

2. Summary of Research Results 2016

2.1 Screening of crop varieties:

2.1.1 Spring Cereals:

Wheat Varieties:

- Twenty one varieties were compared with *Sable*, out of which 6 were durum wheat and the rest almost all hard red.
- Highest grain yields were obtained with *AAC Penhold* (6,136 kg/ha), *Megantic* (5,908 kg/ha), *Elgin ND* (5,799 kg/ha), and *Minnedosa* (5,749 kg/ha). Grain yield of *Sable* was 4,587 kg/ha only.
- Two highest yielding durum wheat varieties were *AAC Marchwell* (5,750 kg/ha) and *Enterprise* (5,512 kg/ha).
- *Megantic* among hard red and *AAC Raymore* among durum produced the highest straw yields (~6,800 kg/ha). This is ~700 kg/ha more than what we got from *Sable*.
- *Megantic* (12,713 kg/ha) and *AAC Marchwell* (12,037 kg/ha) produced the highest biomass.
- Three hard red varieties that had the highest grain protein content were *Go Early* (19.1 %), *CDC Plentiful* (18.6 %) and *AAC Brandon* (17.6 %). In durum wheat, *Strongfield* (20.6 %) and *Enterprise* (18.1 %) had higher grain protein content than others.

Wheat Varieties Demonstration:

- *Innova* registered somewhat higher grain yield (4,847 kg/ha) than *Proclaim* (4,512 kg/ha). Reverse was true for the straw yield (*Proclaim*: ~5,800 kg/ha; *Innova*: 5,305 kg/ha). However, the yield differences were not significant.

Barley Varieties:

- Fifteen high yielding barley varieties (new and proven) were compared for their production potential.
- Three top grain yielding varieties were *Boroe* (6,610 kg/ha), *Alyssa* (6,468 kg/ha) and *Chambly* (6,251 kg/ha).
- *Synasolis* (5,843 kg/ha), *Amberly* (5,719 kg/ha) and *Oceanic* (5,657 kg/ha) formed the second best group in grain yield.
- Straw (6,229 kg/ha) and biomass (12,696 kg/ha) yields were highest with *Alyssa*.

Malting Barley Varieties:

- Six varieties were evaluated.
- *AAC Synergy* gave the highest grain yield (4,988 kg/ha) followed closely by last year's topper *CDC Copeland* (4,640 kg/ha). Grain yield of other varieties ranged from 755 kg/ha (*Newdale*; poor stand probably due to bad seed) to 3,717 kg/ha (*Quench*).
- Straw yield was highest (5,231 kg/ha) with *CDC Copeland* followed by *AAC Synergy* (4,783 kg/ha).
- Biomass yields of *CDC Copeland* (9,871 kg/ha) and *AAC Synergy* (9,771 kg/ha) were higher than other varieties (1,674 kg/ha in *Newdale* to 7,361 kg/ha in *Quench*).

Hulless Barley Demonstration:

- *Azimuth* (6R) produced higher grain yield (~4,600 kg/ha) than *Millhouse* (2R; 3,913 kg/ha).
- However, straw yield was greater with *Millhouse* (5,988 kg/ha) than that with *Azimuth* (3,727 kg/ha).

Black (Hulless) Barley Seed Rates:

- Highest grain (1,339 kg/ha), straw (3,305 kg/ha) and biomass (4,644 kg/ha) yields were obtained with 75 % of the recommended seed rate.

Black (Hulless) Barley is a specialty crop and can be eaten like (boiled) rice! It may be of interest to gardeners/and organic producers.

Oat Varieties:

- Sixteen oat varieties were evaluated for their yield potential. With a trial mean grain yield of 7,000 kg/ha, oat yield this year was excellent! Oats love moisture that was in abundance.

