Maize Nitrogen Management in a Tropical Climate

High maize yields require an adequate supply of N fertilizer; however, nitrogen losses are quite high (>50%). As an alternative, fertilizers with nitrification and urease inhibitors have emerged onto the market to increase N supply to crops.

In an article recently published in Agronomy Journal, researchers report on a two-year study in southeastern Brazil where rainfall is condensed in a short period and nitrogen fertilization is often split to reduce losses. The team evaluated the effect of splitting or not splitting nitrogen application and applying or not applying stabilizers to prevent losses by volatilization and nitrification at several rates.

Results showed that maize yield was not affected by split or single applications and by any additional treatment to the fertilizer. However, rates presented a significant change in production. The highest yield was reported at the 185 kg ha\(^{-1}\) N rate while the yield critical level (90% of the highest yield) was reported at the 110 kg ha\(^{-1}\) N rate.

While these results were optimum for the environmental conditions presented in the study, different locations might have different outcomes. Nevertheless, given the need for a smart and economical approach for the use of limited resources, this study suggests that nitrogen fertilization can be recommended as a single application during crop sowing and that the use of additives might not influence final outcomes.


Maize field with plots where no nitrogen (bottom) and 100 kg ha\(^{-1}\) N (top) was applied.

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Relay-Cropping Pennycress and Camelina with Soybean in Minnesota

Double-cropping soybean with winter wheat or canola is common in the Southern U.S. However, the shorter growing season in the Upper Midwest does not permit this cropping strategy. New interest in domesticating the early maturing oilseed, pennycress, and renewed interest in further improving the ancient oilseed, camelina, led researchers to test the feasibility of relay-cropping these oilseeds with soybean in Minnesota.

In an article recently published in Agronomy Journal, net income from such a relay-cropping system was estimated and compared with mono-cropped soybean. The price of canola was used as a proxy for the oilseeds since camelina has a valuable oil profile high in \(\alpha\)-linolenic acid and improved pennycress has an oleic acid profile similar to canola.

The researchers found that net income was generally the same between the two systems. The primary additional expense in the relay-cropping system was fertilizer; thus, optimizing fertilizer rate to maximize income rather than oilseed yield may improve relay-cropping economics. Another key finding was that the soybean yield in the relay-cropping system was 22–30% less than that of the mono-cropped system.

The authors recommend optimizing soybean planting date as well as oilseed planting method (e.g., using a skip-row approach) to reduce competition between the two crops and improve soybean yields.


Soybean growing underneath a pennycress canopy in a relay-cropping system in Morris, MN. Photo by Jim Eklund, USDA.

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