Rutgers Equine Science Center

ANNUAL REPORT 2013 - 2014

Equine Science 4 Kids

A Fun & Educational Place 4 Kids to Learn

Why Research Matters

How We Are Shaping the Equine Field

Gwendolin E. Stableford

1917 - 2014 Honoring the Life and Legacy of a True Equestrian

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Making equine science accessible for all.

Equine Science Center

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FROM THE DIRECTOR



INCE its inception, the Center has established itself prominently within state, national, and international equestrian communities through its research and outreach programs, strategic partnerships with state and federal agencies and private entities, dynamic website, and the widespread recognition and acknowledgment it has received as a result of the impact of its programs. I am pleased to present this report to all of the Center's stakeholders, which include horse owners and users in all disciplines and to the residents of New Jersey who may be interested in knowing what our faculty, students and staff have been up to in the past year.

Our website, which received over six million hits during the period of July 1, 2013 – June 30, 2014, almost 500,000 first time visitors with an average page visit time of 113 seconds, is a perfect example of our outstanding outreach to equine enthusiasts from all over the world. As it pertains to research and academics, the undergraduate and graduate students who have participated in our programs have gained valuable experience yielding a highly successful rate

Spreading Knowledge: The Importance of Communicating our Message to the General Public.

of acceptance into veterinary and graduate programs, and through the "Developing Future Leaders for the Equine Industry" course we are producing students with skills needed to ensure sustainability of the horse industry.

Congratulations to our two new Ph. D. program graduates Drs. Ryan Avenatti and Danielle Smarsh!

By assembling diverse and multifaceted research teams, we are better equipped to thoroughly investigate equine issues that matter to our stakeholders and advance our mission. Center faculty and staff succeeded in the procurement of over \$1,000,000 through grants,

contracts, and gifts during the 12 month reporting period. Because of the commitment from private donors, the Center was able to fund

three research projects during the past fiscal year.

The Equine Science Center is the force behind connecting invaluable research findings to the greater community and in promoting best management practices and knowledge to those caring for and working with horses. This year, Center faculty and students published 10 refereed journal articles, 6 refereed abstracts, one new book, four book chapters, and numerous multi-media presentations and invited lectures. Center faculty, students and staff also presented their work at several international meetings during the past year.

I invite you to visit our website, spend time with us during one of our educational programs, public meetings, or Open Houses, to learn how we are training new generations of knowledgeable, passionate equine advocates and specialists.

Since people all over the world interact with us daily, we are always looking for ways to make our resources more accessible. In the coming year the Center will be investing in its website to give it a new look, a user-friendly search

"SINCE PEOPLE ALL OVER THE WORLD INTERACT WITH US DAILY, WE ARE ALWAYS LOOKING FOR WAYS TO MAKE OUR RESOURCES MORE ACCESSIBLE." feature, and tools to optimize our presence on search engines so that more people can find us. Look for some exciting changes to

the site in 2015!

With continued partnership and generous support from equine enthusiasts, the Equine Science Center looks forward to continuing its unparalleled service to the horse industry.

Best,

The

Karyn Malinowski, Ph.D. Director, Equine Science Center ESC.RUTGERS.EDU/ANNUALREPORT 1

Who WE& What DO

A Unique Equine Academic Environment

HE Equine Science Center at Rutgers, is the only equinerelated academic entity in the country that assembles faculty, students, and staff from multiple disciplines and departments, both from within and outside the university. Our expert collaborative teams identify, research, and provide solutions for challenges facing horses, horse owners, and the horse industry.

The Exercise Physiology Laboratory, on the G.H. Cook Campus houses a high speed equine treadmill. Faculty and students have systematically used this invaluable piece of equipment in many research studies over the past two decades. The laboratory contains over \$2 million of state-of-the-art analysis equipment. With these resources, we provide undergraduate and graduate students the opportunity to work in a worldclass scientific environment.

A Center for Advanced Learning in Large Animal Sciences

S the rural landscape of New Jersey changes, fewer students with interest in animal and veterinary sciences have sufficient exposure to large animals. For this reason, the Equine Science Center has established a specialized curriculum to provide our students the ability to experience the science of horses first hand. Our graduates are consistently recognized by veterinary schools for their experience with large animals at the Equine Science Center.

As a result, a remarkably high percentage of our students are accepted by veterinary schools, and we are proud to note that many have gone on to become practicing largeanimal veterinarians. Through several yearly treadmill demonstrations which are open to the public, our website, and continuing education courses, the Center impacts people in the equine industry of all ages.



Our excellent facilities and teaching research herd of horses positions us at the forefront for conducting basic and applied research.

A Center for Discovery, Practical Research, and Applied Science

HE Equine Science Center is a hub for mission-oriented, practical research- a critical component in examining and solving equine-related issues.

In addition to ongoing research in fundamental equine areas, some of our recent research topics include the role of natural food products for use in horses; ensuring the well-being and a level playing field for equine athletes; enhancement of immune function in all horses; care and management of young and older horses; and the role of horses in the environment.

The Equine Science Center serves as the epicenter for factual equine-based information derived from sound scientific studies.

Moreover, with the horse as the closest animal model to human physiology, our research findings are not limited to the equine species, but human medicine as well.



A Center Dedicated to Public Outreach and Industry Values

HE Equine Science Center emphasizes outreach and consistently shares research results with the public and the equine We are committed to industry. reaching out to the equine community in a number of different ways including Center hosted events, Rutgers Cooperative Extension programs in every New Jersey county, 4-H Youth Development programs, and a series of horse management seminars, webinars,

and field meetings, as well as academic equine science courses open to the public.

The Center's website (esc. rutgers.edu) includes popular features such as the 'Ask the Expert' page, archived webinars and podcasts, and virtual tours brimming with valuable information. "Equine Science 4 Kids," is an online classroom featuring games, interactive activities, and a little horseplay for children of all ages.

A Vision for the Industry's Future

N thirteen years, the Equine Science Center has become vital to the future of the global horse industry.

As the sole source for research and extension programming, we not only educate leaders, but also ensure the industry's viability, visibility, and vitality.

The Equine Science Center has gained the respect and credence of equine enthusiasts in the Garden State and beyond. The New Jersey horse industry relies on the Center to fill a unique role that beckons the support of the industry because it:

- Speaks for the entire horse industry.
- Provides credibility for the horse industry.
- Has no hidden agenda.
- Is the sole source for programming to ensure the industry's viability and vitality.
- Is the place of education for the future leaders of the horse industry.

- FAST FACTS -The horse is the state animal of New Jersey.

With more horses per square mile than any other state, New Jersey deserves an outstanding Equine Science Center!

RUTGERS UNIVERSITY BOARD FOR EQUINE ADVANCEMENT

In 1992, a committee of stakeholders representing various equine interests formed the Equine Advisory Committee to support the School of Environmental and Biological Sciences, formally known as Cook College.

