. Pam Weidel, a name that the Equine Science Center knows and loves, lived in my neighborhood. She had a Palomino named Miss Fanny Fan Fair and a little black pony named Sugar Jet.

I used to stand at her fence and watch her ride. She noticed me one day and let me get on Sugar Jet and I promptly fell off! I was nine years old.

I spent the rest of grammar school and most of high school getting up early in the morning to feed her horses and clean stalls before school. Of course, there was baby-sitting involved too! I learned to ride.

In grad school I worked three days a week at her Arabian racing/breeding Boxwood Farm. A short time after I graduated from Rutgers, and was employed, I purchased from Pam the horse love of my life, her first Arabian racer, PW Serr Jule. I owe so much to Pam for the opportunity she gave me.

IG: I was fortunate to have supportive parents who encouraged me to learn to work with Appaloosas at a local stable. Under the supervision of a trainer with whom I still maintain a relationship, I competed as a youth rider in both English and Western and continued as a young adult in West Orange.

ESC: How have horses impacted your life?

BG: I look at horses and feel pure joy. They are beautiful, strong, soulful. When I need to summon confidence, I remember how it felt when I used to ride really well! I try to carry that feeling with me. When I need to feel grounded or comforted, I bury my face in their necks.

I believe horses bring out the best in those who love them. They certainly give back so much to their humans. My husband and I share a life with three horses now; a rescued Arabian gelding who is 27, an Oldenburg second level dressage mare, and an Appendix Quarter Horse mare we raised from a foal.

IG: Everyone of the horses that I rode, showed, and later taught students with have taught me about honest partnerships and hard work and positive outcomes.

ESC: What has been your professional career?

BG: My career has been in budgeting and finance mostly. My first job after grad school was in mortgage banking. After that, I spent time between the public and private sectors, working for the Legislature and a state department before I

found my way to the water industry.

I worked for a water utility and finally for the New Jersey Water Supply Authority where I started as Director of Finance and ultimately served as Executive Director.

IG: My banking career has centered around providing home mortgage lending services for clients who may be purchasing and moving into a community, or refinancing to improve their current home loan.

I have chosen to work for a larger organization throughout my career so that I can offer my services for clients not only in the immediate area, but also throughout the country.

ESC: What have been the biggest challenges and rewards of that career?

BG: While at the Legislature, I worked on the State budget and loved the big picture perspective. I gained an understanding of every department in State government and was able to impact State policy. It was challenging to get to a consensus among legislators where budget and tax issues are concerned and so rewarding to finally reach a consensus.

The Water Supply Authority turned out to be, I discovered, the job that fed my other passions - clean water, land acquisition for watershed protection, love of rivers, and managing and maintaining a financially healthy organization.

IG: The opportunity to manage a process which for many is emotionally and financially charged. Often times it is the biggest financial decision for a client. In addition, the process of moving is one which is exciting and emotionally charged. Ensuring that it occurs based upon the plans and aspirations of the client is very rewarding as often as it may occur.

ESC: How did you get involved with Rutgers University?



Lab Notes - Dr. Williams

From The Lab:

Join Dr. Williams as she hosts the Virtual Horse Management Seminar, taking place throughout the month of February.



THE TOP TAKE-A-WAYS

(Continued On Next Page)

Dr. Sarah Gold

What Is New, Tried And True With Equine Rehabilitation And Conditioning?

There is a role for maintenance joint therapy for diagnosed injury, but this should not be confused with preventative care.

There are multiple strategies that can be easily incorporated into the equine athlete's routine care that can improve the longevity of performance in the equine athlete.

It was decided this year to keep the Horse Management Seminar virtual, the same as it was last year, with the same Q&A allowing plenty of time to ask speaker questions.

The seminar will consist of three Tuesday evenings in February, the 8th, 15th, and 22nd.

Each evening will feature two speakers that have conducted very recent work in their specialty field, and therefore we are titling this Horse Management Seminar the "Recent Advances" edition.

Each evening will focus on one topic area and will end with an 'Ask the Expert Live' panel, hosted by Dr. Carey Williams and joined by the evening's speakers.

They will have time to answer guests' questions on their presentations, or anything else in the subject area that guests might have a burning desire to ask.

The weekly webinars will run from 6:30 to 8:30 PM, and those interested can register for one or for all three.

The best part... the webinars will be free to our audience!

However, in order to facilitate a more engaged live-audience with our speakers, there will not be an archived posting of the webinars immediately after the program. So make sure to put the live webinars on your calendar!

