

Nutrient Management and Balanced Fertilization for Major Crops in Shanxi

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Intensification of agricultural production with poor nutrient management practices has decreased N use efficiency and increased environmental pollution in northcentral China. Work in 2008 optimized N application timing in a winter wheat-summer maize rotation system for increased yield and fertilizer use efficiency in Shanxi.

A field experiment conducted in Linfen tested five N timing options. In wheat they included: N0 (zero N), N1 (basal N), N2 (1/2 basal + 1/2 at tillering stage), N3 (1/3 basal + 1/3 at tillering + 1/3 at jointing stage), N4 (1/3 basal + 2/3 at tillering). The total fertilizer application rate was 225-150-150 kg N-P₂O₅-K₂O/ha. The P and K were applied basally across treatments. In maize, the corresponding treatments included N0, N1 (topdressing at V6 stage), N2 (1/2 at V6 + 1/2 at stalk elongation stage), N3 (1/3 N at V6 + 1/3 at stalk elongation, and 1/3 before tasselling stage), N4 (1/3 basally + 2/3 at stalk elongation). The N application rate was 195 kg N/ha and no P and K were applied in maize.

Yields were 5.1, 7.9, 8.1, 8.2, and 8.5 t/ha for wheat, and 7.2, 8.6, 8.8, 9.3, and 9.2 t/ha for maize under the N0, N1, N2, N3, and N4 treatments, respectively. Each 100 kg of grain removed from 2.55 to 2.68 kg N (wheat) and 1.95 to 2.14 kg N (maize) under N application. For the entire system, the apparent N recovery efficiency for N1, N2, N3, and N4 was 38%, 41%, 43%, and 50%, respectively. The yield on both wheat and maize as well as N recovery were maximized with a one-third basal application in wheat (V6 topdressing for maize) and the remainder as a topdress during peak crop demand.