The committee secured from the New Jersey Legislature an allocation of \$1.2 million in uncollected pari-mutuel winnings for the New Jersey Agricultural Experiment Station - of which \$300,000 was used to support equine research and the facilities and operations of the Equine Science Center.

Subsequently, \$900,000 in funding to the Experiment Station for Strategic Initiatives was made a line item in the state budget. Unfortunately, in 2010 this line was removed. The Center now relies on the gifts and donations of generous donors and friends throughout the university, community, and beyond. **MISSION:** RUBEA will become recognized as the advisory, advocacy, and fund-raising organization for the Equine Science Center, meeting the financial needs for its sustenance and growth.

Vision: RUBEA seeks 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.

Board Members:

Ryck Suydam, Chair Elizabeth Durkin Esq., Vice Chair Sandy Denarski, Chair Emeritus David Meirs II, VMD, Chair Emeritus Taylor Palmer Jr., Chair Emeritus

Peter C. Bousum, VMD Michael Campbell Peter Cofranceso, III Thomas Luchento Karyn Malinowski, Ph.D. Mark Mullen Hon. Cathy Nicola Max Spann, Sr.

RUBEA LEADERSHIP BOARD



RYCK SUYDAM, CHAIR

Ryck Suydam is the president of the New Jersey Farm Bureau, partner in Suydam Insurance Agency of Somerset Township, and operator of Suydam Farms LLC, a 300+ acre farm in Somerset County. Mr. Suydam has also served as a member of the New Jersey Thoroughbred Horsemen's Association, director of the Belle Mead Farmers Co-op, and director of the Somerset County Board of Agriculture.



ELIZABETH DURKIN, ESQ., VICE CHAIR

Elizabeth Durkin is founder of The Durkin Firm, LLC. She has been practicing law for over 25 years, and has been involved with horses for equally as long. Part of her practice involves transactions between horse owners. She owns Hound 'N Horse, 140 acres of preserved farmland in New Jersey. Ms. Durkin won the "Spirit of the Horse" Award in 2011, and is a member of the Equine Science Center's "Community of 50."



SANDY DENARSKI, CHAIR EMERITUS

Sandy Denarski is the former CFO of Johnson & Johnson Finance Corporation. She has been involved with horses over the last ten years and has contributed much to their awareness and advancement, especially as the former Chair of RUBEA. She received the Spirit of the Horse Award in 2006, and is a member of the "Community of 50."



DAVID MEIRS II, VMD, CHAIR EMERITUS

David Meirs II has dedicated his life to the well-being and advancement of horses and the equine industry. Since receiving his veterinary license over 50 years ago, Dr. Meirs has cared for thousands of horses, in addition to establishing one of the most prestigious Standardbred breeding operations in New Jersey. In 2012, Walnridge Farm was awarded NJ Standardbred Breeder of the Year.



TAYLOR PALMER JR., CHAIR EMERITUS

Taylor Palmer Jr. is a former board member of the Standardbred Breeders and Owners Association of New Jersey, chairing the Breeders and Finance committees and serving as treasurer for a total of 25 years. Mr. Palmer is a fifth generation operator of Boxwood Farm in Englishtown.



Community of

<u>"Community of 50"</u> <u>Members</u>

Brad Benson Hyundai Sandy Denarski Dr. & Mrs. Stephen P. Dey, II Elizabeth Durkin Karyn Malinowski Fair Winds Farm: Mark and Laura Mullen

Mark and Laura Mullen New Jersey Department of Agriculture New Jersey Farm Bureau Standardbred Breeders and Owners Association of New Jersey UMH Properties Pamela Arena Weidel

What Is The "Community Of 50"?

The "Community of 50 for Equine Excellence" is an open group of dedicated people and organizations that understand the importance of supporting serious scientific

research and also want to have a voice in policymaking as it affects horse farms and the horse industry in New Jersey.

Who Are The "Community Of 50"?

Members of the "Community of 50" are comprised of individuals, groups and commercial entities. They have committed to donating \$10,000 per year for a total of five years. Currently, our 11 individual and commercial members will donate \$550,000 to the Center for research and outreach activities.

So What Is The "Community Of 50" Doing?

By 2018 the "Community of 50" will have procured over \$3 million of funding for the Equine Science Center to pursue research and promote industry sustaining initiatives.

If I Join, How Will I Be Able To Help?

The "Community of 50" works to:

- •Impact policy maker's decisions regarding the equine industry.
- Provide new opportunities for groundbreaking research.
- •Increase awareness of the value of horses to people and the world.

Who Do I Contact To Join?

Karyn Malinowski, Ph.D. Director Equine Science Center

(848) 932-9419(848) 932- 3576Malinowski@AESOP.Rutgers.eduWatts@AESOP.Rutgers.edu

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A TRUE EQUESTRIAN: THE LIFE AND LEGACY OF

GWENDOLIN E. STABLEFORD

WEN Stableford, age 96 of Summit, died peacefully at Overlook Hospital on June 16, 2014. Gwen was an avid horsewoman and international traveler, known for her financial acumen, which resulted in her serving as treasurer for the New Jersey Horse Council, American Saddlebred Horse Association of New Jersey, and the Middlesex Horse Show for decades.

For Gwen, her love of horses came at the age of four when she was put on her first horse. That love of horses and her commitment to the state's equine industry led to her being named the 2007 New Jersey Horseperson of the Year.

Stableford showed and won with her American Saddlebreds and Hackney ponies all over the country and was founder of the American Saddlebred Horse Association of New Jersey in 1968.

She proudly represented the American Saddlebred Horse Association of New Jersey on the New Jersey Equine Advisory Board. She was also a member of the United States Equestrian Federation, the American Saddlebred Horse Association, the American Hackney Horse Society, and the United Professional Horsemen's Association.

Most recently Gwen showed her Hackney ponies, WC Ali and WC Heartland Elegant Touch. She showed WC Ali for 10 years and won many regional and national titles among which was being named four times USEF National Pleasure Driving Pony of the Year.

Upon Ali's retirement, Gwen purchased WC Heartland Elegant Touch who went on to win the World Championship Jr. Hackney Pleasure Driving Pony title and more recently, USEF National Harness Pony of the Year, two times. Both ponies reside in Rockvale, TN.

In January of 2013, the ASHA of NJ presented to Gwen, in recognition of her 33 years of dedicated, unprecedented service as treasurer of the association, an engraved tile in her honor which was installed on the American Saddlebred Museum Walk of Honor in Lexington, Kentucky as a lasting gift.

In honor of her memory, an endowed fund in support of equine research is being established in Miss Stableford's name. Her love for horses and the Equine Science Center will live on through her legacy to "Better Horse Care through Research and Education".

Horse Hero mare leisurely grazing at the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm.

