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Testing fertilizer optimization and timing for nitrogen in maize

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Maize field with influencing water table in the central temperate Argentinean region. Photo by Alejo Ruiz.

The two major constraints in most maize production systems are water and N availability. The central temperate Argentinean region is currently affected by rising water tables, allowing higher and more stable maize yields when they fluctuate within optimum depth. However, limited information is available for optimizing N management in these environments.

In an article recently published in *Crop Science*, researchers conducted 15 on-farm experiments in soils with influencing water tables (always less than 3.5 m depth) where five N rates (0 to 240 kg N ha⁻¹) were tested at two different timings (sowing and V7). In addition, they examined different environment and management variables to help explain differential yield responses across sites.

A consistent yield response to N rate was found with yields increasing from 2,300 to 6,900 kg ha⁻¹ across sites, which depended more on the yield at the zero-N rate treatment than on maximum attainable yields. However, fertilization timing had a minor and inconsistent effect on yield across sites. Soil N–NO₃ at sowing, previous crop, and apparent indigenous N supply helped explain differential yield responses across sites.

The results highlight the relevance of N rate, rather than timing, as a critical crop management decision in environments with high water availability and yield.

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Ruiz, A., Salvagiotti, F., Gambin, B.L., & Borrás, L. (2020). Maize nitrogen management in soils with influencing water tables within optimum depth. *Crop*

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