In addition to the presentations, the seminars will feature a "Words from our Sponsors" where you can ask various companies your questions about the products related to the topics in that evenings seminar.

If you own or are a sales representative for a company that you think would be interested in a sponsor spotlight in this year's seminar, please email Dr. Carey Williams at the address below. You will also have ample time for live discussions with the evening's presenters during our Q & A panel.

Please see the registration information at: <https://go.rutgers.edu/2022HMS>

For questions, please contact Dr. Carey Williams at carey.williams@rutgers.edu.

Dr. Mark Crisman

**New Advances with Equine Diseases -
Lyme, EHV, PHF, and more!**

Foals are at high risk for rabies infection due to their inquisitive nature. A recent study out of Kentucky has demonstrated that foals born to well vaccinated mares had passively acquired antibodies for rabies fall below protective titers against rabies by 4 months of age. AAEP foal vaccination guidelines now recommend initial vaccination should begin by 4-months of age.

A recent study conducted at Virginia Tech evaluated the immune response of 2 different Potomac Horse Fever (PHF) vaccines. One vaccine (monovalent) contained only PHF and the second vaccine (multivalent) contained PHF and Rabies. Results demonstrated that the multivalent vaccine elicited a very poor PHF antibody response while the immune response to the monovalent (single) PHF vaccine was better.

Continued Take-A-Ways

Dr. Samantha Brooks

Genomics In The Horse Industry: Discovering New Questions At Every Turn

Genetics and genomics tools have driven unexpected discoveries across diverse fields of equine research including nutrition, reproduction, and exercise physiology.

Unrecognized benefits (in physiology or in market value) of deleterious alleles, may be an important force increasing the frequency of some genetic diseases in modern horse breeds.

Genomics is a natural fit for the horse industry, where the study of pedigrees and relatedness is centuries old.

Anna Draeger

New findings On CBD/Hemp In Horse Nutrition

Many claims exist concerning the capabilities of CBD and hemp-based nutraceutical products. Each product should be carefully considered regarding clinical effectiveness per condition and animal species.

While oral CBD products are absorbed in horses, additional research is needed to better understand pharmacokinetics necessary for appropriate dosing and standards for competition regulation.

Current data supports that nutraceutical CBD products should be investigated further for their impacts on reactivity and behavior.

Dr. Amanda Adams

Equine Metabolic Syndrome: What Is ID, Why Do We Care, And How Do We Manage?

Insulin dysregulation (ID) is the endocrine disorder of EMS, both obese-EMS and lean-type EMS horses; both ID and hyperinsulinemia are the driving factors to the development, and of chronic reoccurring bouts of laminitis.

Endocrinopathic laminitis or now called 'hyperinsulinemia-associated laminitis (HAL)' is arguably one of the most important causes of morbidity and mortality in horses and ponies worldwide.

Prevention of HAL depends on the ability to diagnose and control ID. The oral sugar test (OST) is a dynamic test used to diagnose ID. Our recent research indicates, season, dose, fed vs fasted state and individual responses need to be considered when diagnosing ID.

Dietary management of ID is critical in helping prevent laminitis, and these nutritional recommendations should not be derived from Non-ID horses. NSC is the main driver of postprandial insulinemic responses in ID horses, and thresholds should be considered.

Dr. Jennifer Weinert-Nelson

Nutrition And Rotational Grazing, Metabolism, And Microbiome

The equine hindgut microbiota is relatively stable as horses transition between grazing cool-season and warm-season grasses.

The hindgut microbiota of grazing horses is most influenced by protein and non-structural carbohydrate concentrations, rather than fiber, of pasture grasses.

The Virtual Horse Management Seminar Program:

February 8th - Recent Advances in Veterinary Medicine:

"New Advances with Equine Diseases - Lyme, EHV, PHF, and more!"

**By: Dr. Mark Crisman, DVM, MS, DACVIM, Senior Veterinarian, Equine Technical Services,
Zoetis**

"What is new, tried and true with equine rehabilitation and conditioning?"

By: Dr. Sarah Gold, DVM, DACVSMR, B.W. Furlong & Associates

Recent Advances in Veterinary Medicine "Ask The Experts" Panel

February 15th - What's New in Equine Genetics and Health:

"Genomics in the horse industry: discovering new questions at every turn"

By: Dr. Samantha Brooks, University of Florida

"Equine Metabolic Syndrome: What is ID, why do we care and how do we manage?"