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RESEARCH MATTES

AFTER ANOTHER YEAR OF RESEARCH FIND OUT WHAT THE RUTGERS EQUINE SCIENCE CENTER HAS TO REPORT, AS WELL AS WHAT PROJECTS HAVE BEEN FUNDED FOR THE COMING ACADEMIC YEAR GRANT CYCLE. HELPING HORSES: RESEARCH THAT WILL HELP HORSES TO BE HAPPY AND HEALTHY

HIS year, the Equine Science Center renewed funding for research projects that were initiated and funded last year. "The Effects of Rotational versus Continuous Grazing Systems for Horses on Environmental Quality, Animal Health, and Production Cost", with principal investigators Carey Williams, Ph.D., and Laura

Gladney, recieved an award of \$12,500 for the 2014-2015 grant cycle. Principal investigators Thomas J. Gianfagna, Ph.D., William A. Meyer, Ph.D., and Jeanne S. Peters were awarded \$5,000 to continue their research on "Creating Safer Pasture Grass through Chemical and Biological Analysis of New Tall Fescue Germplasm". Principal investigators Ryan C. Avenatti, M.S., Kenneth H. McKeever, Ph.D., FACS, and Karyn Malinowski, Ph.D. received \$35,000 for their research on "Effects of Age and Acute Exercise on Heat Shock Protein 70 and Molecular Mediators of Inflammation and Insulin Sensitivity."

HORSES OF AN OLDER GENERATION:

ENSURING HEALTH AND WELL-BEING FOR THE AGING EQUINE NE of the largest industries in the United States, the horse industry, is a \$39.2 billion business associated with 9.2 million animals.

This industry's contribution to the U.S. gross domestic product is \$102 billion, which generates over 1.4 million full-time equivalent jobs across the country.

More than 15% of the equine population is over the age of 20 years, and many of these animals continue to participate in athletic activities.

Partly responsible for the increased life-span of horses is the fact that equine nutritionists have advanced the development of "senior feeds", and that the animal pharmaceutical industry has developed effective anthelmentics for parasite control. However, advancing age in horses often is associated with declining body condition, muscle tone, aerobic capacity, thermoregulatory ability in response to acute exercise, and general well-being.

While aging and obesity-related loss of function and diseases have many factors, understanding the underlying imbalance of molecular signaling mediators in metabolically important tissues, such as muscle, to preserve functionality of physiological systems needs to be addressed.

Advanced age in horses is associated with a decline in immune

response and is characterized by increased production of pro-inflammatory cytokines, termed inflammaging, which has been linked to obesity.

Horses over 20 years can improve aerobic performance, reduce body fat, and partially restore changes that occur in the hypothalamic-pituitary-adrenal axis in response to acute exercise and insulin sensitivity, with regular exercise training.

Physiological similarities between humans and horses allow

for broad implications of equine exercise physiology research in relation to aging and performance.

Understanding the molecular mechanisms behind the adaptive response to exercise will aid in the development of exercise conditioning and nutritional strategies meant to preserve the health and well-being of this socio-economically important species.

The Rutgers Equine Science Center prides itself on being a leader in research efforts focused on keeping older horses happy and healthy.

Glucose-Insulin Homeostasis and Characterization of Proteins Involved in Glucose Uptake Signaling in Equine Skeletal Muscle Project By: Ryan Avenatti, PI - Malinowski-McKeever Laboratory

HE objective of this study was to test the hypothesis that glucose-insulin homeostasis, and activation of AMP-activated protein kinase (AMPK), the protein kinase Akt, and the Akt substrate protein of 160 kDa (AS160) in equine skeletal muscle are altered by acute exhaustive exercise, and by aging.

Insulin-stimulated uptake of glucose occurs through translocation of glucose transporters (GLUTs) to the plasma membrane of cells. Akt is a member of the P13K pathway which has many functions including direct stimulation of GLUT4 translocation to the cellular membrane.

Unconditioned aged and young Standardbred mares were assessed for glucose-insulin homeostasis via frequently sampled intravenous glucose tolerance test (FSIGTT). All mares then underwent a single bout of submaximal exercise.

Mid-gluteal muscle biopsies were taken pre-exercise, and at 0, 4, 24 and 48 hours post-exercise. Muscle samples were analyzed via western immunoblotting for changes in activation of AMPK, Akt and AS160. FSIGTT results indicated that there was no difference between young and aged mares for insulin sensitivity (SI), glucose effectiveness (SG), acute insulin response to glucose (AIRg) or disposition index (AIRg x SI).

The area under the curve for both insulin (AUCi) and glucose (AUCg) were not different between young and aged mares.

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...AGE ALONE IS NOT

SUFFICIENT TO ALTER INSULIN

SENSITIVITY IN HORSES, BUT

DOES ALTER GLUCOSE-INSULIN

DYNAMICS IN RESPONSE TO

EXERCISE.

In response to acute exercise, young mares displayed elevated insulin concentrations at 2 and 4 hours post-exercise while aged

mares displayed elevated insulin at 30 and 60 minutes post-exercise.

Neither age nor exercise caused a significant change in AUCi. Glucose concentration was elevated at 2 hours post-exercise in young mares, while in aged mares glucose remained elevated only until 60 minutes post-exercise.

Exercise caused an increase in AUCg in young and aged mares, however there was no age effect on AUCg. Neither age nor exercise altered total protein levels or phosphorylated protein levels of AMPK, Akt or AS160.

In conclusion, age alone is not sufficient to alter insulin sensitivity in horses, but does alter glucose-insulin dynamics in response to exercise.

> Also, a single bout of submaximal exercise was not sufficient to alter activation of proteins believed to be involved in glucose uptake

in skeletal muscle at the time points measured.

The comparative literature suggests that these proteins are important for endocrine- and exercise-related glucose uptake and energy homeostasis.

HSP70 and HSP90 in Whole Blood and Skeletal Muscle in Young and Aged Standardbred Mares

Project By: Ryan Avenatti, PI - Malinowski-McKeever Laboratory

EAT shock proteins (HSPs) are important mediators of cellular response to disturbances in homeostasis, but little work has been done to investigate HSPs in horses.

Investigating the heat shock protein response to various homeostatic disturbances, including exercise, can have broad implications.

The adaptive response to exercise, specifically the expression of HSPs in order to modulate repair and recovery, illuminates a non-pharmacological approach for improving the quality of life in the aged and unfit. In addition, targeting HSP regulation through nutritional or pharmacological intervention may supplement training regimens and increase quality of life for the aged horse.

It was hypothesized that HSP expression in whole blood and skeletal muscle are altered by age and acute exercise.

Young and aged Standardbred mares underwent an acute sub-

maximal exercise test until fatigue. Whole blood and gluteus medius biopsy samples were collected and analyzed for HSP70 and HSP90 expression.

Young and aged horses had increased HSP70 expression in whole blood following acute exercise, with young horses exhibiting 3-fold greater HSP70 expression than aged mares at 2 hours post-exercise.

