**All About the Weather...Agrometeorology**

The Agrometeorology Lab at the ARDC was established in the mid-1960s. While equipment and projects may have changed over time, the influence of weather on agriculture will always be a key factor in productivity and ultimately, profitability.

**Carbon Sequestration Project**

A state-of-the-art field research facility at the ARDC seeks to quantify carbon sequestration (storage) in agricultural systems. Agricultural crops have the potential to offset a significant amount of carbon dioxide emissions by sequestering carbon in the soil.

The carbon sequestration program is an interdisciplinary research effort that includes six UNL departments, focused on improving our understanding of processes controlling carbon sequestration. The overall goal is to investigate the carbon sequestration potential of major rainfed and irrigated agro ecosystems in the north-central USA and to understand the biophysical controls on carbon sequestration. 450 acres of corn/soybean production are dedicated to the project. In this issue, we review updates related to the agrometeorological research.

**Biomass Removal Project**

- A biomass removal project (Second Generation Biofuels: Carbon Sequestration and Life Cycle Analysis) began at the carbon sequestration sites in 2010. Continuous maize is being grown at the two irrigated sites and identical management practices are being employed, except for one key component. In the fall following harvest, the stover remaining on one of the fields is baled and removed from the field. This stover would be processed for second generation fuels.

**Collaboration Focus of Wheat Field Day**

The USDA recently announced that over half of the state’s winter wheat crop was in poor or very poor condition and harvest is expected to be the lowest since 1944. Fluctuating temperatures, disease, and lack of rain are taking a toll on this year’s wheat crop.

The sustainability of wheat production is crucial for food production and for producers’ profitability. Research on varieties, disease and adaptability play an important role in meeting these challenges.

Participants at this year’s Annual Hard Winter Wheat Workers’ Field Day represented various universities, USDA-ARS locations, and companies from across the United States.

Dr. Stephen Baenziger, UNL researcher and small grains breeder, was on hand to provide the latest information on UNL wheat varieties during the field day. He says, “Getting this group together continues and adds to the sense of community while solving many of the questions facing hard winter wheat improvement.”

Those attending participated in a field tour at the ARDC that featured regional nurseries, UNL breeding nurseries, and an up-close look at the wheat streak mosaic virus screening.

UNL researcher Dr. Gary Hein shared information on research being conducted on wheat streak mosaic virus. Dr. Bob Graybosch, USDA-ARS research geneticist, discussed UNL wheat varieties at the wheat nursery plots at the ARDC. And UNL plant pathologist, Dr. Stephen Wegulo, talked with the group about wheat diseases. Researchers from other states and industry representatives also presented information at the field day.

**The Making of a Queen**

The goal of participants in the queen honeybee rearing workshop is to raise high quality, locally-adapted queen honeybees. During a 3-day workshop at the ARDC, beekeepers were able to practice crafting larvae into queen cups and mock manipulation of beekeeping equipment. Then they moved on to setting up starter boxes of young bees and a strong finishing colony. They also crafted larvae that would be fed royal jelly by the young bees and raised to be queens. In the photo below, workshop participants learn how to arrange a strong finishing colony.
When the center pivot was installed for the carbon sequestration project, the system was modified in order to capture the data needed for the research. Normal clearance on a center pivot is 9 feet. The carbon sequestration pivot was extended by 14 feet (note the higher towers in this photo). Similar systems can be found in Texas where oil wells coexist with pivot-irrigated crops.

A View From The Road

Visiting the ARDC is a must for anyone interested in the beef industry in Nebraska. Jason Parker of Lindsay Corporation accompanied He on his trip to the ARDC. Parker says that Kerchin is planning to develop their own forage production farms where they will use modern production technologies including pivot irrigation.

Dr. Mauricio Silva, a researcher at Universidad Catolica de Temuco, recently traveled with a group from Chile visiting various UNL Department of Animal Science labs and projects. The main purpose of Silva’s visit was to learn about the beef industry in Nebraska. Silva says, “My specific interest was to learn more about reproductive management of beef cattle under Nebraska conditions, but also to learn about nutritional and health management of the cow-calf operations.”

In addition to his visit to the ARDC, Silva says he learned about management of pastures and grazing. He states, “I learned about cow’s and heifer’s breeding weight, duration of gestation season, bull cow ratio during breeding and management of newborn calves.”

Impact of Drought

- Almost 70 articles have been directly published from this research. In addition, the results from these measurements are disseminated to the public, including farmers, through relevant websites.
- Long-term data from the station measurements have shown an increasing trend in NH4-N ion deposition.
- The results from these measurements are disseminated by the National Atmospheric Deposition Program to a wide range of scientific communities.

Automated Weather Data Network

- The station has been selected for use in agricultural decision making throughout the region.
- The Nebraska stations monitor soil water content at depths of 10, 25, 50, and 100 cm. This is a unique dataset that is used by researchers.

