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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