HSP90 expression in whole blood was increased only in young horses. Both young and aged horses had increased HSP70 and HSP90 expression in skeletal muscle following exercise, but there was no difference due to age.

In conclusion, the magnitude and timing of the HSP expression following acute submaximal exercise is altered by age in horses.

Quantification of HSP expression in whole blood may be a useful biomarker, with implications for cellular adaptation and survival in aged horses.



Horse Hero Mares That You Can Be A Hero Too!



CASCADE



SNOWDRIFT



BABY For information on becoming a Horse Hero visit: esc.rutgers.edu/HorseHero

Aging Alters Thermoregulation and Cardiovascular Function in Standardbred Horses

LDER horses have an increased risk for hyper-thermia due to impaired cardiovascular function.

While many studies have investigated thermoregulation in horses during exercise, only a few (performed at Rutgers) have investigated the effects of aging.

Research in the McKeever lab with Master's student Cindy Betros tested the hypothesis that aging alters thermoregulation, cardiovascular function and plasma volume during acute exercise and following exercise training.

In the first experiment it was demonstrated that aging compromises the ability of the cardiovascular system to handle the combined demand of exercise and thermoregulation.

Paradoxically, young and old horses had the same percentage decrease in plasma volume and total body water.

It was hypothesized

that the old horses started exercise with a lower reserve of fluid, so a second experiment was performed which demonstrated that much of the decline in thermoregulatory and cardiovascular functional capacity in the older horse was associated with a substantially smaller absolute pre-exercise plasma volume. Such a decline would affect cardiovascular stability as well as thermoregulatory stability during acute exertion.

A third experiment was performed to examine if aging affects the adaptive response to exercise training.

More specifically, the study examined the effect of aging and training on resting, maximal, and intrinsic heart rate as well as the adaptive hypervolemia associated with exercise training.

Thirteen healthy and unfit Standardbred mares, young and old, were used to test the hypothesis that there would be age and training related differences in resting heart rate (RHR), itrinsic heart rate (IHR), maximal heart rate (HRmax) and plasma volume (PV).

Training resulted in an expansion of PV in young horses but not the old horses. This lack of an adaptive training induced hypervolemia may be due to previously reported aging related differences in the endocrine response to acute exercise in horses.

The decrease observed in RHR and IHR in the young horses following training appears to be related to enhanced pre-load associated with a training-induced hypervolemia as well as changes in autonomic function.

The lack of a change in either RHR or IHR in old horses may have functional significance when it comes to the management of the older equine athlete. ■





The Impact of Age and Exercise on Antioxidants and Oxidative Stress in Horses Project By: Danielle Smarsh, PI - Williams Laboratory

HIS study examined the effect of acute exercise and intensive exercise training on oxidative stress, antioxidant status, and muscle metabolism of yearlings and mature mares.

The first objective was to look at the effect of repeated biopsies on muscle inflammation and oxidative stress.

It was found that the pattern of biopsies impacts oxidative stress occurrence, with an alternating corner pattern resulting in less oxidative stress than biopsies taken in a row.

Another objective was to determine levels of oxidative stress and antioxidants in the blood and skeletal muscle of horses after an acute bout of exercise.

It was found that while some markers were significantly affected by acute exercise, overall the test was not sufficient to induce severe oxidative stress. It was concluded that the intensity of acute exercise does impact the level of oxidative stress endured by horses.

A third objective was to compare the effects of exercise training on oxidative stress and antioxidant status in two groups of horses of different ages (yearlings and mares).

It was found that training did significantly improve antioxidant status and reduce oxidative stress in the mature, previously conditioned mares, while the trained yearlings did not demonstrate significant changes in either parameter.

The final objective of this project was to compare the effects of acute exercise before and after exercise training on oxidative stress, antioxidants, cortisol, and creatine kinase in two different age groups.

When challenged with acute exercise before training, it was found that the mares had significantly higher levels of oxidative stress and cortisol, as well as lower antioxidant status, when compared to the yearlings.

After exercise training, conditioned mature mares had lowered levels of oxidative stress compared to pre-training, and when challenged with acute exercise had lowered oxidative stress and cortisol.

With the yearlings, there were fewer significant changes in oxidative stress after training and in response to acute exercise.

In conclusion, young, maturing horses have lowered levels of oxidative stress and cortisol, and higher levels of antioxidants, as compared to mature mares.

Training can help reduce levels of oxidative stress in mature mares, while in young horses training is not as influential in reducing oxidative stress. This suggests that young age is the most important defense against exercise-induced oxidative stress.



ORSE owners associate pasture-induced laminitis with the spring and summer when horses graze on lush grasses.

Actively growing grasses have a high carbohydrate, or sugar, content which is not metabolized by the horse but passes directly to the cecum where resident bacteria break-down the carbohydrates.

As a result of bacterial metabolism, the properties of the cecal fluid change leading to an overgrowth of certain types of bacteria and a loss of others. It remains a mystery as to how the shift in intestinal bacteria leads to the inflammation found in laminar tissue in laminitic horses.

Recently published results of research completed at the Rutgers Equine Science Center by Jan Onishi, in collaboration with colleagues at other institutions, led to the hypothesis that pasture-induced laminitis could be an early stage of chronic laminitis that develops as a result of exposure to potential bacterial pathogens in the animals' pasture. This idea is developed based on the results of two types of studies.

In one study laminar tissue collected from chronically laminitic horses had higher numbers of bacteria compared to laminar tissue collected from non-laminitic horses. Multiple types of bacteria were recovered and interestingly, the types found could live in the soil and water. It is unclear from the study whether the bacteria 'caused' chronic laminitis or were present as a result of an 'effect' of the disease.

In an attempt to establish a cause-effect role of bacteria in chronic laminitis, a second study was performed in which the bacterial count in laminar tissue was determined in tissue collected from horses in which acute laminitis was induced by carbohydrate overload.

Higher levels of bacteria were not detected in laminar tissue collected from animals that displayed early symptoms of lameness. The horses develop diarrhea and fever before lameness suggesting that an intestinal infection develops. Evidence that the colitis that develops in the horses may be due to a bacterial intestinal infection was revealed by profiling the changes in the bacteria using a metagenomic approach.

To the best of our knowledge, horses that develop pasture-induced laminitis never display symptoms of infection, such as diarrhea or fever. Therefore, in agreement with recent research efforts to understand pasture-induced laminitis, the carbohydrate overload model of acute laminitis may not accurately reflect events in pasture-induced laminitis.

Our experience in managing a research horse herd on the

G.H. Cook campus for over 20 years shows that development of pasture – induced laminitis does not occur.



with equine metabolic syndrome;



body condition scores for the horses range from normal to obese.

Accepted horse management practices have been used whereby horses remain outside year round feeding on forage typical of the season. During winter months, horses receive supplemental forage in the form of mixed grass/alfalfa hay. Transition to pasture grasses typical of our geographic area occurs gradually as the grasses begin to grow in the spring.

