RUTGERS
Equine Science Center

Research Updates

Recovery of Pasture Forage Production Following Winter Rest in Continuous and Rotational Horse Grazing Systems

Current Ph.D. student Jennifer Weinert, under the direction of Dr. Carey Williams (Department of Animal Science, Rutgers University) evaluated pasture production in rotational and continuous grazing systems after winter grazing exclusion. This research, funded by the Equine Science Center was conducted at the Rutgers Ryders Lane Environmental Best Management Practices Demonstration Horse Farm.

The Research Project

Implementation of pasture Best Management Practices (BMPs) can have numerous economic and environmental benefits for horse producers. One primary goal of BMPs is to minimize overgrazing of horse pastures, which typically occurs when pastures do not produce at a high enough rate to provide adequate available forage for grazing.

Overgrazing can negatively impact both the environment and the financial health of horse operations. Overgrazing can lead to a lower percentage of vegetative cover in pastures, increasing the potential for erosion and nutrient losses from runoff.

Overgrazing can also damage health of pasture stands and result in soil compaction

Horse grazing on cool-season grass rotational pasture at the Ryders Lane Environmental Best Management Practices Demonstration Horse Farm.

Rutgers students collecting pasture forage for herbage mass analysis.

Rutgers students collecting sward height observations in a research pasture at the Ryders Lane Farm.

which contributes to lower pasture yield over time, thus increasing costs for supplementary feed and/or pasture renovation.

Additionally, overgrazed pastures may not be able to provide an adequate amount of forage to meet the nutritional needs of horses and could result in decreased body condition, especially in horses that are hard-keepers or have increased nutrient requirements due to exercise, growth or lactation.

One of the main BMPs that can be utilized to prevent overgrazing of horse pastures is rotational grazing. Correct management of rotational grazing systems ensures that pasture forage has adequate time to rest and recover before another grazing bout, thereby preventing the overgrazing commonly seen in more traditional, continuously-grazed pastures.

Winter rest of pastures is also recommended to ensure adequate availability of spring forage for grazing. However, rest alone may be insufficient to compensate for overgrazing in continuously-grazed pastures.

The objective of this study was to quantify the effect of intense grazing in a continuous and rotational horse grazing system on pasture condition and herbage composition in a subsequent growing season following winter grazing exclusion.

Pasture forage yield, persistence, and quality were assessed monthly in two horse pastures, one continuous (CON) and one rotational (ROT), from April to August 2017.

Prior to this study, pastures had been committed to grazing in their respective management system for 27 months. Horses were then removed from the pasture fields in November 2016, and fields were not grazed throughout the duration of the current study.

Herbage mass was greater in ROT in May, June, and July, while sward height only differed by grazing system in May. Overall, prevalence of planted grass species was greater in ROT than CON.).

Furthermore, there was an association between pasture forage composition and grazing

management system at all sample points other than in August.

Additionally, sward components were most affected by previous grazing system in April and May, with a greater proportion of live leaf in ROT than CON.

Conclusions and Future Directions:

These results demonstrated that even after prolonged rest, previous management of pasture influenced forage re-growth.

Moreover, winter rest alone may not be sufficient to mitigate overgrazing of continuous pastures. Differences in yield between continuous and rotationally managed pastures persisted throughout much of the growing season following winter exclusion, and a total of nine months of rest was required for herbage mass in the continuous field to reach similar levels as the rotational field.

Vegetative cover in the rotational field was consistently above the recommended levels for prevention of erosion and nutrient runoff, while low levels of vegetative cover in the continuous field presented an increased erosion risk in the early spring.

Findings of this study support the implementation of rotational grazing practices as a means of optimizing long-term pasture production.

Further investigation is needed to assess of the impact of rotational grazing practices on equine metabolic and digestive health to ensure that recommended pasture management practices are not only environmentally and financially sound, but also promote optimal horse health.

Meet the Researchers

Dr. Carey Williams
Associate Extension Specialist
Rutgers-The State University of New Jersey
New Brunswick, New Jersey, USA