- *Rosken* recorded the highest grain yield (8,269 kg/ha) followed by *OA 1357-2* (7,828 kg/ha) and *Almonte* (7,652 kg/ha).
- Formerly high yielding varieties with stable yields, such as *AC Rigodon* (6,305 kg/ha) and *AC Jordon* (6,063 kg/ha), had the lowest grain yields this year.
- Among the registered varieties, *Nicolas* produced the highest straw (9,341 kg/ha) and biomass yields (16,138 kg/ha).

2.1.2 Winter Cereals:

Manitoba and Ontario Winter Wheat Varieties:

- Sixteen winter wheat varieties from Manitoba and Ontario were compared for their production potential.
- *Gallus* (plant height 97 cm), a relatively new HRWW variety from Ontario, registered the highest grain yield (6,781 kg/ha) and a reasonably good (though not the highest) straw yield (9,328 kg/ha). 2016 was the first testing year for this variety at TBARS!
- *Princeton* (6,451 kg/ha) and *1603-137-1* (6,426 kg/ha) were the second best in grain yield.
- *AAC Gateway* (4,775 kg grains/ha) that had recorded highest grain yield in the past 3 years and *CDC Falcon* (4,128 kg grains/ha) didn't do well this year. This year's heat at ripening was probably too much for these varieties.
- Among the registered varieties, *Emerson* produced the highest straw (10,380 kg/ha) and *Gallus* the highest biomass (16,109 kg/ha) yield.
- Grain protein content in *Gallus* and *Princeton* was over 1 % point lower than that in *AAC Gateway* (12.9 %).
- Grain N removal by *Gallus* was 128 kg N/ha.

Winter Rye/Triticale Varieties:

- Only two varieties (*Hazlet* and *Brasetto*) were compared/demonstrated.
- *Hazlet* (7,525 kg/ha) gave somewhat higher grain yield than *Brasetto* (7,255 kg/ha) though both had similar straw (~9,300 kg/ha) and biomass (over 16,500 kg/ha) yields.
- *Winter rye could be a good option for grain (feed or malt)/and straw production!*
- Grain, straw and biomass yields of winter triticale (cultivar *Fridge*) were 5,415 kg/ha, 10,453 kg/ha and 15,868 kg/ha, respectively.
- In rye, plumpness of grains was higher (89.4 %), but ergot lower (6.0 %) in *Brasetto* than in *Hazlet* (71 % and 12 %). Germination percentage in both the varieties was almost 100 %. There was hardly any ergot (1 %) in *Fridge* (triticale) that had 87.4 % plump kernels. Germination in *Fridge* was low (88 %).

2.1.3 Grain Corn:

- Five corn varieties (3 from DuPont Pioneer and 2 from Pride Seeds) were evaluated for grain production.
- Grain yield ranged from 14.1 MT/ha (*A4025G3*) to 15.9 MT/ha (*P7202AM*). Grain yield from *A4199G2* (15.7 MT/ha) was close to that of *P7202AM*. However, the grain yield differences between the varieties was not significant.
- Pride seeds varieties (*A4025G3* and *A4199G2*) recorded higher stover yield (>15.6 MT/ha) than the DuPont Pioneer varieties (11.2-13.7 MT/ha).
- *A4199G2* produced the highest biomass yield (>31 MT/ha).

2.1.4 Grain Legumes and Oil Seeds Varieties:

Soybean Varieties:

- Twelve varieties were evaluated for grain production.
- Three top grain yielding varieties were *NSC Moosomin RR2Y* (5,343 kg/ha), *TH33005R2Y* (5,300 kg/ha) and *P002T04R* (5,188 kg/ha).
- Grain yield in other varieties ranged from 3,342 kg/ha (*NSC Tilson RR2Y*) to 4,876 kg/ha (*Podago R2*).

Edible Beans Varieties:

- Four white and 2 red edible bean varieties were compared for their grain yield.
- *Earlired* that has given consistently high yield in the past, gave the highest grain yield (3,621 kg/ha) this year too. This was 1,241 kg/ha higher than the other red variety (*Dynasty*).
- Among the white varieties, *Bolt* (2,791 kg/ha) and *Yeti* (2,654 kg/ha) produced significantly higher grain yield than *Spark* (1,813 kg/ha) and *Fathom* (1,756 kg/ha).