Over the twenty year period, one would expect differences in plant-derived carbohydrate content and composition due to seasonal and climate changes, as well as ozone changes in our area due to air pollution.

A review of twenty years of veterinary records from the Rutgers University herd revealed that out of 200 horses, no horses were diagnosed and treated for laminitis by a licensed equine veterinarian. None

> developed the chronic form of the disease even though many remained in the research herd for over a decade.

We don't know whether the female Standardbred horses used in our research are resistant or whether our husbandry practices protected our horses from developing pasture-induced laminitis. In recent publications describing the incidence of pasture-induced laminitis in Great Britain and in Virginia, Standardbreds were not included in the studies.

Results from a currently funded AAEP study on laminitis in horses designed to reveal risk factors for developing pasture or endocrinopathy-associated laminitis (PEAL) laminitis are not yet available.

The results of our study suggest that a research study should be designed to consider the possibility that horses that 'just-go-lame' in the pasture may have a bacterial infection in the laminar tissue. Although antibiotic treatment has been used in the past to treat laminitis without success, the results of our study suggest that the failure might be due to the presence of a biofilm-type infection. Biofilm infections are well known to be resistant to antibiotic treatment.

The equine community must understand that treating lame horses with penicillin, which is readily available on the internet, is not advised and may make a bad situation worse. With inappropriate use of penicillin, the numbers of penicillin-resistant bacteria would be expected to rise in the horse. These types of bacteria, which are known as MRSA, are a major health concern in the equine community.

...TREATING LAME HORSES

WITH PENICILLIN, WHICH IS

READILY AVAILABLE ON THE

INTERNET, IS NOT ADVISED

HOW TO MAKE THE ENVIRONMENT SAFE FOR ALL ENVIRONMENTAL STEWARDSHIP AT THE EQUINE SCIENCE CENTER

> **HE** NE-1041 USDA Regional Project, Environmental Impacts of Equine Operations, is beginning its second five-year project cycle. This group, led by Rutgers faculty members Michael Westendorf and Carey Williams as well as more than 15 scientists at other institutions, conducts research and outreach concerning the impact of horses and farm management upon the environment and water, air, and soil quality.

The upcoming five-year project will: 1) study pasture and grazing management practices on equine farms; 2) help producers implement new manure storage and disposal strategies; 3) quantify current feeding management practices; and 4) study the influence of stable and housing management on air and environmental quality, emphasizing both equine and human environments.

In addition the group will evaluate current Best Management Practices (BMPs) in order to optimize effectiveness and develop new and appropriate outreach programs.

The leadership team is excited to have over ten states participating in the project representing several disciplines including animal science, plant science, and economics. The Equine Science Center's faculty have assisted horse farm owners develop Comprehensive Nutrient Management and Field Rotation Plans, based on the Center's research.



Rutgers Equine Science Center's Commitment to Helping Create "Greener Pastures":

Improving the Environment for Both Humans and Horses

HE Equine Science Center teamed up with the Great Swamp Watershed and Natural Resources Conservation Service to put on a series of three pasture walks in May. The first, on May 5, was held at the Ryders Lane Best Management Practices Demonstration Horse Farm on the Rutgers G.H. Cook Campus.

Mike Westendorf led the tour, describing all of the environmentally friendly practices installed, with the help of Carey Williams and Laura Kenny (nee Gladney).

On May 12, another group met at Seaton Hackney Stables, a county-owned lesson stable in Morristown. Representatives from Morris County Park Commission and Princeton Hydro led a tour while discussing various practices that had been installed to improve water quality on the farm, which sits adjacent to the Loantanka Brook.

The final pasture walk was

held on May 19 at Lord Stirling Stable in Basking Ridge, another county-owned riding facility in Somerset County. Participants were treated to a hayride farm tour highlighting environmental BMPs led by stable manager Margie Margentino.

The second half of the evening featured a slide-show illustrating before and after photos of Seaton Hackney Stables by Mike Westendorf. ■

Creating Safer Pasture Grass Through Chemical and Biological Analysis of New Tall Fescue (Festuca Arundinacea Schreb) Germplasm

ALL fescue is an excellent forage for horses. It is high-yielding, insect and disease resistant, stands up to close grazing and horse traffic, and has high levels of digestible energy, protein, and minerals.

However, the best tall fescue varieties contain a fungal endophyte that produces alkaloids, some of which are toxic to grazing animals. Nevertheless, not all of the alkaloids are bad; some are toxic only to insect pests and are safe for horses.

In collaboration with the Equine Science Center, the Center for Turfgrass Science is screening the university's substantial collections of tall fescue germplasm, obtained from its center of origin in the Mediterranean Basin, for endophyte-positive selections that do not produce alkaloids toxic to grazing animals.

We have identified 66 such selections that grow well in New Jersey. The most promising of these selections will be tested in rotational grazing studies.

The outlook is favorable for development of new tall fescue varieties, selected for our Northern Continental climate, that are safe and nutritious for horses and that will thrive in New Jersey pastures for many years to come.

- Fast Facts -

Ryders Lane, approximately 40 acres, is a model Best Management Practices horse farm, and learning center where research, education, and proactive outreach is conducted through live demonstrations and seminars. Enriching the public's understanding of how to successfully manage the environmental challenges on their farms, Ryders Lane is a working horse farms which exhibits proper horse management practices. The Farm is open to the public for self-guided tours daily. For more information visit: esc.rutgers.edu or call (848) 932-9419.



WITH HELP FROM THE GREATER EQUINE COMMUNITY, WE ABLE TO FURTHER OUR MISSION OF "BETTER HORSE CARE THROUGH RESEARCH AND EDUCATION." ENSURING THE SUSTAINABILITY OF THE EQUINE INDUSTRY

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Developing Future Leaders in the Equine Industry: Bringing Students and Prominent Leaders Together to Learn from One-Another

ARYN Malinowski rang in 2014 with the offering of the "Developing Future Leaders for the Equine Industry" short course on January 7 and 9.

Students assembled for the two-day intensive course, which hosted prominent speakers in their respective fields covering a broad range of topics from marketing and building effective relationships with legislators, to conflict management and coalition building.

Speakers and topics included: Barbara DeMarco, VP of Porzio Governmental Affairs - "Building Effective Relationships with Legislators," Dan Kramer, former VP of Marketing for Pfizer – "Importance of Networking and Marketing," Liz Durkin, Esq., the Durkin Firm – "Legal Issues of Importance for the Equine Industry," and Dr. Jerry Baron, Director of IR-4 – "Nuts and Bolts of Building a Coalition."

The class closed with a panel discussion about the challenges of being a leader presented by panel members, Assemblyman Ronald Dancer, Standardbred Breeders and Owners Association President Tom Luchento, and Meadowlands Racetrack CEO and GM, Jason Settlemoir.