By: Dr. Amanda Adams, University of Kentucky

What's New in Equine Genetics and Health "Ask The Experts" Panel

February 22nd - Recent Advances in Equine Nutrition:

"Nutrition and rotational grazing, metabolism and microbiome"

**By: Dr. Jennifer Weinert-Nelson, formally Rutgers University,
currently USDA-ARS Post-Doc, Lexington, KY**

"New findings on CBD/Hemp in Horse Nutrition"

By: Anna Draeger, Murray State University

Recent Advances in Equine Nutrition "Ask The Experts" Panel

To register and learn more, please go to: <https://go.rutgers.edu/2022HMS>

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Series of 3
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**Feb. 8 -
Health &
Disease**

Recent Advances in...

**Feb. 15 -
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**Feb. 22 -
Nutrition**

Topics Include:

**CBD/Hemp in
Horse Nutrition**

**Equine
Diseases**

**Rehabilitation
& Conditioning**

**Equine
Metabolic
Syndrome**

**Genomics and
the Horse
Industry**

**Grazing and the
Microbiome**

Speakers From:

**BW Furlong &
Associates**

**Murray
State University**

**University of
Florida**

**University of
Kentucky**

Zoetis

**Rutgers
University**

A full program and registration details, see:

<https://go.rutgers.edu/2022HMS>



RUTGERS



Equine Science Center
Better Horsecare through
Research and Education

Meet The New Co-Chairs For RUBEA

Continued from Pg. 5



Ms. Beth Gates with VE Alex Bey, an Arabian rescue, about 7 months after it was rescued by Gates. She took it in when it was 12 years old, skin and bones, and was able to bring it back to health. They are pictured above after their first hunter pace.

BG: I became aware of the Equine Science Center years ago when I attended an event with a friend. We saw an impressive demonstration at the Physiology Lab, then took a bus trip down to Special Strides and then to the NJ Equine Clinic. I was incredibly impressed with the science. I also ran into Dr. M occasionally at NJ farm tours. In early 2020, I had some extra time to volunteer for efforts supporting animals and my resume found its way to Dr. M.

JG: I have been in the process of rediscovery of the human/horse relationship through ground based (non-riding) Equine Assisted Learning programs. I was impressed with the work of the

Rutgers Equine Science Center in science-based discovery of positive outcomes for ground based interactions.

As I learned about the history of the efforts of the Center, I have come to understand its importance to the scope of equine businesses; the impact to the economic well-being of NJ, as well as the importance of science based studies for the proper care and development of horses and humans.

ESC: In your own words, why is the Equine Science Center important (to Rutgers, the State, etc.)?



Mr. John Godecke pictured riding a horse during a trip to Ireland in 2019.

BG: New Jersey is home to so many professional horsemen and women, enthusiasts, boarding facilities, racing farms and tracks, small backyard farms, and the businesses and hay farmers who support the needs of horses and horse owners.

I responded to the 2007 Economic Impact Study questionnaire. The Center is important to Rutgers and the State because the horses, horse owners and businesses, all contributing in a significant way to the economics of this State, need a resource and a voice.

IG: Scientific inquiry combined with connections to business interests in a values based community benefits all. We have that opportunity here.

ESC: How/why did you become interested in joining RUBEA?

BG: Over the years, I have personally relied on the resources of the Equine Science Center and the Ag Experiment Station to get my pasture soils tested, to understand manure and pasture

management and caring for elderly horses. I am happy and honored to be able to give back in some way.

IG: Karyn's responsiveness to my questions and interest in the horse / human relationship; it is reflected in her student's study and discovery.

ESC: What do you envision as your future plans, goals, and objectives for RUBEA as Co-Chair?

BG: As Co-Chair of RUBEA, I want work with the other members of the Advisory Board to continue to support the mission, research and events of the Equine Science Center, as well as promote public awareness of the Center and advocate on its behalf.

IG: I would like to help fulfill the mission as stated in the RUBEA Strategic Plan by learning and sharing the positive economic and emotional benefits of the horse / human relationship through scientific discovery.

Many thanks to both Ms. Beth Gates and Mr. John Goedecke for their time answering these questions, and providing Equine Science Center constituents with a brief glimpse of what they have in store for RUBEA.

"We look forward to working with them to accomplish many of the goals that have been set for both the Center, as well as the equine community at large," said Equine Science Center Director, Karyn Malinowski.

