Modern Turfgrass Development and Management

at the John Seaton Anderson Turfgrass Research Center

The John Seaton Anderson (JSA) Turfgrass and Ornamental Research facility houses the University of Nebraska-Lincoln turfgrass research program. The JSA research facility has served the turfgrass industry for decades. It houses 50 acres of irrigated turfgrass plots ranging from golf fairway and putting green turf, to high mowed turf, to plots of weeds for herbicide evaluations and more than one thousand accessions of buffalograss for the breeding program.

The JSA research area is utilized primarily by UNL’s Department of Agriculture and Horticulture, but the Departments of Plant Pathology and Entomology also conduct research at the area. Turfgrass research is led by the primary research faculty, Keenan Amundsen and Bill Kreuser. The research program strives to bring the best and most relevant turfgrass research, education and outreach opportunities to Nebraska and surrounding states.

Kreuser is the newest hire to the program, starting in January 2014 as the state’s Turfgrass Extension Specialist. His research expertise was a timely and welcome addition to the turf program following the retirement of Dr. Tom Kunze, who had been involved with UNL’s turfgrass program since the 1990s.

Kreuser’s primary goal is to improve turfgrass production and management techniques to minimize inputs/labor and maintain quality turfgrass. He is interested in studying how various management techniques can be employed to minimize inputs/labor and maintain quality turfgrass.

Teaching Herd Vital to Research and Education

The UNL School of Veterinary Medicine and Biomedical Sciences (SVMBS) manages a cow/calf operation at the ARDC. The unit consists of approximately 350 acres of grassland with a beef herd consisting of approximately 90 cow/calf pairs that calve in the spring. Classified as a “teaching herd,” the unit plays an important role in the UNL Professional Program for Veterinary Medicine (PPVM).

The SVMBS cow/calf herd is the focal point of a large animal veterinary elective class (VMED596) offered to 1st and 2nd year students in the PPVM. The students have the opportunity to gain hands-on experience in large animal production practice. They participate in the decision-making process for the herd in the areas of reproductive management, replacement heifer development, weaning management, feeding and nutrition, marketing and health management.

The students are also introduced to the issues of beef quality assurance, food safety and animal welfare and how these issues are addressed at the cow/calf level. Laboratories are held at the unit throughout the year to provide students experience in animal handling, body condition scoring, pre-breeding health maintenance, bull breeding soundness, pregnancy diagnosis and processing at weaning. Data collected on the herd is entered into a record system and the data is utilized by the students to monitor the herd and identify problems.

Access to the teaching herd has been a very important teaching tool to enhance the student experience at UNL.

The lack of a teaching hospital for animal exposure requires alternative thinking in the PPVM program. The SVMBS teaching herd provides the PPVM students live animal experience in a production setting. In addition to the large animal veterinary elective, there are nine exercises, labs and lectures directly tied to teaching herd experiences.
Two years in Nebraska. Two years in Iowa. The University of Nebraska–Lincoln (UNL) partners with the Iowa State University College of Veterinary Medicine (ISU-CVM) to offer the Professional Program in Veterinary Medicine (PPVM). This cooperative program provides Nebraska students increased opportunities for learning as they draw upon the expertise of faculty at both universities. Students and faculty have found the 2+2 program a very effective way to provide Nebraska residents an education in Veterinary medicine. As one student put it, “We are thankful to UNL, Vet Med for the opportunity to stay in Lincoln for 2 extra years and have in-state tuition! You all definitely took good care of us. There were strengths that we had that ISU students did not, and vice versa. I think our strengths better suited us for real-world medicine and practice. 2+2 program is perfect design and allows us to mesh with our ISU counterparts during the 3rd year before we head into rotations and really have to work together. Being able to be a student on both campuses has also allowed me to really increase my networking.”

Here is how the 2+2 program works. Twenty-five Nebraska resident students are admitted to ISU and enroll and complete the first two years of the veterinary curriculum at UNL and the last two years at ISU. As Nebraska resident students pay ISU resident veterinary tuition for all four years of enrollment with the tuition for the first two years paid to UNL and for the last two years to ISU. As one would expect with veterinary medicine education program – there are the “ologies” on the class schedule….such as virology, physiology and immunology. However, elective classes provide very specific and sometimes unique learning experiences. Some of the electives include: cattle production systems, exotic animal handling, emerging and exotic diseases of animals, behavior of domestic animals, shelter medicine, dairy production informatics, infectious diseases of wild animals, and Spanish for veterinarians. The cattle in the UNL School of Veterinary Medicine and Biomedical Sciences (SVMBS) unit are utilized for the Veterinary Foundations curriculum for 1st and 2nd year students using the herd including animal behavior, animal restraint, and physical examinations providing 30 contact hours.