All attendees noted in an exit survey that the course met or exceeded expectations and met all objectives. Knowledge gained included building relationships, which increased 11%, building legislative relationships increased 155%, and knowledge gained about legal issues increased 122%.

The next course will be offered in early January of 2016. HOW PUTTING THE WONDER BACK INSCIENCE HAS INSPIRED A NEW GENERATION: MAKING EQUINE SCIENCE ACCESSIBLE FOR ALL

Come to an Open Houses and experience RU Wish Bone live and in person.



"Equine Science 4 Kids!": A Fun and Interactive Way to Teach Kids the Science of Horses

ECOGNIZING the growing need to promote Science, Technology, Engineering, and Mathematics (STEM) education, the Equine Science Center launched "Equine Science 4 Kids," an interactive youth portal available on the Center's website: esc.rutgers.edu/kids.

The goal was to create a teaching tool to introduce highly academic scientific concepts and research to youth ages 10-14 in a manner that is fun, interactive, educational, and intuitive.

Information within the youth component focuses on three primary areas of research: Horses & the Environment – detailing how horses and humans fit harmoniously in a clean environment; Exercise Physiology – sharing similarities in how horses and humans exercise, including measurements of total protein and red blood cell volume (PCV); and Healthcare & Nutrition - covering the odd things that horses eat, aging, and keeping horses healthy.

"Equine Science 4 Kids" is equal parts education and entertainment. Two games, "Fun on the Farm" and "Exercising HorsePower," are available on "Equine Science 4 Kids."

"Fun on the Farm" was created as an illustrated interpretation of the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm on the G.H. Cook Campus in New Brunswick, NJ.

The game features a "bird's eye-view" of the farm and highlights several key environmental concerns on horse farms such as nutrient and waste management, weed control, fencing, pasture rotation, and soil enrichment.

The "Exercising HorsePower" game depicts the Equine Science Center's exercise physiology treadmill laboratory.

The player has an opportunity to pick one of three horses to work with throughout the distinct levels of the game.

The levels. which are progressively more challenging, represent the stages of a standard equine exercise study: Horse Preparation, Treadmill, and Laboratory Analysis.

In addition to the customdesigned games, "Equine Science 4 Kids" also includes fun fact sheets and FAQs in each of the three research areas.

The mascot, Lord Nelson, has a blog which provides anecdotal accounts of his mischievous antics, and offers a comical, real-life approach to the science of horses.

Lord Nelson also answers any and all horsey-questions submitted by visitors to "Equine Science 4 Kids" at: LordNelson@aesop.rutgers.edu. ESC.RUTGERS.EDU/ANNUALREPORT 23

NEW LEADERS OF EQUINE SCIENCE EMERGE AT RUTGERS: SUCCESSFUL DISSERTATION DEFENSES BY RYAN AVENATTI AND DANIELLE SMARSH

Real Property lies

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Graduate students are expected to participate in outreach efforts. Danielle Smarsh and Ryan Avenatti teach budding scientists about equine exercise physiology.

2012 HHYF Summer Progra

Juna 1

ONGRATULATIONS to Dr. Ryan Avenatti and Dr. Danielle Smarsh on successfully defending their doctoral dissertations in 2014.

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Danielle's thesis was studying the "The Impact of Age and Exercise on Antioxidants and Oxidative Stress In Horses". She is currently employed in a teaching position at the University of Wisconsin-River Falls teaching Equine Studies. Ryan's thesis the "Effects of Age and Acute Submaximal Exercise on Inflammatory Cytokines, Cortisol, Insulin, Heat Shock Proteins and Skeletal Muscle Mediators of Energy Homeostasis in Horses" will further our efforts in helping to keep old horses healthy. Ryan is now residing in Oregon, employed by Kindred Biosciences, working with supplements for horses and how they can be improved.

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THE IMPACT ON RACING:

SUPPORTING SCIENCE-BASED INFORMATION FOR THE HEALTH AND SUSTAINABILITY OF THE EQUINE INDUSTRY

HE Center continues its support of the horse racing industry in a variety of ways and recognizes the importance of racing to the overall equine industry in the Garden State.

January, Kenneth In McKeever provided expert testimony during the New York State Gaming Commission meeting in Schenectady, NY.

The purpose of the hearing was to listen to testimony about the adoption of regulatory thresholds for 24 approved equine medications and amending pre-race restricted time periods for various drugs.

McKeever has assisted the racing community numerous times in its policy decision-making about threshold and withdrawal times for permitted therapeutic medications outlined in recommendations from

the Racing Medications Testing Consortium.

Center Director, Karyn Malinowski and Kenneth McKeever are currently collaborating with Dr. George Maylin, director of the New York Drug Testing and Research Program at Morrisville State College, to develop regulatory controls for the use of cobalt in race horses.

Cobalt is a natural magnetic, metallic element related to iron and nickel. Similar to magnesium and mercury, cobalt occurs normally in the blood of both humans and horses. Given as a supplement, cobalt increases the number of red-blood cells in the body, essentially creating a "blood-doping" effect.

Finding cobalt in testing is difficult as it is only detectable for approximately four to six hours. Further, chronic cobalt use can have severe and toxic side effects.

For some, the link between horses and cobalt may not be obvious. Similar to human athletes who intentionally consume cobalt to gain a competitive advantage, there have been recent instances of horses being given cobalt to enhance athletic performance, too.

For Maylin, the principal investigator of the research initiative, the addition of Malinowski and McKeever provided both valuable resources and expertise.

The research is funded by the United States Trotting Association

It is the Center's responsibility, with its proven track record of peer-reviewed research, to provide the scientific data to regulatory bodies which are deliberating the use of various agents in racehorses.



WELCOME TO EQUINE SCIENCE 4 KIDS!

Would school be more fun if there were horses in your classroom? How about horses in your gym class? And even in your lunch room? Hey, it's not a dream! It's the Rutgers Equine Science Center.

We go to school with horses every day! We've learned a lot about keeping them happy, healthy and strong, and keeping their environment clean. And now you can too. Just saddle up and click around!

visit: esc.rutgers.edu/kids

Equine Leadership Opportunities

N March 31, 2014, a group of alumni from the four classes of the equine leadership course met to discuss the creation of a Leadership Course Coalition in order to affect positive change in the New Jersey horse industry.

While it was frustrating to discover SWOT analysis threats that were identified during the 2008, 2010, and 2012 classes remain the same, some appropriate goals that the group could accomplish were identified.

Summary of the Goals Discussed at the Meeting

•Promotion of the New Jersey horse industry during June, the month of the horse. Some initiatives are already underway in support of promoting the industry by the NJ Equine Advisory Board (EAB).

•The weekday morning time for the EAB monthly meeting is not conducive to fostering new/young membership. To that end, the October 16 EAB meeting was held during the evening in conjunction with the Center's Stakeholder Meeting at Rick's Saddle Shop in Cream Ridge.