"I would also be remiss if i did not mention the phenomenal leadership of our previous Co-Chairs Dr. Amy Butewicz and Mr. Warren Zimmerman," she continued, "If our new Co-Chairs are anything like our previous ones, we are in for some truly amazing work."

Crabgrass Integration in New Jersey Horse Pastures

A Fact Sheet by: Dr. Jennifer Weinert-Nelson, USDA-ARS Post-Doc; and Dr. Carey Williams, Extension Specialist in Equine Management

Maintaining horses on pasture can be beneficial for financial and environmental sustainability of equine operations. Providing pasture access can reduce costs associated with supplemental feeding as well as the potential for nutrient leaching, which can occur when horses are confined in dry lots with concentrated manure accumulation and low levels of vegetative cover. Horse health and well-being may also be positively impacted by pasture access, which provides more natural feeding conditions and promotes more voluntary exercise in comparison to confinement in stalls or dry lots.

However, cool-season grasses commonly utilized as pasture forages in temperate regions of the U.S. often undergo a period of low-productivity during hot, dry summer months, which is commonly termed the "summer slump." Reduced forage growth during the summer slump can lead to overgrazing and create management challenges for horse producers. In contrast to cool-season grasses, growth of warm-season grasses is most vigorous during this same summer slump period.

Therefore, a grazing management strategy that incorporates warm-season grasses into traditional cool-season equine rotational grazing systems has the potential to bridge the forage gap during the summer slump and increase season-long pasture production.

Cool-Season vs. Warm-Season Grasses

Pasture forages in temperate regions of the U.S. are mainly perennial cool-season grasses such as orchardgrass [*Dactylis glomerata* (L.)], tall fescue [*Lolium arundinaceum* (Schreb.) Darbysh.], Kentucky bluegrass [*Poa pratensis* (L.)], timothy [*Phleum pratense* (L.)], and perennial ryegrass [*L. perenne* (L.)]. These grasses possess a C₃ photosynthetic system that functions most efficiently between 60°F and 75°F, which corresponds to temperature ranges during cooler periods of the growing season in the north-central to northern U.S. (i.e., late spring to early summer and fall). Under the elevated temperatures that occur during the summer months, photorespiration for these C₃ plants increases and carbon fixation declines, leading to a period of semi-dormancy.



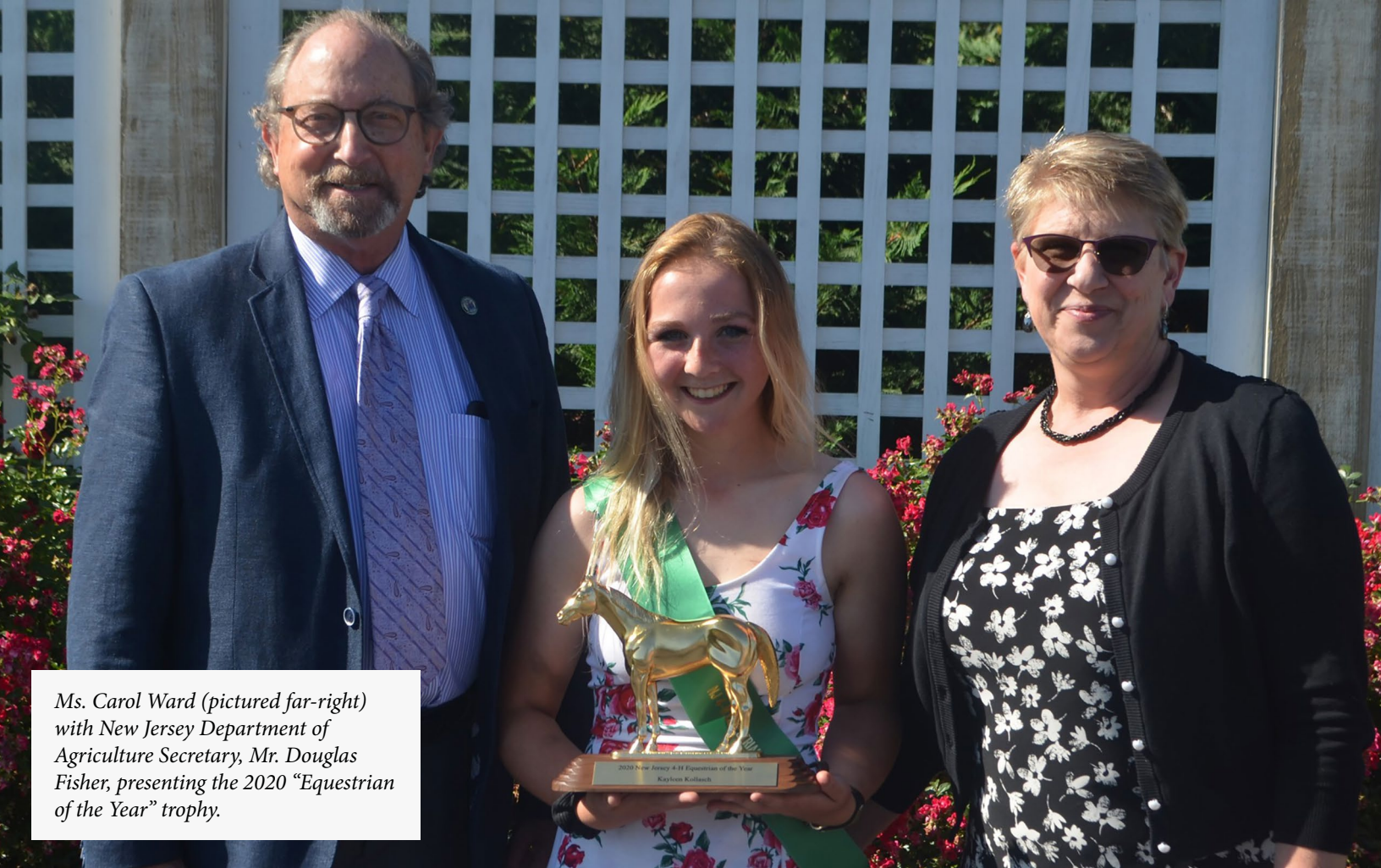
Figure 1. Horse grazing on pasture. Image courtesy of K. Hartmann.

