

## **Thunder Bay Agricultural Research Station; Research 2008 Presentation – Main points**

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Most of the crop(s) variety results were shared with the members of the Thunder Bay Agricultural Research Association in the Annual Meeting last fall. This note summarizes findings from other experiments.

### **Spring cereals:**

- Sable grain yield under organic farming system, even though double than that of Red Fife, was about 80% of its grain yield under conventional system.
- Barley + field peas intercropping in alternate rows with nitrogen (N) applied only to barley rows had an edge in combined grain yield from the two crops as compared to the two crops grown separately. The practice helped cutting N application rate by 50%. Produce value from barley + peas would be higher than that from barley alone. Fields peas alone, without any N application, gave as much grain yield as barley with N.
- Spring wheat @ 40 kg N/ha, in a field with 12 ppm (48 kg/ha) pre-seeding nitrate N (0-30 cm soil), produced as much yield as at 80 or 120 kg N/ha.
- ESN had a slight edge over urea in grain yield and had the same residual N as urea.
- Residual nitrate N in soil increased with increasing rates of N from 40-120 kg/ha.

### **Winter cereals:**

- Winter wheat grain yield increased with delay in seeding from August 25 to mid September (~6,800 kg/ha) and declined thereafter. Winter wheat seeded early on August 25 or late on October 5 could produce over 5,200 kg grains/ha.
- Winter barley had a partial success with maximum grain yield of ~3,300 kg/ha, when seeded on August 25.
- Dakota, a western winter rye variety, gave 2.8 t/ha higher grain yield than Ontario's Common No. 1.
- Winter wheat harvested on July 14 (20 days after the boot stage) with a dry matter (DM) yield of ~10 t/ha could be a good forage option. Winter rye (Common No. 1) harvested on July 21 resulted in a DM yield of ~8.5 t/ha. Winter rye dry matter yield with other varieties would be higher than that from Common No. 1! Protein content was highest at the boot stage, but the DM yields were low (winter wheat: 6.1 t/ha, winter rye: 3.1 t/ha).
- Maximum grain yield in winter wheat was obtained when entire N @ 100 kg/ha was applied at seeding as compared to its split application in fall and spring or entire N applied in spring. Soil samples taken in spring, after the spring application of N, revealed that N in spring applied plots was only marginally higher than the plots with the fall applied N. This means that there was no significant loss of N from the fall applied N!
- Winter wheat produced the highest grain yield (5,837 kg/ha) and protein content (13.9 %) with N @ 80 kg/ha.

### **Soybean:**

- RR Rosco surpassed other varieties in grain yield, but forage DM yield at green pod stage was the highest (8.5 t/ha; 13.1 % protein) in OAC Prudence.
- Increasing plant population from 200,000/acre to 360,000/acre increased the soybean grain yield by ~600 kg/ha.
- Zero tillage, direct seeding, produced the maximum and fall chisel ploughing, followed by spring disking and cultivation before seeding gave the lowest soybean grain yield.

- Late sown (June 17) soybean grain yield wasn't affected by uni or bi directional seeding and decreased with increase in row spacing from 6 to 12 inches or more.

#### **Forages:**

- Partial (21%) substitution of urea N with N from ammonium sulphate or ESN made no difference in silage corn yield, but left a higher residual N in soil, after corn harvest, as compared to urea alone. Zn @ 7-14 kg/ha increased the dry matter yield by over 1t/ha!
- Timothy dry matter yield (DM) increased with increasing rates of N from 0 to 105 kg/ha; ESN had an edge over urea in residual soil N (fall 2008), but not in DM yield. In another experiment, however, ESN had an edge over urea in timothy DM yield, and 25% substitution of urea N with N from ESN seemed to be the best option.
- Seeding alfalfa in 30 cm rows gave higher yield than its seeding in 15 cm rows or paired rows at 30 cm or bi-directional seeding at 30 cm.
- Maximum yield of alfalfa was obtained with combined application of N, P, K and S.
- Residual effect of ammonium sulphate, applied to alfalfa in the previous years, had a significant positive effect on alfalfa yield and protein content (4% point higher in the first and 1% point higher in the second cut as compared to urea/or ammonium nitrate)!
- In an experiment on forage legumes (alfalfa and galega) and grasses (timothy and orchard grass), maximum DM yield (6.5 t/ha) was obtained with alfalfa + orchard grass (50:50). DM yield from alfalfa + orchard grass (80:20) was 5.4 t/ha; same as that from alfalfa + timothy (50:50 or 80:20). Amongst the pure stands, orchard grass resulted in the highest DM yield (5.1 t/ha). Galega DM yield was 95% of that from pure stand of alfalfa (4.7 t/ha).
- DM yield from berseem clover (6.0 t/ha; 21% protein) equaled that from oats (9% protein), but exceeded that from teff by ~2.3 t/ha (14% protein). Delay in seeding from May 20 to 30 significantly reduced the forage yield (~2t/ha). Berseem and oats mixture (100:50/and 100:70) increased the DM yield by ~1-1.3 t/ha as compared to the pure stands of the two crops.

#### **Lime, wood ash and manure/NPK fertilizers:**

- Application of wood ash increased soil pH and availability of zinc and manganese more than (did) lime. Wood ash, not lime, significantly increased the grain and straw yield of barley (as compared to the check – no lime or wood ash). Application of lime, but not wood ash, after every two years improved the grain yield. This means that lime has to be applied more frequently than wood ash.
- Wood ash increased soil pH, available calcium, magnesium, zinc, manganese (Mn), and boron more than manure, whereas, reverse was true for organic matter and available potassium. The ash didn't increase heavy metals contents in the soil!
- Barley grain and straw yields were in the order of wood ash  $\geq$  wood ash + manure  $>$  manure  $\geq$  check (no manure or wood ash).
- Application of NPK fertilizers increased organic matter and availability of P and K, but not of secondary and micronutrients!
- Application of 70 kg N/ha increased the grain as well as straw yield of barley by ~1.1 t/ha. Addition of 20 kg P<sub>2</sub>O<sub>5</sub>/ha with N increased the yields only marginally (grains by 300 kg/ha and straw by 200 kg/ha). Addition of 20 kg K<sub>2</sub>O/ha, along with N and P, didn't further improve the grain or straw yield as compared to N and P. Same holds good for foliar application of Mn @ 2 kg/ha.

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