•The importance and benefits of the rapeutic riding should be shared with the general public.

•The exclusivity of most breed groups and riding disciplines is a disadvantage when trying to lure new people into the industry.

•Information about horses could be introduced to the 4th grade curriculum, which already contains learning about New Jersey as part of the curriculum.

•Giving urban youth, who do not have access to horses, a "hands on" opportunity. Burlington County's Living Bridges program is an example of this type of program.

PROVING THAT EDUCATION IS IMPORTANT:

SCHOLARSHIPS AT THE EQUINE SCIENCE CENTER

Doris C. Murphy Endowed Scholarship in Equine Science

HE Doris C. Murphy Endowed Scholarship in Equine Science was created to honor the memory of a woman who loved animals.

Shortly before Ms. Murphy's death in 1998, she contacted her financial advisor, Kate Sweeney of Smith Barney, and expressed her desire to support animal science education.

Ms. Sweeney, a Cook College alumna, suggested the equine science program as an appropriate beneficiary. Similar to Ms. Murphy, Kate is also very supportive of women's education.

The endowed scholarship is offered to female undergraduate students majoring in Animal Sciences with an equine science interest.

Students must have a financial need and also be a New Jersey resident. The scholarship recipient for 2013-2014 was Rachel Walter.

Ernest C. Bell Memorial Scholarship Awarded to Senior Amanda Xue

MANDA Xue, a senior at the Rutgers School of Environmental and Biological Sciences (SEBS), is the recipient of the Ernest C. Bell Scholarship for 2014.

The award was presented by Carey Williams, Chair of the New Jersey Equine Advisory Board, at the Annual Breeders Awards luncheon hosted by the New Jersey Department of Agriculture on Sunday, January 26.

The Ernest C. Bell Memorial Scholarship Fund was established to perpetuate Mr. Bell's memory and his ideals of courage and determination. The scholarship is awarded to a senior at SEBS who is majoring in Animal Science with an emphasis in Equine Science.

The recipient must be a New Jersey resident and demonstrate a high level of scholastic achievement, involvement with New Jersey's horse industry, and financial need.

RU Wish Bone is a fully articulated equine skeleton used for undergraduate and outreach teaching.

DEMONSTRATING HOW REACHING OUT HAS AN IMPACT: OUTREACH TO THE EQUESTRIAN COMMUNITY AND OUR MANY PUBLICS

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N 2013-14 Center faculty, students, and staff were busy doing what they do best, sharing the mission of "Better Horse Care through Research and Education" with equine enthusiasts all over the state of New Jersey.

In July of last year the Equine Science Center was proud to open its doors to the largest Summer Showcase (formerly known as the Open House) it has ever hosted on campus.

Faculty and staff welcomed over 120 local New Jersey visitors as well as attendees who traveled from surrounding states.

The day featured a morning session in the physiology lab where guests learned about the equine industry and the importance of horses to the economy.

Horse Hero mare "CC" brought a fascinated smile to every face as she paced at 22 mph on the equine treadmill, demonstrating the primary research method faculty use to gather vital data during studies.

After the high-speed treadmill demo, attendees broke into smaller groups to participate in three different program rotations around the research facility.

One group continued into the lab where they were introduced to the equipment and methods that faculty and students use regularly to analyze and measure their findings.

The second group visited

Carey Williams in the Roundhouse where she discussed the similarities between the skeletal system of horses and humans using a fully articulated equine skeleton, RU Wishbone.

Finally the third group experienced a full-immersion in barn safety with Laura Kenny at the stable area.

Kenny facilitated a barn scavenger hunt for guests to peruse the stable grounds for unsafe and hazardous scenarios before identifying them as a larger group.

Ending the program on a high-note, all guests reconvened for closing remarks at the Center's Equi-CiserTM, which looks similar to a real-life merry-go-round.



SOME SPORTING GOOD FUN:

"THE HUNT" AND OTHER EVENTS THAT THE RUTGERS EQUINE SCIENCE CENTER PARTICIPATED IN OVER THE LAST YEAR

Visiting the Monmouth County Hunt: Alumni Enjoy a Day of Horses, Hounds, and Hunting

N November 3 the Monmouth County Hunt (MCH) hosted its second annual "Rutgers Day" in the beautiful Assunpink bordering the Horse Park of New Jersey.

This day was designed to foster a relationship between the

two organizations and to educate students on the sport of Fox Hunt-ing.

Students who do not have a horse are invited to ride in a car with one of the hunt members.

This year mounted riders Carey Williams, Mica Scalia (student), Wendy Hale (alumni) and Karyn Malinowski departed from the hunt kennels in Allentown, NJ.

After three and a half hours of riding to the hounds, all participants welcomed a delicious brunch provided by the MCH.

Globe-"Trotting": How The Rutgers Equine Science Staff is Traveling the Globe

UTGERS Equine Science Center research was presented at the 9th International Conference on Equine Exercise Physiology (ICEEP) held June 15-20, 2014 in Chester, England.

ICEEP (http://iceep.org/) is the pre-eminent organization devoted to scientific research into the physiology, health, and function of equine athletes.

McKeever's presentation entitled "Hemodynamic and endocrine changes associated with splenic reserve mobilization" explained

UTGERS Equine Science the endocrine mechanisms associ-Center research was presented at the 9th Internasplenic red cell reserve in the horse.

> This research sheds light on a key physiological process that facilitates the huge rate of oxygen transport seen in the horse during exercise.

> Former Ph.D. student, Danielle Smarsh presented data from her dissertation in a talk entitled "Effects of age and exercise training on oxidation of skeletal muscle and blood in mature and yearling horses".

McKeever Chaired the final session of the conference that featured papers on Physiotherapy, Rehabilitation, and Equitation Science.

Finally, Dr. McKeever was also elected by his peers to serve a 12-year term on the prestigious eight member International Committee that oversees the planning and scientific content of future ICEEP conferences.

The 10th ICEEP will be held in 2018 in Lorne, Victoria, Australia. ■

With a Website and a Plan, the Reach of the Rutgers Equine Science Center is Limitless

6.3 Million Hits Over 600,000 Page Views
457,181 Unique Visitors (49% Increase)
Average Visit Length of Almost 2 Minutes
Top Pages: Home Page & Ask the Expert

OH THE PLACES WE GO:

NUMEROUS LECTURES, CLASSES, COURSES, PARADES, PODCASTS, FAIRS, EVENTS, AND FUN!







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COMMUNITY MEMBERS HORSING AROUND ON THE RUTGERS FARM: AG FIELD DAY AT THE RED BARN

HE Rutgers Equine Science Center celebrated the "Year of the Horse" with a party at the Red Barn after an exciting horse show during Ag Field Day on April 26th.

The event featured two demonstrations of the wildly-popular equine exercise physiology lab's treadmill.