Teaching Herd - Continued from page 1

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The SVMBS unit is also currently active in several applied research studies that evaluate various management strategies in reproduction and their impact on the production system. In 2014, a research and demonstration project was initiated to evaluate the economic impact of the use of estrous synchronization, artificial insemination and sexed semen technologies to potentially add value to the animals and improve the economic position of a livestock enterprise. The adult breeding herd was estrous synchronized and fixed-time artificially inseminated (AI) with male sexed semen from a Simmental terminal sire. Seven days following AI the cows were turned with herd bulls for a 160 day natural service clean-up period.

Gender ratio from the calves born is being evaluated along with the calving distribution. Ownership of both the AI and natural service males will be maintained through harvest with feedlot performance and carcass data collected. Partial budgeting will be used to evaluate potential to increase per cow beef production and returns by increasing the percentage of terminal-type steer production.

Another project under way is designed to identify modalities to monitor bull mounting behavior on cows.

Parentage data from beef calves at the U.S. Meat Animal Research Center has shown that in multiple-sire breeding methods towards its improvement. Amundsen's approach to achieve input reduction is through careful grass species selection. The turfgrass breeding program at UNL has been developing improved turf-type buffalograsses for more than 30 years. Buffalograss is broadly adapted to the Central Great Plains region and thrives with minimal fertility, supplemental irrigation, and pesticides when compared to traditionally grown turfgrass species. Buffalograss is also a dioecious species so it has separate male and female plants, which is rare among flowering plants. The dioecious nature of buffalograss makes it difficult to apply modern advanced breeding methods towards its improvement. Amundsen assumed leadership of the turfgrass breeding program in 2011. His two primary research objectives are to...
A subgroup of the SVMBS cows were fitted with location monitoring ear-tags and estrus synchronization will be initiated. Two bulls were fitted with location monitoring ear-tags and placed with the group of cows immediately following synchronization and then activity of all animals was continuously monitored by the system for 5-7 days. Video cameras captured activity of the bulls and cows over the test period. The video is being time-stamped and synchronized with the location monitoring system for purposes of system validation and analysis. Data includes real time locations for each animal in the pen at all times, along with accelerometer measurements of movement on an X, Y, Z axis. Data structure provides one measurement for each tag from each animal for each second of the observation period. Activity data was recorded by video with time synchronized to the real time location system. Video is being analyzed and behaviors logged through visual observation. The video observers were trained to identify specific behaviors of interest (initiation and completion of mounting behavior) and sex hormones were marked in the behavioral data. Real time location data is being used to determine the paired matings as well as social interactions within the housing area during the test period. After logging video behaviors, the accelerometer data will be categorized into mounting and non-mounting behaviors. Results from the project will include the ability to quantify differences in social behavior of bulls in this pen during breeding activity and the accuracy of using accelerometers mounted in different locations on the bulls to detect breeding behavior. The ability to use such systems to accurately monitor the sexual behavior of bulls in multi-sire breeding pastures would be a major advancement, providing a reliable, non-invasive method to detect bull behavior. Data from the study will be compiled in order to accurately determine the effect of bull behavior on reproductive efficiency. Many man hours are required to ensure that the animals at the unit have the best care possible. Faculty in the school is involved in research, teaching, extension and diagnostic service throughout Nebraska. Dr. Richard Randle is the faculty supervisor of the SVMBS unit. Dr. Randle is a professor at the School of Veterinary Medicine and Biomedical Sciences and serves as a Beef Extension Veterinarian. His area of interest is beef cow/calf production management with emphasis on young stock management, disease surveillance, biosecurity and quality assurance.

Blaine Clowser is the Animal Operations Manager for the SVMBS unit. He is a graduate of Penn State University with a bachelors degree in animal science. Summer Nicholson-Gengenbach is the Project Coordinator of the Extension program at SVMBS. She graduated from Oklahoma State University with a bachelors degree in animal science (pre-veterinary medicine).

Richard Randle
Blaine Clowser
Summer Nicholson-Gengenbach

On the Road for Education

A crowd gathers around to see a cow giving birth at the state fair - on experience that many will never encounter anywhere else. At a Nebraska high school, another unique educational experience takes place. A student steps onto a trailer, slips on a plastic gown and reaches inside a steer’s rumen. The rumen contracts around her arm and she sees, feels and smells what the steer had been munching on as she learns about ruminants. Amongst the “goats” and “cows” and sometimes “oink,” the animals seem relatively unaffected by the onlookers that have gathered around them. So how is it that these animals are seemingly at ease around strangers and often large crowds?