Edible beans could be an integral part of the cropping systems in northwestern Ontario!

Flax Varieties:

- Nine varieties were evaluated for their production potential.
- *CDC Glas* recorded the highest seed yield (3,411 kg/ha) as was the case in the previous two years.
- *CDC Neela* (3,236 kg/ha) and *CDC Sorrel* (3,153 kg/ha) were the other two varieties that gave more than 3,000 kg/ha seed yield.
- Straw yield followed the trend similar to the seed yield. This means that the varieties that produced high seed yield, gave high straw yield as well.
- Highest biomass yield (~9,000 kg/ha) was obtained with *CDC Glas*.

New Flax Varieties (Brown Seeds):

- Thirty seven new lines were compared with 5 standard varieties (total 42 flax biotypes).
- Seed yield in the 5 standard varieties was in the order of *CDC Bethune* (3,439 kg/ha) > *NorLin* (2,985 kg/ha)/*Prairie Thunder* (2,952 kg/ha) > *CDC Buryu* (2,816 kg/ha) ≥ *Flanders* (2,759 kg/ha).
- In the new lines, seed yield varied from 2,638 kg/ha (*FPL14026*) to 3,636 kg/ha (*HYF14034*).
- Overall trial mean seed yield was 3,084 kg/ha (as compared to 3,450 kg/ha last year). This year's heat at ripening was probably a bit more than desired for flax.

Liberty Canola Varieties:

- *L252* recorded the highest seed (5,473 kg/ha; 803 kg/ha higher than *L5440*), straw (10,251 kg/ha) and biomass (15,724 kg/ha) yields.
- Seed yields of other two varieties; *L233P* (4,345 kg/ha) and *L140P* (4,243 kg/ha) were lower than even that of *L5440*.

Brett & Young Canola Varieties:

- Seed yield was in the order of *6074 RR* (4,444 kg/ha) > *6080 RR* (4,160 kg/ha) > *L5440* (3,578 kg/ha). *6074 RR* had the highest straw (7,771 kg/ha) and biomass (12,215 kg/ha) yields.

2.1.5 Forage Crops/Varieties:

Alfalfa Varieties OFCC 2015:

- Dry matter yield ranged from 6,053 kg/ha (*55V50*) to 6,608 kg/ha (*54Q14*).
- None of the varieties (*55V48*, *55V50*, *55Q27* and *54Q14*) produced significantly higher dry matter yield than the check (*OAC Superior*; 6,502 kg/ha). *OAC Superior* has shown yield stability for more than a decade!

Alfalfa Varieties OFCC 2014:

- Two years total dry matter yield varied significantly with the 6 tested varieties. However, none of the varieties recorded significantly higher dry matter yield than the check (*OAC Superior*; ~13,000 kg/ha).
- Highest dry matter yield (13,655 kg/ha) was obtained with *55V48*.
- *GS-14-05* had the lowest dry matter yield (12,040 kg/ha), which was significantly lower than that of *OAC Superior*. Another General Seeds variety (*GS-14-06*; 12,897 kg/ha) equaled *OAC Superior* in dry matter yield.

Sainfoin Varieties 2014:

- Six sainfoin varieties were compared with alfalfa for dry matter yield and feed quality.
- In the two years totals, alfalfa (11,256 kg/ha) gave over 1 MT/ha extra dry matter yield than the two best varieties of sainfoin (*Nova*; 10,064 kg/ha and *LRC 3432*; 10,026 kg/ha).
- Feeding 25-30 % of sainfoin with alfalfa is known to overcome bloat problem!

- Feed quality of sainfoin (*Nova*) and alfalfa was more or less similar in the first cut except that sainfoin (108) had higher RFV than alfalfa (99). In the second cut, protein content in the two legumes was similar, but energy values and RFV was lower in alfalfa than sainfoin.
- This year we have seeded *Mountainview*, which is considered to be the best sainfoin variety; results will be known in 2017.

