**QUESTION:** Does banding N near the crop row increase N availability and allow for lower rates at planting?

**OBJECTIVE:** Determine the optimal preplant rates for broadcast and banded placements of nitrogen.

**INTRODUCTION**
- Inadequate nitrogen (N) availability during the start of the corn (Zea mays L.) growing season can result in reduced yield potential. However, the greatest amount of N is required during the period of rapid growth (from 10-leaf stage to tasseling [VT]).
- Sidedress applications can ensure that N is available during this period of rapid plant uptake and reduce the potential of leaching with spring rains.
- Additionally, because of the small corn root system at the start of the season, which does not cross the center of the row, nutrients that are banded belowground near the crop row are more likely to be available for uptake than if the same amount of nutrients were broadcasted over the entire soil surface. Banding N at the start of the season could allow for proportionately more N to be sidedressed in-season, without sacrificing yield potential.

**MATERIALS AND METHODS**

**N Placement:** Urea ammonium nitrate (UAN) was either broadcasted with light incorporation (7 cm deep) or banded (10 cm deep x 5 cm away) next to the row (Figure 1).

**N ratios:** Nitrogen was applied at planting at 50, 100, 150, or 200 kg ha⁻¹, then balanced at the six-leaf (V6) growth stage to total 200 kg N ha⁻¹ using urea ammonium nitrate (UAN) via a Y-drop placement (Figure 2).

**Environments:** The trial was conducted near Yorkville (41°N; 2019, 2020), Champaign (40°N; 2019, 2020), Ewing (38°N; 2019), and Nashville (38°N; 2020), Illinois.

**Cultural:** DKC64-34RIB corn hybrid planted following soybean with conventional tillage.

**Design:** Experimental units were plots, 4 rows wide and 11.4 m long, arranged in a randomized complete block design with 6 replications in each environment.

**RESULTS AND DISCUSSION**

- Averaged across preplant N rates and locations, banding nitrogen at planting increased gain yield by 0.5 mg ha⁻¹ compared to broadcast applications (data not shown).
- Greater yields were obtained from banded N at the 50 and 150 kg N ha⁻¹ preplant rates compared to broadcast, while observed yields maximized at preplant rates of 100 kg N ha⁻¹ when broadcast and 50 kg N ha⁻¹ when banded (Figure 3a).
- Banding N, regardless of preplant N rate, led to greater season-end plant total nitrogen accumulation (Figure 3b). Additionally, banded tended to increase the amount of N accumulated after tasseling (Figure 3c).
- Yield efficiency (the amount of yield per amount of fertilizer applied) and recovery efficiency (amount of final N in the plant per amount of fertilizer applied) followed the same trends as grain yield and total N uptake, respectively, indicating that banding N led to greater applied N recovery and yield than when N was broadcast (Figure 3d,e).

**CONCLUSIONS**

- **Banding N belowground near the crop row increased grain yield, via greater post-tassel and total N uptake, and N recovery efficiency.**
- **At planting, broadcasting approximately half of the total N fertilizer (100 kg N ha⁻¹) was optimal, while lesser amounts were needed preplant when banded to maximize yields in this study.**
- **Banding low rates of N at planting decreased the potential for N loss to the environment without sacrificing yield.**