LUARS Forage Research Results 2018

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Forages have been an integral part of the farming systems in Thunder Bay/NWO and hence an important component of development oriented research at LUARS. This note is to share the 2018 research results from our experiments on forage crops.

Comparative Performance of Alfalfa and Galega: Two cuts were taken!

- Galega seeded in 2011 @ 25 kg seed/ha gave significantly higher dry matter yield (~500 kg/ha) than alfalfa seeded @ 13 kg seed/ha; only in the first cut. Higher than 25 kg/ha seed rates in Galega didn't prove beneficial in 2018 (unlike last year).
- Protein content in Galega seeded @ 25 kg/ha was 1 % point higher in the first cut and 2.6 % point higher in the second cut as compared to alfalfa seeded @ 13 kg/ha.
- Galega had lower mineral content (K, Ca, Mg, Cu, Zn, Mn and Na) than alfalfa in the first cut (averaged over 2016 to 2018). In the second cut, Mg, Zn and Mn were higher in Galega than in alfalfa. Galega contained higher amounts of iron (Fe) than alfalfa in both the cuts.
- Averaged over 2012 to 2018, Galega seeded @ 25 and 35 kg seed/ha produced 600 kg/ha and 1,000 kg/ha higher total dry matter yield (from 2 cuts) than alfalfa.
- Protein content in Galega @ 25 kg/ha, averaged over 2016 to 2018, was 3.6 % point higher than in the first and 2.7 % point higher in the second cut than that in alfalfa.
- *Higher yield and higher protein content in Galega than in alfalfa, will make Galega a better fodder than alfalfa!*

Comparative performance of gypsum and lime for Galega production:

- Galega seeded in 2017 was infested badly with pineapple weed, had a scanty stand and produced low dry matter yield from two cuts (up to 3,356 kg/ha).
- Neither lime (@ 2.14 – 6.28 MT/ha) nor gypsum (@ 2.5 -7.5 MT/ha) helped to improve dry matter yield of Galega in the first harvest year! However, both the amendments increased the protein content by 1 % point or more.

Forage Production Potential of Different Annual Forage Crops:

- *Silage corn* produced the highest dry matter yield (28.2 MT/ha – 7.5 % protein content). *Oats/Oats +Berseem* registered the 2nd highest dry matter yield (13.4/~13.0 MT/ha – 8.6/10.0 % protein). Among other crops/or crop combinations (*Barley, Berseem, Barley + Peas/or Berseem, Sorghum Sudangrass, Soybean*, and *Fababean*), *MasterGraze corn* had the highest dry matter yield (7.9 MT/ha – 9.9 % protein).
- *Berseem/and Soybean* forage had the highest RFV (155/152)! Second highest RFV was found in *Oats + Berseem/or Peas* (134/131).
- Averaged over 2016-2018, dry matter yields of *Silage corn, Oats, MasterGraze corn* and *Oats + Berseem* were 34.8, 8.72, 8.55 and 8.47 MT/ha, respectively. Protein content in these crops was 8.0, 8.1, 10.3 and 13.4 %, respectively. RFV was highest in *Fababeans* (177) followed by 150 in *Berseem*. Higher RFV is indicative of a higher milk yield.

New Annual Forage Crops:

- *Union Ultimate Blend* (30 % Hairy Vetch, 25 % Italian Ryegrass, 15 % Sorghum, 10 % Crimson Clover, 10 % Winfred, 5% Hunter, and 5% Graza) + *CDC Coalition* gave the highest dry matter yield (5,031 kg/ha – 13.1 % protein) for the 2nd consecutive year!

Second and third highest dry matter yields were obtained with *frosty berseem* seeded @ 13 kg/ha (4,047 kg/ha – 20.5 % protein) and *Italian Ryegrass* (Crusader; 3,901 kg/ha – 14.5 % protein).

- Protein content was highest in *conventional berseem* (23.6 %) that yielded 1.5 MT/ha lower than the *frosty berseem*.
- Dry matter yield of other crops (*Choice Chicory*, *Tonic Plantain, Fixation Blansa, Peas all Brassica Blend* and *Belle Red Clover*) ranged from 2,070 kg/ha to 3,017 kg/ha. Protein content in these crops ranged from 16.2 % to 20.8 %.
- Highest RFV was recorded in *Peas* (163) followed by conventional *Berseem* (159).

The new forage crops will be good for grazing/or feeding small ruminants!

Optimizing Seeding Rate in Kernza and Comparing its Forage Production Potential with Perennial Rye and in Mixture with Alfalfa:

- Optimum seed rate of *Kernza* was found to be 90 seeds/m^2. At this rate, it produced 4,943 kg/ha dry matter yield, which was 2,300 kg higher than dry matter yield of *Ace 1* (perennial rye), 982 kg/ha than *alfalfa + Ace 1* (80:20) mixture and 801 kg/ha than *alfalfa + Kernza* (80:20) mixture.
- In the first cut, protein content was higher in *alfalfa + Kernza* (80:20) mixture (17.0 %) than in *alfalfa + Ace 1* (80:20) mixture (15.5 %), and pure stands of *Kernza* (12.8-14.3 % at seed rates of 70-130 seeds/m^2) and *Ace 1* (13.3 %). In the second cut, the trend was same; though the protein content increased to 20.1-21.2 % in alfalfa cereals mixtures, because of drastic reduction in the cereals stand after the first cut!
- In the first cut, RFV was higher with alfalfa perennial cereals mixtures (136-138) than *Kernza* (93-100) or Ace 1 (91) alone. In the second cut, RFV came down to 122 in alfalfa + *Kernza* and 129 in *alfalfa + Ace 1*, but remained unaffected in the pure stands of *Kerneza* and *Ace 1*.

Comparative performance of Kernza, Perennial Rye, RR Alfalfa, Conventional Alfalfa, Sainfoin and Chicory:

- Dry matter yield from the two cuts ranged from 735 kg/ha (*Chicory*) to 5,101 kg/ha (RR Alfalfa variety *WL319HQ*).
- *WL319HQ* yield was significantly higher than the two other RR Alfalfa varieties (*WL354HQ* and *Mission HVX*), but not significantly higher than the two conventional alfalfa varieties (*135* and *Instinct*).
- Among the perennial cereals, *Kernza* recorded higher dry matter yield (4,518 kg/ha) than *Ace 1 Rye* (3,179 kg/ha).
- Two *Sainfoin* varieties had poor yields; *Mountview* 2,259 kg/ha and *Glenview* 1,967 kg/ha.
- Protein content in the first cut was in the order of *Choice Chicory > Alfalfa > Ace 1 > Kernza > Sainfoin*. In the second cut, *Alfalfa* had the highest protein content, and *Glenview (Sainfoin)* exceeded *Mountview/Kernza* in protein content by 2.5/2.3 % points and *Ace 1* by 3.8 % points.
- RFV was highest in *WL319HQ* in the 1st (164) as well as in the 2nd cut (136)!

Considering the dry matter yield, protein content and RFV, WL319HQ Roundup Ready Alfalfa could be recommended for cultivation on farms!

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