Comparative Performance of Alfalfa and Galega:

- Galega seeded @ 25 kg seed/ha (6,375 kg/ha) produced 1 MT/ha higher dry matter yield than alfalfa (5,317 kg/ha) in two cuts. Whereas @ 35 kg seed/ha, Galega (8,391 kg/ha) gave 3 MT/ha higher dry matter yield than alfalfa.
- Galega @ 35 kg seed/ha inter seeded with berseem clover @ 13 kg/ha in the previous years, helped to raise the Galega yield this year to 8,879 kg/ha! However, the protein content in Galega wasn't affected by berseem.
- Protein content in Galega, both in the first and the second cut, was up to 2.4-3.3 % point higher than that in alfalfa.
- Calcium, sodium and boron seemed to be lower, but copper, zinc, iron and manganese were higher in Galega than that in alfalfa.

Tall Fescue Varieties OFCC 2014:

- In the two years total dry matter yields, 3 (out of 7) top yielding varieties were *Courtenay* (14,631 kg/ha), *Yukon* (14,484 kg/ha) and *Kora* (14,407 kg/ha).

Orchardgrass Varieties OFCC 2014:

- *Dividend VL*, which has done well in the previous years too, produced the highest dry matter yield (12,070 kg/ha) over two years.
- *Okay* was the next best variety for hay production (10,792 kg/ha).

2.2 Fertilizer Management Practices (Grain/seed crops):

2.2.1 Spring Cereals:

Fall vs. spring application of N fertilizers (urea and ESN) for spring wheat production:

- Fall application of N was made on October 6, 2015 and the spring application at seeding on May 6, 2016, as per treatments. N was applied @ 80 kg/ha in all treatments, except the check (No N).
- Application of N (@ 80 kg N/ha as urea or ESN or their blends applied in fall/or spring) significantly improved the grain yield by 1,170 kg/ha to 2,483 kg/ha as compared to the check.
- ESN @ 80 kg N/ha applied in spring recorded the highest grain (~4,800 kg/ha) and biomass (10,773 kg/ha) yields.
- *Spring applied ESN gave 1,244 kg/ha extra grains and 920 kg/ha higher straw yield than urea at the same rate of N (80 kg/ha);* due probably to excessive rains this year, especially in June. Blends of urea and ESN (3:1 or 1:1 on N basis) equaled ESN alone in grain, straw and biomass yields.
- When the two fertilizers were applied in the fall, increase in grain yield by ESN over urea was relatively small (225 kg/ha), though more than enough to cover the extra cost of N from ESN as compared to urea.
- Grain yields from the fall or spring applied urea were the same.
- Grain protein varied from 12.6 % with no N to 14.3 % with ESN applied in spring. It was little bit higher with ESN than with urea and wasn't affected by the time of N application.
- Averaged over three years (2014-'16), highest grain yield (4,456 kg/ha) was obtained with spring application of a blend of urea @ 60 kg N/ha + ESN @ 20 kg N/ha. Spring applied urea was only marginally better in grain yield (129 kg grains/ha) than its fall application. Grain protein content was highest (15.3 %) with spring applied ESN.

2.2.2 Grain Legumes and Oil Seeds:

Effect of P and bio-ag products on soybean grain yield:

- Neither application of 20 kg P₂O₅/ha nor seed treatment with *Jumpstart (Penicillium bilaii;* a fungus providing better access to soil and applied P) improved the soybean yield.

- Seed treatment with *Quickroots* increased the soybean grain yield significantly by ~900 kg/ha as compared to the check. *Quickroots* is a microbial (*Bacillus amyloliquefaciens* and *Trichoderma virens* based) seed treatment to improve NPK availability.

