

2022 NITROGEN USE EFFICIENCY WORKSHOP

August 1–3

University of Nebraska–Lincoln



2022 Nitrogen Use Efficiency Workshop

Demystifying Water and Nitrogen Management with Dynamic Solutions

Report

August 1–3, 2022

University of Nebraska–Lincoln

Nebraska Innovation Campus and Nebraska East Union

<https://agronomy.unl.edu/nitrogen-use-efficiency-workshop>

The University of Nebraska–Lincoln Department of Agronomy and Horticulture and Department of Biological Systems Engineering hosted the annual Nitrogen Use Efficiency Workshop on Aug. 1 to 3, 2022. The workshop targeted graduate students, scientists, industry, and professionals to promote discussion about avenues to increase NUE. A total of 170 attendees participated in the event, the largest number since the workshop started more than 20 years ago.

The event is about networking and exchanging innovative ideas around nitrogen, which remains a huge priority among academia, industry, and stakeholders. This workshop represents a great opportunity for graduate students and scientists to get to know industry representatives and establish collaborations. The Workshop offered the opportunity to highlight the essential role of water management when it comes to N management decisions. Discussion around strategies for the effective reduction of N losses to the environment critical for the state of Nebraska and beyond took place during the event.

During this event, graduate students competed with a poster presentation and a data-Hackathon contest. The Chair of the Event was Dr. Laila Puntel and the event committee was integrated by Guillermo Balboa, Joe Luck, James Schepers, and Laura Thompson.

About the origins of the Workshop

This group began meeting together in 1996 (Nebraska-Oklahoma) and it expanded to include Virginia Tech and CIMMYT-Mexico in 1998. By 2003, this group included most mid-west Universities in the corn belt and has since met every year at different institutions. Nebraska last hosted this event in 2004. Participants have included individuals from Canada, Argentina, Mexico, Australia, Germany, and Brazil. Originally designed as a “workshop,” discussions and presentations were built around sensor-based methodologies that could increase NUE in cereal production systems. Both engineering and agronomic problems continue to be addressed by this group that hopes to deliver “by-plant” N management.

The Program

The event started on August 1st at the Innovation Campus with a Reception and Tour Through the Greenhouse and phenotyping Facilities coordinated by Dr. Yufeng Ge followed up with a dinner and a robots demonstration coordinated by Professor Santosh Pitla and his graduate students Team. On

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Tuesday August 2 and Wednesday morning the workshop took place in the Great Plains Room at the East Campus Union. After welcoming remarks from Dr. Laila Puntel the History on the NUW Workshop and Memories of Dr. Bill Raun were presented by Dr. James Schepers and Dr. Newell Kitchen. Followed by Dr. Ken Cassman, UNL emeritus professor keynote speaker presenting on Journey to Pollution-Free Agriculture.

The Workshop was organized in four sessions with recognized speakers from academia presenting on the topics. Followed by time for questions and discussion. The Session 1 topic was Using Crop Modeling to Demystify the N Cycle, a Session, moderated by Dr. Laila Puntel. In Session 2, the topic was Soil Health, NUE indicators, and Biologicals: How do we Manage N in a C-Centric Era moderated by Dr. Andrea Basche (UNL). On Wednesday, Session 3 focused on Using Weather Uncertainty to Promote more In-Season N Applications moderated by Dr. Brian Arnall (OSU). And Session 4 topic was Innovations for N management: A push Out of the Box- Machine learning and Artificial Intelligence moderated by Dr. Laila Puntel. The Corteva Data Hackathon Competition was moderated by Dr. Bob Gunzenhauser where the four teams presented the results of their work regarding determining optimum nitrogen rates for different fields. The Poster 1-minute rapid presentation was moderated by Dr. Guillermo Balboa and 27 graduate students used their creativity to invite the audience to visit their posters by introducing the main highlights in one minute at the main auditorium. At the end of each session Institutions and companies that sponsored the Workshop had an opportunity to share what they are doing to contribute to the NUE of the production systems.

Graduate student's posters and Hackathon Competition

A total of 27 posters from the University of Illinois, South Dakota University, University of Manitoba, Oklahoma State University, South Dakota State University, Purdue University, Kansas State University, The University of Nebraska at Omaha, The University of Nebraska – Lincoln, were presented by graduate students in the Bayer poster competition. Nine judges evaluated the abstracts, the 1-minute rapid presentation in the main auditorium, and the author's poster presentation to select three poster awards. The first place was for Nicolas Giordano, from Kansas State University; second place was for Raedan Sharry, from Oklahoma State University; and third place for Taylor Cross, from the University of Nebraska-Lincoln. Each graduate student got a Diploma and cash prize of \$400, \$300, and \$200 for first, second, and third place respectively.

Four teams participated in the Corteva Hackathon Competition. The teams started working on data from N experiments provided on July 1st. Teams were asked to develop a model to determine the economical optimum nitrogen rate for different fields. Creativity, accuracy, presentation, feasibility, and originality were evaluated to select the three winners. The first place was for Jack's Hack Team from South Dakota State University; second place for Hackers of the Pampas Team from Kansas State University and third place for Solver Team from the University of Nebraska Lincoln. Each team got a Diploma and a cash prize of \$400, \$300, and \$200 for the first, second, and third place respectively.

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The event was at no cost for the participants other than travel and hotel expenses. We thank the following Institutions and Companies that made the event possible as sponsors: Nebraska Corn Board, Water for Food Daugherty Global Institute, Nebraska's Natural Resources Districts, the International Society of Precision Agriculture, The College of Agricultural Science and Natural Resources, Bayer, Corteva, Koch, Verdesian, Sentinel, MicroSource, Pivot Bio, CropX, Lindsay, Yara, and Agoro.

Survey and future host for 2023

During the concluding remarks, it was voted that the 2023 NUE Workshop will be held at Oklahoma State University and hosted by Dr. Brian Arnall. A week after the event an online survey was shared with all attendees and speakers. A total of 41 responses were collected with feedback regarding the event coordination and logistics, the topics, and ideas for the 2023 workshop.

The majority of attendees agree that the topics proposed in the sessions were very relevant and useful for their jobs. Regarding logistics related to the website, communication emails, registration, the main venue, keeping the agenda on time, receptions, dinner, parking, number, and length of breaks, and media infrastructure (audio-video) the majority of attendees ranked them as very satisfied and satisfied as second place.

Regarding what attendees liked the most responses included: networking opportunities, the variety of topics covered, and the overall organization. and logistics, among others.

Regarding suggested topics for the 2023 NUE Workshops attendees mentioned the following: biological interactions, growers' perspectives on models and implementation, animal manure as a source of N, the role of covers crops on the N Cycle, farmers' testimonies regarding actual N tools, the human dimension of agricultural decision making, NUE in relationship with other nutrients, among others.

Access to full agenda, posters, presentations, and pictures of the workshop at:

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