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Soil Science Society of America
677 South Segoe Road • Madison WI 53711-1086 • 608-273-8080 • Fax 608-273-2021
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NEWS RELEASE
Contact: Sara Uttech, Soil Science Society of America, 608-268-4948, suttech@soils.org

Illinois Soil Nitrogen Test Measures Microbial Nitrogen

A University of Illinois study takes an in-depth look at the Illinois Soil Nitrogen Test to clarify the chemical nature of the test and its relationship to the microbial growth in soils.

MADISON, WI, May 4, 2009--Contrary to the prevailing view, cereal crops derive the majority of their nitrogen from the soil, not fertilizer. Soils differ considerably in microbial activities that determine nitrogen-supplying power, and these differences must be taken into account if nitrogen fertilizers are to be used efficiently. The Illinois Soil Nitrogen Test (ISNT) was developed for this purpose, and involves estimation of gaseous ammonia liberated by heating the soil with strong alkali in a Mason jar. Several studies have provided evidence that the ISNT is predictive of yield response by corn to nitrogen fertilization, but there have also been negative evaluations in which concern has been raised that test values represent a constant proportion of total soil nitrogen rather than a microbial fraction that would be potentially available.

A study was conducted from 2004 to 2006 at the University of Illinois to clarify the chemical nature of what the ISNT measures and its relationship to microbial growth in agricultural soils. A multifaceted approach was taken, involving recovery tests with pure organic nitrogen compounds, statistical analyses of different nitrogen fractions measured for 26 Illinois agricultural soils, and incubation studies to determine incorporation of labeled nitrogen into soil nitrogen fractions. Results from the study were published in the May-June issue of the *Soil Science Society of America Journal*. The research was funded by the USDA and the Illinois Council on Food and Agricultural Research (C-FAR).

Recovery tests did not support the concept that the ISNT estimates total soil nitrogen. Rather, the results confirmed that the ISNT is selective for certain forms of microbial nitrogen, and differs from conventional acid-hydrolyzable fractions in the proportions of these compounds that are detected. Specifically, amides and the amino sugars in bacterial cell walls were detected, but not alpha-amino acids or fungal chitin. When the findings were applied in a statistical analysis of data from soil nitrogen fractionation, the ISNT was estimated to recover 95% of the nitrogen in bacterial amino sugars and 43% of amide-nitrogen. The incubation studies showed that labeling was more rapid for nitrogen recovered by the ISNT than in hydrolyzable amino sugars, again indicating a dominance of bacterial over fungal nitrogen recoveries by the ISNT.

Taken together, these findings suggest that the ISNT mainly detects bacterial amino sugars and implicates this form of soil nitrogen in the test's effectiveness for predicting the response of corn to nitrogen fertilization. Because the ISNT also detects some amide nitrogen, the bacterial amino sugar nitrogen signal can be obscured in soils where these components are highly variable.

The full article is available for no charge for 30 days following the date of this summary. View the abstract at http://soil.scijournals.org/cgi/content/abstract/73/3/1033.

Soil Science Society of America Journal, http://soil.scijournals.org, is a peer-reviewed international journal published six times a year by the Soil Science Society of America. Its contents focus on research relating to physics; chemistry; biology and biochemistry; fertility and plant nutrition; genesis, morphology, and classification; water management and conservation; forest, range, and wildland soils; nutrient management and soil and plant analysis; mineralogy; and wetland soils.

The Soil Science Society of America (SSSA) is a progressive, international scientific society that fosters the transfer of knowledge and practices to sustain global soils. Based in Madison, WI, and founded in 1936, SSSA is the professional home for 6,000+ members dedicated to advancing the field of soil science. It provides information about soils in relation to crop production, environmental quality, ecosystem sustainability, bioremediation, waste management, recycling, and wise land use.

SSSA supports its members by providing quality research-based publications, educational programs, certifications, and science policy initiatives via a Washington, DC, office. For more information, visit www.soils.org.

SSSA is the founding sponsor of an approximately 5,000-square foot exhibition, Dig It! The Secrets of Soil, which opened July 19, 2008 at the Smithsonian's National Museum of Natural History in Washington, DC.