Maximizing canola yield with nitrogen and other nutrients and fungicides/growth retardant:

- Nutrients (N, S, B, Zn and Mn) effect on canola yield was assessed over uniform recommended rates of P and K.
- Application of N @ 150 kg/ha raised the canola seed yield from 1,414 kg/ha in the check to 2,687 kg/ha. Addition of S, B, Zn and Mn one by one improved the yield further; except the Zn. The seed yield went up to 3,869 kg/ha with NSBZnMn (1,182 kg/ha more than N alone).
- Spraying fungicide or growth retardant (Manipulator 620 @ 1.8 l/ha) didn't help in improving the seed yield.
- Nutrient use efficiency expressed as kg yield/kg applied nutrients was highest (18.5) with NSBZnMn.

Maximizing canola yield with nitrogen and growth retardant:

- Application of N @ 60,120 and 180 kg/ha from urea/or urea + ESN (3:1 ratio on N basis) significantly improved the canola seed yield.
- Response to N @ 60,120 and 180 kg/ha from urea, as compared to check was 517, 1,337 and 2,237 kg/ha, respectively. Corresponding responses from urea + ESN were 768, 2,032 and 3,119 kg/ha, respectively. This is a huge response to application of N!
- Averaged over N rates, urea + ESN gave ~550 kg/ha more seed yield than urea alone; only at an extra cost of ~\$12/ha.
- Manipulator 620 (growth retardant) spray @ 1.8 l/ha didn't affect the plant height, but increased the seed yield by ~230 kg/ha (averaged over sources and rates of N).
- Highest straw yield (6,559 kg/ha) was recorded when canola was supplied with 180 kg N/ha (120 kg from urea and 60 kg from ESN) and sprayed with Manipulator @ 1.8 l/ha. This treatment also produced the highest seed (5,349 kg/ha) and biomass (11,908 kg/ha) yields!

Effect of nitrogen and growth regulator on flax seed yield:

- Application of N (@ 35, 70 and 105 kg/ha) increased the flax seed yield significantly and the response to N exhibited a Law of Diminishing Returns.
- Seed yields at 70 and 105 kg N/ha from urea were 3,070 and 3,236 kg/ha. Corresponding straw yields from these two treatments were 4,778 and 4,833 kg/ha, respectively.
- Substitution of 1/3rd N from ESN in the 105 kg/ha N treatment increased the seed yield only marginally (104 kg/ha) as compared to N from urea alone at equivalent rate. However, urea + ESN produced the highest biomass yield (8,209 kg/ha)!
- Growth regulator (Manipulator 620) spray improved the seed yield by ~200 kg/ha.

Effect of P and K on flax seed yield:

- Application of P₂O₅ or K₂O (both @ 20 or 40 kg/ha) didn't exert any significant influence on flax seed (3,146-3,603 kg/ha) or straw (5,047-5,591 kg/ha) yield. It seems that abundant soil moisture throughout the growing season enhanced the P and K availability from the native soil sources.

Effect of sulphur on flax seed yield:

- Application of S @ 10, 20 or 30 kg/ha had no impact on seed yield of flax. It seems that sulphur availability from the soil source wasn't limiting due to more than enough rainfall during the growing season.

2.2.3 Forages:

Grasses:

Residual effect of urea and its blends with ESN and ammonium sulphate on forage grasses mixture - Timothy (Itasca) 50 %, Bromegrass (Peak) 42.5 %, and Orchard grass (Dividend VL) 7.5 %:

- No fertilizers were applied this year and only one cut was taken.
- None of the fertilizer treatments had significantly higher yield than the check (no fertilizer treatment); though the best yielding (4,572 kg/ha) fertilizer treatment was urea @ 58.25 kg/ha + ESN @ 26.25 kg/ha + ammonium sulphate @ 20.5 kg/ha.

- Protein content varied from 6.4 % in the check (No N) to 8.0 % with urea @ 58.25 kg/ha + ESN @ 26.25 kg/ha + ammonium sulphate @ 20.5 kg/ha (Total 105 kg N/ha) and 8.6 % with urea @ 84.5 kg/ha + ESN @ 35 kg/ha + ammonium sulphate @ 20.5 kg/ha (Total 140 kg N/ha). The latter treatment recorded the highest RFV.
- Thus the residual effect of the fertilizers applied in the previous years was exhibited in the protein content only.

