



Science
Societies

Assessing pre-plant nitrogen sources and waterlogging on corn growth and yield

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Waterlogging can cause corn growth and yield to be reduced and may interact with applied N fertilizer sources differently to affect uptake and use efficiency. A field study was conducted that applied different N fertilizers before corn planting and

then flooded the corn after emergence for four days. Learn how corn growth, nutrient uptake, and yield was affected.

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1. The primary objective of this study was to

- a. evaluate nitrogen stabilizers for wheat production.
- b. compare irrigation methods in corn.
- c. assess how pre-plant nitrogen sources and waterlogging affect corn growth.
- d. test drought tolerance in soybean.

2. Which pre-plant nitrogen sources were evaluated in the study?

- a. Urea ammonium nitrate and urea.
- b. Urea and ammonium nitrate.
- c. Urea ammonium nitrate and composted manure.
- d. Anhydrous ammonia.

3. Waterlogging significantly reduced corn plant population compared with non-waterlogged conditions in both study locations.

- a. True.
- b. False.

4. At what growth stage was waterlogging imposed in the experiment?

- a. V2–V3.
- b. V4–V6.
- c. VT.

d. R1.

5. How many consecutive days of waterlogging were applied in the study?

- a. 3 days.
- b. 4 days.
- c. 7 days.
- d. 10 days.

6. In which U.S. state were the field trials conducted?

- a. Minnesota.
- b. Arkansas.
- c. North Dakota.
- d. Ohio.

7. What was the general effect of N application on corn aboveground biomass?

- a. No effect was observed.
- b. Biomass increased only when using anhydrous ammonia.
- c. Biomass was inconsistent and unpredictable.
- d. Biomass increased regardless of N source.

8. Among the nitrogen sources tested, anhydrous ammonia consistently resulted in the lowest corn grain yields.

- a. True.
- b. False.

9. Overall, what was the approximate yield reduction in waterlogged corn compared with non-waterlogged conditions?

- a. 0–4%.
- b. 9–25%.
- c. 38–46%.
- d. 55–63%.

10. Which form of N additive was NOT used in the study?

- a. N-(n-butyl) thiophosphoric triamide (NBPT).
- b. Nitrapyrin.
- c. Dicyanamide (DCD).
- d. Polymer coating.

11. How many site-years were included in the study?

- a. 2.
- b. 3.
- c. 4.
- d. 5.

12. In this study, the interaction between waterlogging and N source was minimal for most measured variables.

- a. True.
- b. False.

13. What was the main management implication from this study?

- a. Increasing seeding rates may reduce yield losses from waterlogging under some conditions, but cannot fully mitigate the stress.
- b. When aiming for grain yield, using either enhanced-efficiency fertilizers (EEFs) or urea as the fertilizer source is recommended.
- c. The source of nitrogen fertilizer plays a major role in managing waterlogging stress in poorly drained soils.
- d. The impact of waterlogging is restricted to sandy soils and does not significantly affect heavier soils.

14. Which growth measurement(s), besides yield, was/were recorded to assess treatment effects?

- a. Plant population, biomass, and ear leaf nutrient concentrations.
- b. Leaf chlorophyll content, plant height, and biomass.
- c. Root mass.
- d. Photosynthetic rate and transpiration.

15. This research is relevant to corn production in the U.S. Midwest because

- a. corn is rarely irrigated there.
- b. fertilizer costs are lowest in the region.
- c. corn acreage is decreasing.
- d. wetter conditions have reduced the number of days suitable for fieldwork.

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