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UNL Nitrogen Management Resources

As part of its land-grant mission, the University of Nebraska develops and updates guidelines for nitrogen (N) management for major crops in Nebraska. The 4R Nutrient Stewardship approach—using the Right source, Right rate, Right time, and Right place—is critical for N management in agricultural systems. Determining the Right rate of N can be achieved by multiple ways depending on the crop and the technology available to the farmer. In general, setting realistic yield goals and accounting for N credits from soil tests, irrigation water, manure, and crop rotation helps to apply only the N needed and improve nitrogen use efficiency (NUE). Transitioning from a N balance approach to the use of sensor-based, in-season approaches (like fertigation or high-clearance machine applications) can enhance NUE in various crops. Equally important is applying N at the Right time, when the crop can take it up most efficiently and the risk of leaching, volatilization, or denitrification is lower. By aligning rate and timing with the other two 'R's (source and placement), producers can increase NUE, improve profitability, and protect soil and water resources.

UNL's recommendations emphasize improving NUE to maximize profitability while minimizing environmental impact. In corn, for example, over the past 50 years, fertilizer N per bushel of corn in Nebraska has declined from 1.7 lb N/bu to about 0.8 lb N/bu due to better practices. Recent irrigated corn N recommendation NebGuide (link below) highlights the use of sensor-based and in-season management strategies to reduce N application while maintaining yields. Project SENSE (Sensor for Efficient Nitrogen Use and Stewardship of the Environment) and satellite-based fertigation trials (Precision N Project) reduced fertilizer rates by 33–56 lb N/acre while improving profitability and maintaining yields. UNL research shows that applying the majority of fertilizer N during the growing season (instead of fall) and using data-driven approaches increases NUE.

The Soil Fertility Team compiled a list of useful links with N recommendations for major crops in Nebraska and CropWatch articles on the topic. The list also provides resources from the Nebraska On-farm Research Network (answering farmers' questions in farmers' fields), including past seasons' book results and protocols to evaluate different practices. Farmers can also access the Nebraska Digital Agriculture website to explore other platforms to increase Nebraska Farming Systems' efficiency.

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LINKS to UNL recommendations and publications

- The most up-to-date recommendations for nitrogen management in irrigated corn production: In-Season Nitrogen Management for Irrigated Corn (G2365)
- The new online UNL corn nitrogen tool: UNL Corn Nitrogen Calculator
- Nutrient Management Suggestions for Corn (EC117)
- Nutrient Management for Agronomic Crops in Nebraska (EC155)UNL recommendations for corn wheat (EC143, G02-1460), sugar beets (G1459), dry edible beans (G1713)
- Other Soil management resources: Soil Management Recommendations and Resources, Soil Management to increase organic matter (G2283), and to reduce soil nitrous oxide emissions (G2322), how much nutrient we can get from manure (G1335)
- Irrigation and Nitrogen Management (EC2008)
- Visit a Compilation of all UNL Short Crop Watch Nitrogen Extension Articles. Crop Watch Nitrogen Management
- Access the On-Farm Research result finder or books from 2013 to 2024. Explore experiments evaluating N management strategies (and other practices) UNL On-Farm Research Results
- If you are interested in conducting On-Farm research, you can see how an standard protocol look like: On-Farm Standard Protocol
- The network can develop specific protocols to answer your question. Here is an example of a protocol to evaluate the efficacy of biological products via On-Farm: Biologicals
- You can join the On-Farm Research Network (there is no cost to participate) Get in touch with the Network
- Nebraska Digital Agriculture is contributing to increasing nitrogen efficiency in Nebraska cropping systems. Visit our platforms at the Digital Ag website.