Effect of potassium (K) and sulphur (S) on forage grasses mixture - Timothy (Itasca) 50 %, Bromegrass (Peak) 42.5 %, and Orchard grass (Dividend VL) 7.5 %:

- Treatments included all combinations of K (70, 140 and 210 kg K₂O) and S (0 and 24 kg S/ha) and a check with no K or S.
- There was no significant effect of the treatments on the average dry matter yield for 3 years (2014-'16), which varied from 6,600 kg/ha in the check to 7,216 kg/ha with 140 kg K₂O/ha (recommended rate as per the soil test). It appears that due to adequate rainfall during the period of this experiment, nutrient availability and supply from the soil wasn't limiting.
- S, but not K, improved the protein content. Neither of the two nutrients increased the RFV.

Alfalfa:

Evaluation of NK21 as a source of N and K for alfalfa (one cut in 2015 and two in 2016):

- NK21 was compared at two rates of N (21 and 31.5 kg/ha) and K₂O (87.7 and 98.2 kg/ha) with equal amounts of N and K from ammonium sulphate supplemented with muriate of potash. In NK21 treatments, S to equal amounts of ammonium sulphate in the other treatments was applied as potassium sulphate. K levels were adjusted to equal in both the fertilizers (ammonium sulphate and NK21).
- NK21 and ammonium sulphate significantly improved the dry matter yield as compared to the no N, K or S check (7,218 kg/ha over 2 years).
- Highest yield obtained with NK21 @ 31.5 kg N/ha (9,244 kg/ha) wasn't significantly better than that with ammonium sulphate (8,954 kg/ha) at the same rate of N. A reverse trend in yield with the two fertilizers was noticed at the lower rate of N (21 kg N/ha).
- Averaged over the two N rates (21 and 31.5 kg/ha) dry matter yields with the two fertilizers were about the same (~8,800 kg/ha).
- N application improved the protein content by maximum up to 1.7 % points in the first cut and up to 3.7 % points in the second cut. Protein content with NK21 and ammonium sulphate was similar both in the first and the second cut.
- ADF and NDF appeared to be higher and TDN and RFV lower with NK21 than that with ammonium sulphate in the first cut. In the second cut, these values didn't differ much.
- The experiment will be repeated next year for proper evaluation of NK21.

2.3 Other Agronomic Practices:

Mid June Seeding Options:

- Six spring crops (wheat, barley, oat, canola, pea and flax) were evaluated for their success of cultivation and production potential when seeded during mid June.
- Mid June seeding didn't work in canola, flax and peas/and resulted in crop failure.
- Grain yields from mid June seeded wheat (*Sable*), barley (*Encore*) and oat (*AC Rigodon*) were 4,367, 6,018 and 4,349 kg/ha; which were reasonably good for late seeding.

MasterGraze corn seeding and harvest management:

- Among the 4 seeding dates (May 15 to June 15), June 5 seeding had tallest plants (166 cm), produced the highest dry matter yield (9,185 kg/ha) and had a RFV of 113.
- Dry matter yield improved with delay in harvesting from initiation of tasseling (5,804 kg/ha) to 50 % tasseling (7,540 kg/ha) to 100 % tasseling (9,903 kg/ha).
- Protein content was highest (14.7 %) with May 25 seeding and ranged narrowly from 13.1-13.4 % with other seeding dates.

MasterGraze could be added to the cropping systems, especially by the dairy farmers.

