

Alternate forages for dairy cattle

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I was assigned this topic by TBSCIA to speak on at the 2008 Spring Conference. I wasn't told alternative to which crop; alfalfa or barley/within barley or corn or grasses/within grasses? It was interesting to evaluate various forage options that could be added to/or alternate current on-farm forage options:

Annual grasses: Michael Hunter of Cornell University, who has done a considerable research on **teff**, promotes teff as alternate forage for dairy cattle. It was adapted to a wide range of soils, tolerated dry soil conditions, emerged quickly and produced good yields of high quality forage (7.5 t/ha; 13-14 % protein, and 69.3% NDFd) in a short period of time. It could be harvested as both a high moisture forage crop and ensiled, baled as dry hay or grazed. At TBARS, during 2008, it produced a dry matter yield of 3.7 tonne/ha with 14% protein. In 2009 (cold and dry spring), it didn't even emerge after seeding. It likes heat; a constraint for our area. **Italian ryegrass** yield at TBARS in 2008 was only ~20 % of that from silage corn.

Perennial grasses: Multi year results from TBARS showed that orchardgrass, bromegrass, and timothy produced higher dry matter yield than reed canarygrass and tall/or meadow fescue. Bromegrass has been the best in producing high yield of second cut. Timothy (and also reed canarygrass) had done better in the warm years and orchardgrass had yielded better in the cold years. It is therefore advisable to grow more than one species of grass either singly or in mixture.

Winter cereals: Winter wheat/rye/triticale harvested at boot stage (late spring/early summer) could produce a dry matter yield of up to 6 tonne/ha with nearly as much protein as alfalfa, and leave enough room for production of another short duration annual forage crop such as oats. For maximum forage dry matter yield (~10 tonne/ha) however, these crops should be harvested three weeks after the boot stage. This will enable producers to raise turnips or radishes for pasturing after harvesting winter cereals. Timely seeded winter cereals could also be pastured in the fall. A 70 days winter barley crop at TBARS produced 2 tonnes dry matter/ha with ~28% protein.

Intercropping winter wheat with spring barley (both seeded in spring at about 75% of normal population): The practice could produce high quality forage without compromising much on forage yield. Winter wheat seeded in spring doesn't head and has a lot of foliage that contributes to increased protein content and palatability of the forage. It provides a grazing opportunity after the initial crop is harvested, or alternatively, the winter wheat may be left to grow for feed quality grain production. An innovative Thunder Bay producer who grew winter wheat and spring barley together last season seems to be impressed with the feed quality from this intercropping system.

Spring cereals/millets: Triticale and wheat have given higher forage dry matter production than barley at TBARS in the past. For milk cows, wheat would likely provide the most palatable silage, followed by oats, then barley (US work)! Canadian work indicated that amongst wheat, barley and oats, oats had the poorest quality for silage. Barley has the best but it should be left until mid dough stage (at 60- 65% moisture); the grain will increase the yield and maintain the forage quality. At TBARS, two row barley varieties, such as Bentley, CDC Coalition and Millhouse (hullless food barley) produced higher forage yield (over 7 tonne/ha; 11-12% protein) than the six row barley varieties. Millets (Proso/or Foxtail) with ~80% of forage yield potential of barley, have reportedly given some positive results when fed to lactating cows.

Intercropping barley and peas: Seeding peas with barley is considered good for dairy rations. Seed a normal rate of peas and 1/4 rate of barley. At higher seed rates, barley will "choke out" the peas. Yield from barley + peas is reported to be similar to barley alone but quality will be very high. Cut when the bottom pods are filled and may even start to turn. At this time the barley should be in the mid dough stage. We have tried intercropping barley with peas for grain production at TBARS. Average of two years' results indicated that barley + pea intercropping in alternate rows @ 20 or 40 Kg N/ha produced somewhat higher grain yield than barley alone and resulted in an economy of 20-40 kg N/ha. The economic value of produce from barley + pea would be more than that from barley alone.

Legumes other than alfalfa: At TBARS, RR **Soybeans** varieties harvested at green pod stage (bottom couple of leaves turning yellow) could yield 7-8 tonne dry matter yield with nearly or higher than 15% protein. **OAC Prudence**, a conventional soybean, produced 8.5 tonnes dry matter/ha with 13% protein. Soybean may have some digestibility issues and could be high in NDF. With the high price of RR soybeans it may be hard to justify growing soybeans for forage. Many of the approved soybean herbicides are limited to soybeans grown for grain and may not be allowed on soybeans grown for forage.

Berseem clover, a multi cut annual legume, might be an alternative to alfalfa. Seeded on May 20, it produced 6 tonne dry matter yield/ha (as much as from oats) with 21% protein content in all the cuts at TBARS during 2008. Forage yield from berseem and oats could be improved by a tonne/ha by their intercropping (berseem 100%, oats 50%); protein content will be higher than oats, but much lower than berseem alone. A Thunder Bay producer that grew berseem last year (not a good year for berseem due to dry spring) could take two cuts from it! Berseem may be seeded on/around May 10 and offers a good opportunity for grazing/or turning over as a green manure after the two cuts.

Forage yield from **galega**, a perennial legume from the Scandinavian countries, couldn't match with that from alfalfa, though at times it appeared to have a better forage quality. The crop stand in our trial wasn't all that good. We therefore need to try the crop at higher seed rates than before (20 kg/ha; galega seed size is much bigger than alfalfa).

Barley vs. Corn: Corn takes longer time to mature and has higher production cost as compared to barley, though it has the rotational advantage, and cows love to eat it! Silage corn should yield at least 12.5 tonne/ha to be economically competitive with barely. We can get up to 16 tonne/ha yield from corn at Thunder Bay. Barley has high % protein and nutrients content (except Mg/Mn-more or less the same as in corn), low ADF and NDF, as compared to corn, but equals corn in energy levels. And barley is a sure crop in areas with short growing seasons.

Fenugreek - another option: Research at Lethbridge has found that one cut of fenugreek is equivalent in dry matter to two cuts of alfalfa, and that fenugreek silage has a similar nutrient content to alfalfa silage with superior digestibility, potentially reducing costs of protein supplementation. Medicinal value of fenugreek has the potential to make the cattle industry less dependent on synthetic steroids (hormones to promote rapid weight gain in cattle) that can contaminate water resources. We will evaluate fenugreek along with alfalfa and berseem at TBARS during 2010!

Thunder Bay producers may wish to try berseem or berseem + oats, winter wheat + spring barley, barley + peas, and two row barley varieties for silage production, keeping the six row barley for feed grain production. Peas at grain yield of 6 tonne/ha or higher offer good opportunity to replace both barley and soybean for feed production, at least partially, if not fully.

TBSCIA = Thunder Bay Soil and Crop Improvement Association
TBARS = Thunder Bay Agricultural Research Station

Presented at the 5th Atlantic Canada Agronomy Workshop, Rodd Charlottetown Hotel, Charlottetown, January 19-20, 2010, and Published in Northwest Link, February 2010, Pages 9-10!