2006 North Central Region Canola Research Program Summary:
University of Minnesota

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The Canola Production Centre and small-plot variety trials

In 2006 the ninth Minnesota Canola Production Centre was to be located on the Amundson Brothers Farm north of Wannaska, MN. Large-scale trials included the Systems Comparison Trial and Nitrogen Top Dress Trial. In addition to these large-scale trials, the small-plot Roundup Variety and the Non-Roundup Variety Trials were also located at this site.

At the Canola Production Centre the trials were planted on 16 May into land that was in Kentucky bluegrass the previous year. At the time of planting a small portion on the seed was in moisture, but the majority (~90%) went into dry soil. Predictions were for a storm front to bring rain which would germinate all the seed. Unfortunately, for over a month after planting there was not ample rainfall at the site to germinate the seed. Consequently we ended up with a very poor initial stand, and when the rains did come to germinate the remaining seed we were left with a very uneven stands throughout the trials located on the Canola Production Centre. By late June it was apparent that no meaningful data could be obtained from these plantings and that replanting the trials would not give reliable or pertinent information. Therefore, a decision was made to terminate all the trials on the Canola Production Centre.

The Systems Comparison Trial had eight entries submitted for testing by seed companies. Varieties were seeded at the seed company recommended seeding rates. Plots were 400 feet long by 30 feet wide. The trial was laid out in a modified randomized complete block design with four replications. Prior to planting, a base rate of 110-50-0-24 (N-P-K-S) fertilizer was applied to all plots. Roundup Ready varieties were grouped together to help avoid drift problems between different systems. All varieties received the same tillage, fertilizer and seed treatments. All the herbicide tolerant varieties were to be sprayed with their respective herbicides at the recommended rates for the weed spectrum in the field.

The Nitrogen Top Dress Trial was designed to evaluate canola response to multiple rates of nitrogen (N) applied pre-plant or at the 4- to 6-leaf stage of growth using field-scale equipment. The post-emergence application was to evaluate the effectiveness of top dressing urea N (46-0-0) compared with ammonium nitrate (34-0-0). Prior to planting, a base rate of 31-50-0-24 (N-P-K-S) fertilizer was applied to all plots. The trial involved eight treatments: a non-N fertilized control which received the base fertilizer rate only; three N-rate treatments (30, 60, and 90 lbs/acre) applied pre-plant; three N-rate treatments (30, 60, and 90 lbs/acre) top dressed as urea N; and one treatment (60 lbs/acre) applied as ammonium nitrate. The three treatments involving pre-plant N applications received those applications, but the trial was terminated before the top dress N

applications were applied. Plots were 400 feet long by 30 feet wide, and planted with a 10-foot 9350 JD double-disk press drill. The variety Hyola 357 was planted at a seeding rate of 5 lbs/acre.

The Roundup Ready and the Non-Roundup Ready Variety trials were also seeded at the Canola Production Centre in 2006. There were 24 entries in the Roundup Ready Variety trial and 8 entries in the Non-Roundup Ready Variety trial. Each trial had four replications arranged in a randomized complete block design. Prior to planting, a base rate of 110-50-0-24 (N-P-K-S) fertilizer was applied to all plots. As with the other trials located at the Canola Production Centre, plots in these trials were disked under in early July due to poor and uneven plant stands.

The Winter Canola Survival Study

A winter canola survival study was established on a 4 acre wheat stubble field southwest of St. Hilaire MN to determine the cause/timing of winter kill in winter canola to be better able to devise practices to prevent it in the future. A bulk seeding of the winter canola variety 'Witchita' was seeded on September 8, 2005. The straw amount was light and was not removed from the field prior to seeding. The canola was seeded at 5 lb/ac with a 9350 JD double disk press drill with 100 lb/ac MAP (11-52-0) seed placed fertilizer. Emergence was excellent and the canola was in a healthy 6 leaf stage going into the winter. The trial was sprayed on September 15 with Assure II (8 oz/ac) to control volunteer wheat. Ammonium nitrate was top dressed on September 16 at 100 lb/ac (34-0-0) when the canola was in the cotyledon to 1-leaf stage.