Horse Hero mares, Mazel and Lady, performed for over 100 guests during each of the demos held at 1:00 and 2:00 PM.

People were lining up 30 minutes before the demonstrations in order to watch the Horse Heroes go.

In addition to learning about exercise physiology, visitors to the Red Barn thoroughly enjoyed an opportunity to chat with alumni and current students about career options within the horse industry and equine academic courses in the department of Animal Sciences at Rutgers.

Young equine enthusiasts were all about Lord Nelson and Equine Science 4 Kids as Center volunteers assisted them by applying temporary tattoos, helping kids color and personalize Equine Science Center tee-shirts, and picking out beanie babies.

With picture-perfect weather, this was the best Ag Field Day yet. ■

Nancy Jaffer Receives 2014 "Spirit of the Horse" Award



HE Equine Science Center was proud to name noted equestrian photojournalist, Nancy Jaffer, as the 2014 recipient of the "Spirit of the Horse" award.

Ms. Jaffer received the award during the Center's annual year end event, "An Evening of Celebration and Science" on Tuesday, November 19.

The "Spirit of the Horse" award recognizes individuals whose lives have been profoundly changed because of their involvement with horses and who have acknowledged the impact by giving back to the horse industry.

Director of the Equine Science Center, Karyn Malinowski, stated, "Nancy Jaffer's tremendous admiration and love for horses is no secret; one can just refer to any of the innumerable articles that she has written about equestrian sport and the equine industry throughout her illustrious career.

Nancy provides a voice for the industry and we were thrilled to honor her with the Spirit of the Horse award."



Drs. Karyn Malinowski and Michael Westendorf presenting Carolyn and K.C. Nemutlu, and Dr. Philip D'Arrigo with the Gold Medal Horse Farm Award for the environmental sustainability practices which have been implemented at D'Arrigo Racing Stables.

- Fast Facts -

The 2004 Equine Science Update, now known as the "Evening of Science and Celebration", marked the first year that a tour of the facilities was offered. Every year since this tour has become a popular feature of the "Evening of Science and Celebration."

Join us every year in November to

celebrate the work that the Center does to advance its mission of "Better Horse Care through Research and Education."



D'Arrigo Racing Stables Receives Gold Medal Horse Farm Award

HE "Gold Medal Horse Farm 2014" award was presented to Dr. Philip D'Arrigo and Carolyn and K.C. Nemutlu of D'Arrigo Racing Stables.

A collaborative new initiative between the Equine Science Center and the New Jersey Department of Agriculture, the Gold Medal Horse Farm award recognizes outstanding management and calls attention to how the New Jersey equine industry helps to maintain the beauty of the Garden State.

To information about the Gold Medal Horse Farm program, visit esc.rutgers.edu.

Newsletters, Online Radio Show Guest Spots, and Press Releases Increase Our Reach

ARKETING and public relations goals for the Equine Science Center primarily stem from efforts to: increase awareness of equine research and for Center programs; and identify new opportunities to connect with supporters within the equine community.

One such example during the reporting period achieved both goals. In April, the Center began teaming-up with Horse Radio Network to provide a monthly equine science expert segment featuring several faculty members during the "Horses in the Morning" daily online radio show.

Karyn Malinowski partici-

pated in the first program and provided a broad overview of the Center and what Horses in the Morning listeners should expect to hear from faculty members.

As of late October, Karyn, Michael Westendorf, Michael Fugaro, Carey Williams, Clint Burgher, and Laura Kenny have been interviewed on the show.

The collaboration with Horse Radio Network has increased awareness of the Equine Science Center.

Immediately following each radio program, the Center experiences a surge in "Likes" to its Facebook page. In fact, during one program, there were over 80 new "Likes"!

Archives of "Horses in the Morning" featuring Center faculty are archived on the MultiMedia page of the Center's website: esc.rutgers.edu.

During the 12-month reporting period, the Center produced over 15 press releases which resulted in numerous articles published online and in-print.

The Center published four newsletters highlighting research, accomplishments, and events, which provide an opportunity to meet with friends and supporters to further spread our mission of "Better Horse Care through Research and Education."

New Year, New Changes: Introducing the Electronic Newsletter and New Website Design

N early 2015, the Equine Science Center will unveil its completely redesigned website.

The site will include new layouts, easier page navigation, and a overall better user experience.

Utilizing the majestic and regal beauty of the horse, the site will include more pictures of horses and the picturesque Equine Science Center facilities on the G. H. Cook Campus in New Brunswick.

Although the site will look vastly different, the integrity of the scientific research will remain intact.

Searching and finding specific content will be much easier for visitors to manage.

Embedded video content by going green, and opt-in will also make an appearance, al- your online copy of the **38** RUTGERS EQUINE SCIENCE CENTER ANNUAL REPORT 2013-2014

lowing visitors to familiarize themselves with our horses and facilities. So even if you can't come visit us in person, you can still see whats going on at the Center.

Templates to submit questions and info directly to Center faculty and staff from the website will now be available, making communicating with us even easer.

The Center will also launch several new social media accounts including Twitter and YouTube.

In an effort to reduce the expense of print production and postage costs related to producing the newsletter, the Equine Science Center will be offering its quarterly newsletter online.

Help the Center save a little, by going green, and opt-in to receive your online copy of the newsletter NNUAL REPORT 2013-2014 via email. Simply visit the Center homepage (esc.rutgers.edu) and click the link to "E-Newsletter Sign up" link.

The online newsletter will be more interactive by utilizing pageturn software which mimics the experience of flipping through a magazine or book.

It will also be easier to share articles with friends and family by selecting the social sharing features included in the new online newsletter software.

Stay tuned as details regarding the new website and online newsletter will be posted to the Center's Facebook page at esc.rutgers.edu/fb.

We look forward to seeing you on our new site, and interacting with you on our social media!

The Equine Science Center 4-H Designed Correspondence Cards













As part of a collaboration with New Jersey 4-H youth members, we now offer a set of correspondence cards featuring artwork submitted for competition in the annual 4-H Equine Art Contest. If you are interested in purchasing a set of these six cards please contact: Kyle Hartmann at Hartmann@aesop.rutgers.edu

Get Your Business Planning Workbook and DVD Set Today!



Equine Business Planning Workbook



Equine Science Center Better Horse Care Through Research and Education The workbook that was developed to go along with the Equine Business Planning Course was updated and improved to stand alone as an educational resource.

The workbook walks readers through every step of producing a business plan in easy to understand sections with space to take notes and answer suggested questions to ask oneself.

It also includes a sample business plan written for a fictional horse farm and comes with a DVD containing extra resources and several of the recorded presentations from the course.

The DVDs are priced to sell at \$40 each; there is a limited quantity available. To order contact: Laura Kenny at kenny@aesop.rutgers.edu.



Better Horse Care through Research and Education

esc.rutgers.edu



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