It all starts at the School of Veterinary Medicine and Biomedical Sciences (SVMBS) research area at the ARDC - home to a small group of cattle that were selected for their educational value. Cattle in the birthing pavilion at the state fair and the fistulated steer that travels for onsite education in the Husker Mobile Beef Lab are part of the SVMBS herd at the ARDC.

The livestock birthing pavilion at the Nebraska State Fair provides fair-goers the opportunity to see live animal births under the supervision of trained professionals from the University of Nebraska SVMBS and members of the Nebraska Veterinary Medical Association. But it takes a lot of training before the cattle make the trip to Grand Island. The Birthing Pavilion herd consists of approximately 15 head of females that are selected at a very early age. Heifer calves from the teaching herd are closely observed during the 1st month after birth to determine their general disposition. Doile calves are targeted as prospects and the training begins. Blaine Clowser, the Animal Operations Manager for the SVMBS unit, spends time with these calves at an early age so that they are accustomed to being handled. At weaning, the heifers are trained to a halter and the ones that respond well to this training are selected for the Birthing Pavilion herd.

But that is only half of the challenge. These animals must be bred to calve during the 11-day window of the State Fair. A combination of physiology, biological variation and a little luck is used to accomplish this. The normal gestation in a cow is 283 to 285 days. But as with pregnancies in any species, there are variables on when a baby is actually born. Data from cows that conceived on the same day show that there can be a 10-day window either side of the projected calving date. To account for these variables, cows in the Birthing Pavilion herd are estrus synchronized and timed inseminated for a projected calving date midway through the dates of the State Fair. Normal variation in calving allows for calves to be born over the 11-day window. This has been very successful and there is an average of 6-8 cows that calve during this period.

The Husker Beef Lab provides hands-on experiences for students in middle school and high school. The Nebraska Extension Mobile Beef Lab teaches science through hands-on learning with a fistulated steer. “Rudy” the steer that travels with us is part of the SVMBS herd at the ARDC. The Mobile Taco Lab provides learning opportunities with ruminate nutrition, microbiology, animal care, forage utilization, and the importance of beef production in Nebraska.

The birthing pavilion and the Husker Mobile - Continued on Page 4

Richard Randle
Blaine Clowser
Summer Nicholson-Gengenbach

Ag Safety Training for Medical Professionals

Cameras are clicked and questions are asked. It’s a fairly routine expectation with visitors on educational visits at the ARDC. But there is a group that visits annually that brings the picture taking and question asking to a new level because they are being graded on their participation in the tour.

The Central States Center for Agricultural Safety and Health (CS-CASH) within the University of Nebraska Medical Center (UNMC) College of Public Health provides an intensive four day course each summer for those wanting to expand their knowledge base in agricultural medicine. The course entitled Agricultural Medicine: Occupational and Environmental Health for Rural Health Professionals is attended by doctors, nurses, emergency medicine responders, health educators, physical therapists, public health students and other professionals who work with or have an interest in agricultural health and safety.

UNMC Professor Risto Rautianen, the director of the CS-CASH, contacted the ARDC 5 years ago with the idea of bringing students out for a field study during the course. The four hour tour allows course participants to experience first-hand the health and safety hazards that are encountered daily during routine farm work. The on-farm experience paired with in-class lectures provides a broad base of knowledge to professionals thereby improving clinical, rescue and emergency outcomes for the agricultural community. In addition to continuing education credit, participants completing this course can become certified as AgSafe providers. AgSafe is a nationwide nonprofit program that supports health care providers with education and resources allowing them to better serve agricultural communities.

Ellen Duysen serves as the CS-CASH coordinator. She travels with the course participants to the research center coordinating the logistics with the ARDC and Extension. Duysen reports that the feedback from participants over the 5 years has been enthusiastic. Duysen says, “Many health care providers taking the course have never been on a farm. Participants leave with a better understanding of physical farm hazards such as PTO entanglement, grain bin engulfment and injuries caused by livestock. Health hazards including exposure to pesticides, anhydrous ammonia and livestock medication are also highlighted throughout the tour.”

Students taking the course for academic credit take pictures, complete a Certified Safe Farm Report designed to help the students recognize hazards associated with farm equipment and complete a hazard report. The reports are shared with ARDC staff.

Topics covered in the course include: overview of farming practice, agricultural respiratory diseases, zoonotic diseases, health effects of agricultural pesticides, veterinary biological and therapeutic occupational hazards, physical factors affecting health in agriculture, agricultural trauma, general environmental hazards in agriculture, behavioral health issues in the farming community, agricultural skin diseases, cancer in agricultural populations, musculoskeletal diseases and ergonomics in agriculture, skin cancer and precancerous lesions, AgrAbility Nebraska, youth

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

University of Nebraska ARDC Director Mark Schroeder (left) explains the hazards and safety concerns involved in crop production to the UNMC agrimedicine group.

