Overview of 2002 Oilseed Nitrogen Trials

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The Carrington Center's field production research effort includes crop fertility management. In 2002, trials with canola, flax and soybean focused on nitrogen (N) management. The following is an overview of three of these trials.

Canola

Top-dressing N fertilizer on canola during the growing season offers potential benefits in cost (prices normally drop after the heating season) and efficiency (applying N at the time of highest demand by the plant may reduce fertilizer losses). A project begun in 2001 is studying N fertilization of canola at the NDSU research extension centers in Hettinger, Carrington, Langdon, and Minot. One aspect of the project is determining the response to different levels of pre-plant N. Although more data are needed, initial results suggest the possibility that the N recommendation for a specific yield goal may be reduced. The other aspect of the project compares application of all fertilizer N pre-plant to applying some or all the N post-emergence as urea. At one location in 2001, a significant yield increase was observed with top-dressing N at either the 5-leaf or the early-bud stage. In the other 4 site-years, top-dressing had a minimal effect on yield. The response may be related to the time between top-dressing and rainfall. Other researchers have found that, in the case of urea, losses occur if a significant rainfall (at least 0.33") does not occur within 2-4 days after top-dressing. This work will continue in 2003.

Flax

Area flax grower concerns are that with high soil N and optimum plant densities, plant lodging and subsequent yield loss occurs. A trial was initiated at Carrington in 2000, and continued at Carrington, Langdon, and Minot in 2001 and 2002, to explore the impact of various N and seeding rates on flax seed yield and quality. The trial was conducted on low N soil with N fertilizer applied to reach 0- to 24-inch depth soil N levels of 60, 90, and 120 lbs./acre for 20, 30, and 40 bu/acre yield goals, respectively. Seeding rates of 'Cathay' flax were at 20, 32, 44, and 56 lbs./acre. Even under the influence of high plant populations and high N applications, plant lodging has been very low in Carrington and Minot. In general, yield increase did not occur with soil N levels above 60 lbs./acre or with increasing seeding rates. Relatively low trial yield (< 30 bu/acre) has not allowed treatment differences to be expressed. Response of other seed traits has been variable.

Soybean

A trial was conducted in 2002 to determine the response of soybean to a rescue application of POST (post emergence) N. The trial was established in a commercial soybean field near Fessenden, North Dakota, with no prior history of soybean production, low soil N (33 lbs./acre at 2-ft depth), no nodules present on the root system (seed was initially inoculated), and visually yellow plants. N was applied at early pod formation at 50 and 100 lbs. N/acre as urea (46-0-0) and UAN (liquid 28-0-0; applied with stream bars). Approximately 0.85 inches of rain occurred 8 days after N application. Some N loss likely occurred due to field conditions during N application and the rainfall delay after N application. Seed yield improved by 7.1 bu/acre with 50 lbs. UAN and 11.0 to 12.6 bu/acre with 100 lbs. N as urea and UAN, compared to the untreated check yield (21.9 bu/acre). Seed protein improved 1.8 percentage points with 50 lbs. UAN and slightly over three percentage points with 100 lbs. N compared to the untreated check protein content (25.7%). This is preliminary data and further field studies are needed before this strategy can be recommended.