Warm-season grasses such as bermudagrass [*Cynodon dactylon* (L.) Pers.], crabgrass [*Digitaria sanguinalis* (L.) Scop.], sudangrass [*Sorghum bicolor* (L.) Moench spp. drummondii], sorghum-sudangrass [*S. bicolor* (L.) x *S. bicolor* var. *sudanense*], pearl millet [*Pennisetum glaucum* (L.) R. Br.], and teff [*Eragrostis tef* (L.)] are more commonly grown in the warmer climates of the southern U.S. Warm-season grasses utilize an alternate C₄ photosynthetic system, for which the optimal temperature range is 85°F to 95°F. Differences in the photosynthetic system and leaf anatomy of C₄ plants concentrates carbon dioxide within the plant cells, which effectively limits photorespiration and allows for greater yields under higher temperatures like during hot summer months.

In addition to differences in leaf anatomy and photosynthetic processes, cool- and warm-season grasses also store soluble carbohydrates differently. Cool-season grasses have the capacity to accumulate relatively large quantities of sugars and fructans, particularly during periods of cooler temperatures. Warm-season grasses do not produce fructan, instead relying on sugars and starch for carbohydrate storage. Sugars and starches are also typically found in lower concentrations in warm-season vs. cool-season grasses. Overall, these differences in carbohydrate storage mechanisms often result in greater non-structural carbohydrates [NSC; water-soluble carbohydrates + starch] concentrations for cool-season grasses in comparison to warm-season grasses.

Integrated Warm- and Cool-Season Grass Grazing Systems

An integrated rotational grazing approach incorporates forages with complementary seasonal growth patterns into one rotationally or sequentially grazed system. In temperate regions of the U.S., this would mean that cool-season grasses would be grazed during the spring and fall, while warm-season grasses would be grazed during the summer slump period. This strategy has primarily been evaluated for grazing management of cattle in the Midwest. These prior studies have reported higher summer and/or season-long yield for warm-season species in integrated systems, particularly under drought conditions (Tracy et al., 2010; Ritz et al., 2020). However, the generally lower nutritional quality of warm-season grasses resulted in no advantages for milk production or growth performance in grazing cattle (Moore et al., 2004; Ritz et al., 2021). However, forage preferences, grazing behaviors, nutritional requirements, digestive physiology, animal management goals, and drivers of enterprise profitability are vastly different between cattle and horse operations. An integrated rotational grazing strategy may be well-suited to nutrition and management goals of horse operations, as horses are fed to maintain or control body weight and sustain athletic performance rather than to maximize growth. Furthermore, lower-NSC forages may be desirable for obese horses and horses with a history of metabolic dysfunction (i.e., insulin resistance, laminitis, etc.).