Summer 2015
Summer Pneumonia in Beef Calves

Generally, mid to late summer is a time when cow calf producers relax a little. Calving is over; cows and calves are on summer pastures and typically it is a relatively uneventful time. But as summer progresses, producers should be on the lookout for summer calf pneumonia. Summer calf pneumonia is the term used to describe respiratory disease in pre-weaned calves on pasture. Over the past several years, this condition has been increasingly identified in beef herds. These outbreaks tend to be unpredictable, occurring in herds at all levels of management.

The infectious agents associated with summer calf pneumonia appear to be similar to those implicated in typical post-weaning bovine respiratory disease complex such as Mannheimia haemolytica, Histophilus somni, Pasteurella multocida, Infectious Bovine Rhinotracheitis Virus (IBR) and Bovine Respiratory Syncytial Virus (BRSV). Compared to the post-weaning bovine respiratory disease encountered by animals entering the backgrounding or feed lots, little is known about the risk factors that predispose calves to pneumonia while on pasture.

In herds examined with this problem, two patterns have emerged. One pattern is in very young calves a month or less. It is believed this is related to poor colostrum quality or quantity as a result of poor nutrition in the cows prior to calving such as in drought situations. The other more common pattern is in late summer, early fall as the average age of the calves reach 90 to 120 days. This is the time that colostral protection is running out making the calves susceptible.

Some of the factors that have been speculated to be involved include:

- Exposure of calves to older calves (such as feedlot animals) shedding high levels of infectious agents (but not necessarily sick themselves)
- Hot, dry, dusty conditions that interfere with the respiratory tract’s normal defense mechanisms that typically occur in late summer along with dusty conditions that can cause an increase in dusts during harvest
- Adverse weather conditions such as wide temperature swings between day and night
- Crowding and separation from mothers for prolonged periods of time, such as during breeding or synchronization
- Signs of respiratory disease in pre-weaned calves do not always include breathing problems such as cough or rapid respirations, although those signs may become more obvious when the herd is moved from one location to another. Shugginess, reluctance to stand up with the herd, and drooping of ears are commonly noted. Many affected calves will have high fevers.
- Most reports are that treating calves with summer pneumonia is frequently successful. It is important to identify and treat affected calves early. While treatments appear successful, they are difficult and frustrating to develop the next generation of turf-type buffalo grass cultivars and apply modern techniques to improve the efficiency of the breeding program. Amundsen coins himself a “computer nerd” but brings a unique expertise to buffalo grass breeding as a computational biologist. He applies modern DNA sequencing methods to understand genome complexity of buffalo grass. He is also implementing DNA-based techniques to complement his breeding activities and has identified genes that confer pest resistance and improved buffalo grass quality that can be used to identify plants with these traits faster than field-based observations. Amundsen’s research group, led by Carol Caha (lab manager), Katie Kreuser (breeding coordinator), and Jeff Witkowski (gernplasm manager), is working to increase seed yields, apply experimental directives breeding methods, improve turf quality and sod characteristics, and further increase buffalo grass pest and abiotic stress tolerance.

The turfgrass research program’s success is in part honed on the research facilities at the John Seaton Anderson Turfgrass Research Center and the staff that work onsite. Matt Sousek was hired as the ISA Turf Manager in the Spring of 2015 and oversees all aspects of farm and project management. Before taking this important leadership role, he worked closely with UNL turf researchers to test efficacy and safety of herbicides applied to turf and brings years of practical and applied experience to the position.

Modern Turfgrass - Continued from page 2

Weathering the 2015 Calendar

What’s On The Calendar

September

10  Field to Market
11  4-H Council Meeting
11  Legislative Day on the Farm

October

1, 2, 5, 6  Ag Literacy Festival
16  Southeast Research and Extension Fellows Conference
19  Trans Atlantic Water Conference

November

6  Husker Beef Nutrition Conference
18  4-H Council Meeting

Learning about the care and safety of working with large animals is an important part of the group’s visit to the ARDC. Henry Hilscher, beef feedlot researcher, met with the group to discuss beef cattle production, care and research.

Jeff Witkowski is assistant manager and Buffalograss researcher. He has been involved directly or indirectly in every single research trial over the last 20 plus years at the John Seaton Anderson Research Center.

The UNL turf program also owes its success to the support it receives from national, regional and local stakeholders including the University of Nebraska, and the ARDC. The support received by the program gives it the flexibility to quickly prioritize new lines of research and disseminate results to turfgrass managers. Turfgrass management advice is accessible to turf managers at every skill level, ranging from homeowners to professional turfgrass managers, through the turfgrass program’s website (http://turf.unl.edu), Backyard Farmer, and Turf Info.