

Development of a Soil N Test for Fertilizer Requirements for Corn Production in Quebec

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Abstract

Corn requires high nitrogen (N) fertilizer use, but no soil N test for fertilizer N requirement is yet available in Quebec. Objectives of this research were (1) to determine the effects of soil nitrate (NO_3^- -N, soil ammonium (NH_4^+)-N, and N fertilizer rates on corn yields and (2) to determine soil sampling times and depths most highly correlated with yields and fertilizer N response under Quebec conditions. Soil samples were taken from 0- to 30-cm and 30- to 60-cm depths at seeding and postseeding (when corn height reached 20 cm) to determine soil NH_4^+ and NO_3^- in 44 continuous corn sites fertilized with four rates of N in two replications using a quick test (N-Trak) and a laboratory method. The N-Trak method overestimated soil NO_3^- -N in comparison with the laboratory method. Greater coefficients of determination were observed for soil NO_3^- -N analyses at postseeding compared with seeding.

Keywords: Corn (*Zea mays* L.) yield; N fertilizer; N mineralization; sampling time; soil depth; soil N test; soil NH_4^+ -N; soil NO_3^- -N

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