

Iron deficiency in soil threatens soybean production

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An expansion of soybean production into areas where soybean has seldom, if ever, been grown can be problematic for some farmers. Soils having high pH values and large amounts of calcium and/or magnesium carbonate are notoriously iron deficient. Iron deficient soils in the North Central United States are estimated to reduce soy bean production by 12.5 million bushels every year.

John Wiersma, a researcher at the University of Minnesota Northwest Research and Outreach Center at Crookston, concluded a study examining the effect of nitrogen based [fertilizers](#) on soybean crops grown in iron deficient soil. Because soybeans require more nitrogen than most commercial crops, Wiersma hypothesized that adding nitrogen fertilizer could help increase yields in nutrient poor [soil](#).

Several soybean varieties along with [nitrogen fertilizer](#) were tested from 2003-2005 on soils where soybean has historically exhibited mild to severe iron deficiency. Seed was inoculated at twice the recommended rate, and the amount of extractable iron in soils of the experimental areas was measured each year. Growing season temperature and rain also were recorded each year and compared with each other and with the 30-year average for Crookston.

According to Wiersma's study, plant height, seed number, and grain yield all decreased linearly in response to increasing nitrogen rates for iron inefficient varieties, whereas these responses in iron efficient and moderately efficient varieties changed little as nitrogen rates increased.

"Additional nitrogen definitely should not be applied when iron-inefficient varieties are grown on chlorosis-prone (iron deficient) soils, and there is little support for adding nitrogen to iron efficient or moderately efficient varieties," states Wiersma.

Research is ongoing at Crookston to compare the accuracy and consistency of different measures of [iron deficiency](#) in soybean crops. Wiersma's study can be found in the 2010 November/December issue of [Agronomy Journal](#).

More information: View the abstract at [www.agronomy.org/publications/ ... abstracts/102/6/1738](http://www.agronomy.org/publications/.../abstracts/102/6/1738)

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