Precipitation Chemistry

- The carbon exchange, evapotranspiration, and fluxes of nitrogen oxide and methane are being monitored.
- Life cycle analyses are also being performed and researchers are looking at the impact this could have on soil organic carbon. The carbon results are currently being analyzed.

Summer Interns and Student Employees

With the increased workload that summer brings, students and interns play an important role in keeping projects running smoothly at the ARDC. The following students are working or interning at this summer at the research areas listed. Also included are hometowns and colleges.

- Agriculture - Brett Virgil - Mead (UNL)
- Agriculture - Andrew Kuhr - Mead (UNL)
- Beef Feedlot - Bradley Boyd - Colorado (UNL)
- Agronomy - Brittney Cihal - Valparaiso (UNL)
- Entomology - Brett Virgil - Mead (UNL)
- Entomology - Andrew Kuhr - Mead (UNL)
- Extension - Doug Bohaty - Wahoo - (Buena Vista University - Storm Lake, IA)
- Extension - Jarie Dinge - Fremont (Wayne State College)
- Extension - Melissa Matalika - Thedford (UNL)
- Extension - Roger Verdon - Alliance (UNL)
- Horticulture/Turf - Emily Brabec - Wahoo
- Horticulture/Turf - Tony Thorson - Wahoo
- Horticulture/Turf - Ryan Wikswo - Lincoln (UNL)
- Veterinary Science - David Williams - Lincoln (UNL)
- Veterinary Science - Emily Brabec - Wahoo
- Veterinary Science - Tony Thorson - Wahoo
- Veterinary Science - Ryan Wikswo - Lincoln (UNL)
- Veterinary Science - David Williams - Lincoln (UNL)

The University of Nebraska mobile beef lab stopped by Mead High School to educate the students on ruminant and non-ruminant digestive systems. This hands-on experience fit right in with the Mead Agricultural Education’s animal science class as they were going over animal nutrition and were covering digestion. The students at Mead High School learned a great deal and were able to experience animal digestion first hand by learning about the four compartments of a ruminant stomach - Thomas Dux, Mead Agricultural Education instructor.

A visit to the individualized feeding barn at the ARDC was a first encounter seeing cattle up close for many of the Omaha Westside students.

A human geography class from Omaha Westside visited the ARDC to learn about agriculture. The students were studying the development and economics of agriculture. The visit also assisted them in their understanding of how rural communities differ from urban areas.
Ask a Scientist about Ag Meteorology

Andy Suyker and Ken Hubbard are two of the UNL faculty members currently working on agrometeorological research at the ARDC. Other UNL researchers with agrometeorological projects at the ARDC include: Tim Arkebauer, Adam Liska, Elizabeth Walter-Shea, Martha Shulski, Jinsheng You, and Art Ziegfeldbaum - all are faculty in UNL’s School of Natural Resources. The following questions were posed to Hub- bard and Suyker regarding current research.

Ask a scientist... Dr. Hubbard, sunlight radiation data has been collected at Mead since 1981. Obviously, it was very hot and dry during the 2012 drought. But were there measurable changes in the intensity of the energy from the sun?

Dr. Hubbard says, “Yes, generally we have fewer clouds during a drought and therefore more hours of direct sunlight. The average daily energy from the sun last year, during the period April 1 to October 31 was 461 Langley’s. This is one of the highest values since observations began in 1981 being exceeded only by 468 (1987), 494 (1988) and 472 (1994).”

Meet Lindsay Chichester

Saunders County extension educator, Lindsay Chichester is no stranger to 4-H and livestock production. Chichester grew up on a ranch in northern California, raising sheep and cattle. She was an active member of 4-H for 10 years, participating in projects such as: market and breeding cattle and sheep, fashion review, speech and demonstration, and junior leadership.

Her extension educator career began in Richardson County (Falls City, NE) in January 2010. In April 2013, she accepted an extension educator position in Marion Ellis, and UNL Entomology Department Head, Gary Brewer.

Quality Assurance Program, Animal Care and well-being issues, and will begin to host consumer education field days at the ARDC.

Chichester was recruited to attend Redlands Community College, El Reno, OK on a livestock judging scholarship. After completing her associate’s degree in animal science, she transferred to Oklahoma Panhandle State University and earned a bachelor’s degree in animal science and agricultural business. She obtained master’s degrees in animal science and in speech communication West Texas A&M University. She also possesses a PhD in systems agriculture.

Best Wishes to Bill McCormick

Best wishes are extended to Bill McCormick who has served as the entomology research project coordinator at the ARDC since 1999. McCormick assisted with many entomology projects at the ARDC with researchers, Lance Meinke and Marion Ellis over the last 14 years. He was instrumental in building and modifying research equipment and assisting with research.

While working at UNL, McCormick went back to school to obtain a 2nd undergraduate degree and is currently working towards a masters degree at UNL. He is now working in an engineering position in private industry.