IPNI INSIGHTS
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The yield of crops in most areas of the Northern Great Plains (NGP) region is often determined by the weather, specifically whether sufficient precipitation and heat units are received. However, making sure there are sufficient levels of plant nutrients present is critical, because adequate moisture and temperatures cannot be utilized effectively if there is a nutrient deficiency. The research project summaries presented in this issue of *INSIGHTS* show that plant nutrient research is being done to help NGP farmers have the information needed to grow high yielding and good quality food crops.

This information and even more detail on each project can be found at the research database at our website: >**www.ipni.net/research**<.

Dr. Thomas L. Jensen
Northern Great Plains Director
International Plant Nutrition Institute (IPNI)
102-411 Downey Road
Saskatoon, SK S7N 4L8
Phone: 306-652-3535
Fax: 306-664-8941
e-mail: tjensen@ipni.net
website: www.ipni.net

Alberta

Assessment of Soil Quality on Tillage-Straw-Nitrogen (TSN) Plots at Ellerslie and Breton Utilizing Physical, Chemical, and Biological Properties

Project Leader: Noorallah Juma, University of Alberta, Department of Renewable Resources, Edmonton, AB T6G 2E3. Telephone: 780-492-6426. Fax: 780-492-1767. E-mail: noorallah.juma@afhe.ualberta.ca

The Tillage-Straw-Nitrogen (TSN) plots were originally set up at the Ellerslie and Breton research sites in 1979. These plots have been in consistent management under different experimental treatments for 28 years. The tillage treatments include tillage and no-tillage; the straw treatments include no straw (i.e., straw was removed and not returned to the plots) and straw (i.e., straw returned to the plots); N fertilizer was applied at rates of 0, 50, or 100 kg/ha. Much information has been gathered over the length of the research project about aboveground productivity and changes in some soil characteristics. This research initiative is designed to gather detailed chemical, physical, and biological information to assess the effect of long-term management practices on soil quality characteristics. Soil samples from experimental treatments were collected in the early fall of 2007 from both research sites and laboratory analyses are on-going. *AB-25*

Manitoba

Impact of Cropping Sequence and Phosphorus Fertilization on Cadmium and Zinc Accumulation in Soybean and Durum Wheat

Project Leader: Dr. Cynthia Grant, Agriculture & Agri-Food Canada, Brandon Research Center, Box 1000A, RR 3, Brandon, MB R7A 5Y3. Telephone: 204-726-7650. E-mail: cgrant@agr.gc.ca

Project Cooperators: Mario Tenuta, Don Flaten, and Eugene Gowalko

Crop sequence and tillage system can influence nutrient availability and response of crops to fertilizer applications, through effects on nutrient cycling, microbial population, soil temperature, and root growth. Therefore, optimum P fertilizer management may change with management practices as well as with crop type sequence. This study is evaluating the effects of cropping sequence and tillage practices on yield and quality response of durum wheat and soybean to different forms and placements of P fertilizer.

Phosphorus fertilization has previously increased the biomass yield in durum wheat, but not in soybean. When averaged over the 3 years of the study, wheat on both the clay-loam and silty-clay soils produced the highest grain yield when grown after canola and the lowest yield when grown after barley. On the clay-loam soil, P fertilizer produced a significant increase in yield. Durum wheat yield tended to be higher when ammonium polyphosphate was side-banded rather than surface dribble-banded, but was similar with monoammonium phosphate (MAP), ammonium polyphosphate, MAP treated with Avail®, and polymer coated MAP when the fertilizers were side banded. Cadmium (Cd) content of the durum wheat seed was strongly affected by

preceding crop, being highest when grown after canola and lowest when grown after barley. Mycorrhizal colonization in durum wheat was not affected by P fertilization, but is highest when durum wheat has grown under reduced tillage following flax, and lowest when grown under conventional tillage following canola. It is possible that the increased mycorrhizal colonization due to the combination of reduced tillage after flax may encourage nutrient uptake and improve crop performance. There has also been an interaction between tillage system and preceding crop on biomass and grain yield. Generally, both soybean and durum wheat produced higher yields after flax than after canola under reduced tillage, but produced lower yields after flax than canola or barley under conventional tillage. Analysis of crop and soil samples is on-going from the 2007 crop year and will help clarify some of the factors causing the tillage system x previous crop sequence interaction. *MB-20F*

Saskatchewan

Effect of Potassium and Chloride Nutrition on the Seed Yield of Canaryseed

Project Leader: William May, Agriculture & Agri-Food Canada, Indian Head Experiment Farm, Box 760, Indian Head, SK S0G 2K0. Telephone: 306-695-5225. E-mail: mayb@agr.gc.ca

Project Cooperators: Yantai Gan and Sukhdev Malhi

In 2007, this trial was conducted at five locations in Saskatchewan, near Melfort, Stewart Valley, Regina, and two locations south of Indian Head. Yields were low due to temperature and moisture stress during seed development in July and August.

At both of the sites near Indian Head, a strong yield response occurred when chloride (Cl^-) was applied and a moderate yield response to Cl^- occurred at the Regina site. The yield components most affected were seeds per square meter and seeds per head. Grain yield was not affected by Cl^- or K applications at Melfort or Stewart Valley. These preliminary results indicate that Canaryseed growers should assess soil Cl^- status through soil testing. The response to Cl^- occurred when the canaryseed was under moisture stress, and it will be interesting to see if this response occurs under higher yielding conditions. This research will be conducted for two more growing seasons. *SK-38*

North Dakota

Suppression of Disease with Agronomic Practices in Recently Released Spring Wheat and Winter Wheat Cultivars

Project Leader: Dr. David Franzen, North Dakota State University, Dept of Soil Sciences, 229 Walster Hall, Box 5758, Fargo, ND 58105-5758. Telephone: 701-231-8884. Fax: 701-231-6186. E-mail: david.franzen@ndsu.edu

Project Cooperators: Jeffrey Stein and Howard Woodard

This study was designed to examine whether a synergy exists between chloride (Cl^-) nutrition and fungicide application in winter and spring wheat. The study was conducted at two sites in North Dakota in 2007.

Heading applications of Cl^- were not effective in reducing scab in winter wheat. Soil application of Cl^- as calcium chloride ($CaCl_2$) reduced leaf diseases at one site. $CaCl_2$ seemed to increase yield at the spring wheat site. These studies will be repeated in 2008 to further investigate if $CaCl_2$ consistently demonstrates these effects. Future work will examine both Cl^- and copper (Cu) and the interaction with foliar and heading-applied fungicide on winter and spring wheat. *ND-13*

Agronomic Evaluation of New Sulfur Sources for Canola

Project Leader: Mr. John Lukach, North Dakota State University, Langdon Research Extension Center, 9280 107th Ave NE, Langdon, ND 58249. Telephone: 701-256-2582. E-mail: jlukach@ndsuext.nodak.edu

Fertilizer sulfur (S) plays a major role in the production of canola. The balance between N and S is critical to flowering and seed formation in this crop. Research trials were carried out to evaluate a number of S sources on canola production at two different locations deficient in S near Langdon, North Dakota. Two fertilizer S products, which incorporate N, P, and S into a compound fertilizer granule, were compared to treatments that had only P as monoammonium phosphate (MAP), only S as ammonium sulfate (AS), and both P and S in a physical blend of MAP and AS.

There was a significant response to S at the site south of Langdon, but not at the site north of Langdon. At the S responsive site, the response to S fertilizer products that are compound fertilizers containing N, P, and S was similar to the response to a physical blend of MAP and AS. This research will continue in 2008. *ND-14* ■