Insulation boxes made of 2 inch thick polystyrene foam insulation were constructed to be 96 inches long by 80 inches wide by 8 inches deep. These boxes were placed upside down over the respective plots that were 10 feet long by 8 feet wide and replicated 4 times. The boxes were secured to the ground by driving a "T" fence post in the corner of each plot to fasten a poly tarp to that was stretched over each box. Additional weight was added to each box by placing 2" x 2" furring strips over the tarp to keep it from rippling and tearing in the wind. The tarps were exposed to 50 mph winds after installation and survived nicely. Temperature sensors were placed in each plot to record surface temperature every hour over the course of the winter. Due to limited data loggers and temperature probes, only 2 reps had an extra probe installed to record soil temperature at 2 inches deep. The treatments included a control treatment with no installation boxes, the installation of the insulation boxes in the fall prior to freeze-up, in mid-winter, in early spring and in late spring. The fall treatments were covered in the fall when there was not adequate snow cover to protect the crop from extreme cold (0 ^{o}F or below). The early spring treatments were to provide similar protection after the snow has melted but prior to spring regrowth. The late spring treatment was to provide cold protection if a spring cold snap occurred after the plants have broken dormancy and begun to grow.

By protecting the canola plants from extremely cold temperatures at different times of the cold season, we can better under stand when they are being winter killed. The fall installations occurred on 26 November, 2005. In early December there was a

snow cover, and when the air temperatures dropped to below 0 ^{o}F the soil surface temperature never dropped below +11 ^{o}F.

In late spring when we were going to install the insulation boxes over additional treatments when we realized that the mice had established themselves under all the plots with the insulation boxes. This occurred even though we had placed a rodenticide in the insulation boxes the previous fall. The mice had eaten the wheat residue and canola seedlings, as well as chewed through many of the cables for the temperature sensors. It was apparent that we were not going to be able to continue the trial as planned. Because of the damage done by the mice, and with the departure of technician Dave LeGare in early 2006, we concluded the study was not worth salvaging and collected no further data.

The Winter Canola Variety Trial

The National Winter Canola Variety trial was fall-seeded in mid-September southwest of St. Hilaire into no-till wheat stubble on 8 September, 2005. Thirty-four entries were replicated four times in a randomized complete block design. The wheat straw was raked off of the plot area prior to seeding. The canola was seeded at 5 lb/ac with a Hege 1000 double disk small plot seeder with 80 lb/ac MAP (9-42-0) seed placed fertilizer. Emergence was excellent and the canola was in a healthy 6 leaf stage going into the winter. Plots were 6 feet wide by 30 feet long and replicated 4 times. The trial was sprayed on September 15 with Assure II (8 oz/ac) to control volunteer wheat. Ammonium Nitrate was top dressed on September 16 at 100 lb/ac (34-0-0) when the canola was in the cotyledon to 1-leaf stage.

As of January 1, the plants were in good shape because there was adequate ice and snow cover. Because of that insulation, when the air temperatures dropped to below 0 ^{o}F in early December the surface soil temperature never dropped below +11 ^{o}F. Winter survivability was a problem in portions of the plots where there was excess wheat residue which hampered stand establishment and in compacted areas from tire-tracks during small-grain harvest. Average yield of the canola varieties across all 34 entries was 1,510 lbs/acre, with the best yielding variety averaging over 2,200 lbs/acre. In 2005-2006, average yield of the canola varieties was 9580 lb/ac. Late application of spring nitrogen may have contributed to the lower than anticipated yields.

Results from the individual entries in the trial can be found in the University of Minnesota Varietal Trials Results bulletin (MP 113-2007).

Minnesota Weather Station Data

Funds from the North Central Region Canola Research Program supported three weather stations in Minnesota in 2006. These stations are located near Greenbush, Wannaska, and Mavie. These stations provided soil temperature, air temperature and precipitation data which went into the Sclerotinia Risk Map project, which provided timely maps to growers during the growing season on the likelihood of environmental conditions conducive to an outbreak of sclerotinia in canola .

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