Ms. Carol Ward (pictured far-right) with New Jersey Department of Agriculture Secretary, Mr. Douglas Fisher, presenting the 2020 “Equestrian of the Year” trophy.

A 36-Year Love Of Teaching, Learning, & Education

Upon hearing about the impending retirement of Ms. Carol Ward, Equine Science Center Director, Karyn Malinowski, was immediately interested in highlighting someone who has given so much back to the equine and 4-H community.

With a long career spanning multiple important roles and positions, Ms. Ward retired after 36 years of service to Rutgers Cooperative Extension (RCE).

Ms. Ward joined RCE in 1986 after receiving her bachelor's degree in Animal Husbandry from the University of Connecticut in 1983, and her

master's degree in Dairy Science from Clemson University in 1985.

When people would learn of her degrees in Animal Science, most would assume that Ward wanted to be a veterinarian. Ward's response was always an emphatic, “No - I want to be a 4-H agent!” And through her position as an agent, she has shown just how much she truly enjoys working with youth audiences and volunteer adult leaders.

Ward began her RCE career as a 4-H Agent in Atlantic County, which was followed by a transfer to Warren County, and finally permanently took

residence in Somerset County where she spent the rest of her career.

Initially she was not received warmly by the horse program leaders in Somerset County who thought that she was a “cow” person who didn’t have much equine experience. Ward was able to turn that lack of trust around by attending as many activities as she could and introducing herself to people throughout the county.

Ms. Ward fondly remembers her first mentor in Atlantic County, 4-H Agent Rita Natale, as well as her extension colleagues, T.C. Floree-Buchanan and Annette Devitt. She recalls that T.C. was the adventurous person, while she and Annette were more “by the books,” (which is probably why Ward was so successful as the faculty liaison for the NJ 4-H Horse Project Advisory Committee).

With the understanding that the horse leaders were the experts in running these events and activities, and with the assistance of fabulous leaders like Estella Almeida who chairs the State 4-H Horse Show, Ward was able to help the leaders run the state-wide program effortlessly. She spoke warmly about the dedicated and passionate 4-H Horse Project volunteers who would help guide her before she would devise a plan for working together, incorporating everyone’s ideas.

More recently, a new hurdle came as Ms. Ward spoke about how Covid-19 changed how her programming and events. “It taught us how to do our work in more than an in- person format,” said Ward. “Holding educational programs and events virtually enabled us to expand our audiences, to have experts from all over the world, and to reach people who like learning virtually.”

Ms. Ward hopes that Rutgers Cooperative Extension (under which 4-H is housed) will be able to hire more expert faculty and staff in the future who will utilize these new avenues for learning. “That is what Cooperative Extension is all about – providing science- based information for our constituents,” says Ward.

In discussing the highlights of her life and career, Ms. Ward is not hesitant to mention the fact

that she is most proud of her two daughters Ashley, who has a graduate degree in Pharmacy from Rutgers, and Emily, who will graduate in May with a master’s degree in Health Sciences from the Ohio State University.

Ward is proud of their success but also of the fact that they are responsible and caring adults.

A major career highlight for Ward is the lasting impact on kids that you make as extension professionals. She really enjoys seeing how 4-H members learn, grow, and eventually achieve their goals.

In June of 2020, Ward had the opportunity to present the New Jersey “Equestrian of the Year” trophy to one of her former members from Somerset County. She had not seen the recipient for a year, and she asked what her former member was now doing.

The young woman was elated to let Ward know that she was now a professional rider and trainer and making a living doing what she loves. “That is the reward for a job well done” said Ward, “seeing our 4-H members succeed.”

Ms. Ward also fondly spoke about another former Somerset County 4-H member and teen leader, Conrad, who formed a new magic club in Somerset County and now performs magic shows all over the country. “Thank you for believing in me when I didn’t believe in myself” he told Ward, something that has stuck with her exemplifying the difference that 4-H agents make in young lives.

When asked about her vision for Rutgers Cooperative Extension and youth education in animal sciences, she was quick to respond that “Our youth need to be made aware of the opportunities that exist in the animal sciences beyond veterinary school, and that many of these careers impact human medicine as well.”

Ms. Ward and her husband Nelson are building their retirement home in Ohio. As a parting gift, she requested two hazelnut trees and Scarlet Red dogwoods from Rutgers. They are currently in Ohio waiting to be planted!

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