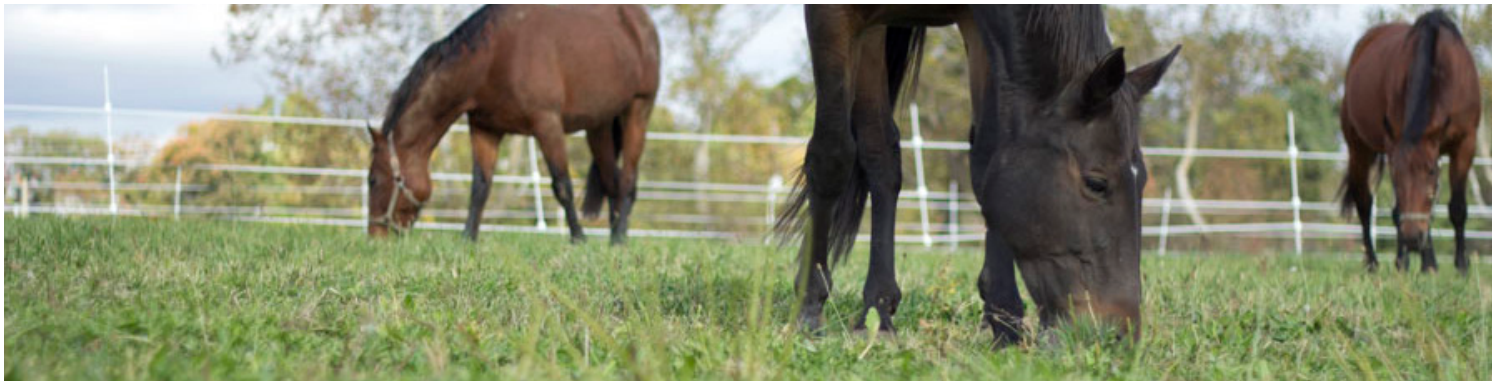
Carey A. Williams, Ph.D. joined Rutgers University in July 2003 as its Equine Extension Specialist and the Associate Director of Extension in the Equine Science Center, taking an active role in teaching, conducting research and working with the equine and academic communities to ensure the viability of the horse industry in New Jersey.

A Wisconsin native, Dr. Williams started her schooling with a bachelor's degree in Equine Science from Colorado State University (1998), where instead of strengthening her passion for veterinary medicine, she realized her passion for nutrition and teaching.

She went from there for a master's and doctorate degrees in Animal and Poultry Sciences (with an emphasis on equine nutrition and exercise physiology) and graduated in June 2003 from Virginia Polytechnic Institute and State University.

At Rutgers, Dr. Williams maintains a herd of Standardbred horses for nutrition, exercise and pasture research. Her exercise work dealt with strategies for decreasing the stress of intense exercise through nutritional modification and antioxidant supplementation.

Her nutrition and pasture work has focused on different grazing systems and how they impact horse health and the environment. She has also maintained a Best Management Practice



Demonstration Horse Farm where she performs research on the BMPs. Dr. Williams has been author or co-author of over 40 scientific journal articles in her field of expertise. She has also authored eight book chapters on antioxidant, oxidative stress, supplements or pasture management for horses. Along with self-written publications, you may have seen her name in various publications like The Horse Magazine, Equus, Practical Horseman and The Blood Horse as an 'expert' interviewee. You may have also listened to one of her webinars or appearances on radio shows.

Meet the Researchers

Jennifer Weinert
Ph.D. Student & Graduate Teaching Assistant
Rutgers – The State University of New Jersey
New Brunswick, New Jersey, USA

Jennifer Weinert is a non-traditional Ph.D. student in the Department of Endocrinology and Animal Biosciences at Rutgers University. She received her Bachelor's Degree in Animal Science – Equine Emphasis from the University of Wisconsin-River Falls and went on to work in the western performance horse sector of the equine industry. Ms. Weinert's background in 4-H and AQHA competition as a youth initially led her to pursue a career in horse training. Working at Reining Horse training facilities in Texas and Wisconsin provided invaluable practical experiences and gave Weinert an even greater appreciation for the scope of the equine industry.

Following her time in industry, Ms. Weinert returned to UW-River Falls to manage the equine enterprise at the Campus Laboratory Farm. In that capacity, she oversaw management and maintenance of 60-90 university-owned teaching horses and all equine facilities, including over 40 acres of pasture land. Ms. Weinert also took on a new role managing the UW-River Falls Horse Breeding Program, with responsibilities including ultrasonography and insemination of mares, foaling and collection and processing of stallion semen.

Since beginning her PhD studies at Rutgers, Ms. Weinert has worked under the guidance of Dr. Carey Williams. Ms. Weinert began her dissertation research in 2018 investigating the effect of integrated cool- and warm-season rotational grazing systems on horse pasture production as well as equine metabolism and the gut microbiome.

Further Readings:

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Kenny LB. 2016. The effects of rotational and continuous grazing on horses, pasture condition, and soil properties [thesis]. Rutgers University, New Brunswick, NJ.

Martinson, K.L., P.D. Siciliano, C.C. Sheaffer, B.J. McIntosh, A.M. Swinker, and C. A. Williams. 2017. A review of equine grazing research methodologies. J. Equine Vet. Sci. 51:92-104.