Comparative forage production potential of different forage crops:

- Nine forage crops (legumes and non legumes) were evaluated for forage production potential and feed quality on the same site!
- Silage corn produced unbelievably high yield (39.3 MT dry matter; 8.3 % protein), which was the highest among all crops.
- Dry matter yield from MasterGraze corn (6,789 kg/ha; 10.2 % protein) was much lower than that with sorghum Sudangrass (12,083 kg/ha; 19.0 % protein).
- Oats (8,034 kg/ha; 6.7 % protein) gave higher dry matter yield than barley (5,658 kg/ha; 8.9 % protein).
- Intercropping barley and oats with peas lowered the forage dry matter yield by ~800 kg/ha in barley and by ~1,570 kg/ha in oats, but raised the protein content from 8.9 % to 13.7 % in barley and from 6.7 % to 9.0 % in oats.
- On the contrary, intercropping barley and oats with berseem clover improved the forage dry matter yield by ~1,500 kg/ha in barley and 1,100 kg/ha in oats. Increase in protein content by intercropping barley and oats with berseem was from 8.9 % to 16.6 % and from 6.7 % to 8.7 %, respectively.
- Forage dry matter yields from berseem clover, fababeans, soybean and peas were 6,151 kg/ha (19.2 % protein), 4,781 kg/ha (23.2 % protein), 4,151 kg/ha (17.3 % protein) and 2,215 kg/ha (23.1 % protein), respectively.
- RFV was highest (284) in fababeans as compared to 119 in barley and 90 in silage corn. Berseem clover registered the 2nd highest RFV (180).

Dairy producers could add berseem crop to their cropping systems either as a pure crop or as an intercrop with barley/or oats.

2.4 Extension and Outreach:

A proactive approach to extension and outreach activities was adopted by TBARS for dissemination of Technology to the end users (farmers, extension scientists and researchers not only in northwestern Ontario, but also in the other parts of the province, and the country/other countries). There is hardly any farm magazine/journal in Ontario in which TBARS wasn't mentioned at least once. Impact of our Extension and Outreach activities could be seen in the form of favourable changes on farms. High grain yields in wheat (up to ~2 MT/acre), barley (up to 2.5 MT/acre), canola (up to ~2 MT/acre), soybean (up to 1.3 MT/acre) and winter rye (2 MT/acre), were especially noteworthy. Increasing number of winter rye growers/and acreage under winter rye in Thunder Bay attracted media attention. Demonstration plots were maintained to demonstrate high yielding varieties of different crops. Main changes that took place on our member farmers' fields/or elsewhere are as follows:

- New crop varieties such as *Cardale* and *Brandon* in spring wheat, *P140*-a non shattering canola variety for direct combining and *Pekko* and *P002T04R* in soybean were seeded first time in hundreds of acres.
- Two farmers successfully experimented with flax cultivation first time in ~50 acres each.
- Three producers used plastic mulch in corn for the first time in ~350 acres.
- The number of winter rye growers increased from one last year to six this fall (total nearly 400 acres seeded; out of which 120 acres were seeded as a cover crop by a single producer).
- Winter wheat made a comeback with one grower seeding AAC Gateway, a high yielding hard red winter wheat variety, in 60 acres.
- Two producers applied part N as ESN in the seed row to winter wheat and rye.
- Galega, a perennial legume, which proved to be a potentially good alternative to alfalfa at TBARS attracted a lot of interest not only from within the province, but also from the other provinces (Quebec, Saskatchewan and Alberta). One of our local producers is planning to expand his acres under Galega in 2017. One private Firm in Guelph has reportedly imported Galega seed for 50 acres.
- One local dairy producer tried cultivation of *Teff* and *MasterGraze* corn on 5 acres each.
- Dairy farmers around Calgary expanded their acreage under MasterGraze corn three fold. TBARS pioneered in research on MasterGraze corn that produces 8 MT dry matter yield/ha in 80 days. Its feeding to dairy cows improved, milk and butter fat yield by 3-4 %.

- Tile drainage on farms continued!
- Students from the Lakehead University got educational tours at TBARS/and got guidance for their on-farm research and thesis writing.
- A local Grain Elevator procured 5,000 MT grains (equals two million dollars) this year from Thunder Bay and Rainy River districts; up from 750 MT last year. I believe at least one more Grain Elevator procured grains from the area as well (volumes not known).

For details, refer to the section on Extension and Outreach in the main report.

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November 28, 2016