Volume 5 Issue 1
February 2001

2000 Premier's Award of Excellence

Agriculture & Agri-Food Canada/Alberta Agriculture, Food & Rural Development

Western Forage/Beef Group

Cicer Milkvetch - Is There A Place For It In Your Grazing Plans?

The quantity and quality of pasture available often limits fall grazing. Graziers are seeking new options in their management systems to maintain stock on pastures into the late fall. Cicer milkvetch may be an option that hasn't been considered.

Field trials were conducted near Melfort, Saskatchewan to compare seasonal changes in yield and nutritional qulaity of Oxley cicer milkvetch and Rambler alfalfa.

Duplicate tests were established in two consecutive years. The plots were established a year prior to sampling on May 15, June 15, July 1, August 1, September 1 and October 1 for the next six years in each test. Samples were taken from previously unharvested areas in the plot each time. This provided a picture of seasonal changes in yield and quality of the two species; not total yield potential as regrowth was not a consideration.

Cicer milkvetch peak yields were similar to or higher than those of alfalfa in 7 out of 10 harvest years. Alfalfa yield was generally higher in the season (June-July) while cicer milkvetch had higher late-season yields (August-September). You must remember that what was harvested each month was the growth from the beginning of the season. Other studies have shown that cicer milkvetch has slow regrowth, and if cut during the summer will produce less forage in the fall than alfalfa. So for fall grazing it is best to stockpile cicer milkvetch over the summer months for use in the fall.

Cow/calf production on the prairies is based on forage produced in the Aspen Parkland and Boreal Transition ecoregions. These two regions, dominated by Aspen trees when uncultivated, cover approximately 53% of the total land area of the three prairie provinces.

A postive attribute of cicer milkvetch was its retention of leaf material. Cicer milkvetch had a higher percentage of leaf material than alfalfa at most harvests. The difference in leaf material between cicer milkvetch and alfalfa increased from about 20% more leaf dry weight in August to over 50% in October.

As would be expected, the quality of both species declined from May to October as the forage matured. Over the experimental years, crude protein declined with each harvest from 22 to 35% in May to 11-18% in October. The crude protein levels of cicer milkvetch in late fall were to 2% to 3% higher than those for alfalfa. Both

Weather and Site Info for the 6 Years of the Study

Soil: Melfort silty clay (chernozem); 9.5% organic matter; pH 6.0
Avg. precipitation (mm): 344 mm
Avg. date of first killing frost (<-3°C): Sept. 19

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species maintained crude protein content above 11%, meeting protein requirements of gestating heifers and mature cows. The crude protein contents could also support a rate of gain of 0.7 kg/day for calves over 180 kg.

The estimated dry matter digestibility of alfalfa declined in the fall to a level that would limit animal intake to about 2% of body weight compared to an intake of over 3% for cicer at that time. Thus, in the fall, the dry matter digestibility and the potential intake of the milkvetch is sufficient to meet the energy requirements of pregnant cows. On the other hand, the estimated intake of 2% of body weight and the dry matter digestibility for alfalfa at that time would not be sufficient to meet the requirements of suckled cows.

Cicer milkvetch can provide quality, non-bloating, late-season pasture if established and managed correctly.

Stockpiled cicer milkvetch is another tool for graziers to consider in their pasture systems.

For additional information call Dr. Heather Loeppky at 403-782-8025.

The Pro's and Con's of using Cicer Milkvetch or Alfalfa as Pasture Species

	Cicer Milkvetch		Alfalfa	
	Positives	Negatives	Positives	Negatives
Adaptation	* More tolerant of alkaline or acidic soils * Medium salt tolerance * More winter hardy			* Intolerant of acid soils (below pH 6.0) * Less salt tolerant
Establishment		* Slower * Very hard seeds, requires scarification, even then not all seeds will germinate in the year seeded * Seeds slightly larger than alfalfa because of germination characteristics * Seeding rate pure stand recommendation for 6" rows - 13 lb/acre	* Faster * Seeding rate pure stand recommendation for 6" rows - 8 lb/acre	
Longevity	* Usually long-lived once established			
Yield Potential		* Lower	* Higher	
Spring Growth		* Slower	* Faster	
Regrowth		* Slower, tends to retain leaves and remain green in in the fall	* Faster regrowth but loses leaves in the fall	
Drought tolerance	* Tolerant but does best in areas receiving more than 16" of precipitation		* Tolerant	
Bloat	* Non-bloating			* Bloating
Insect resistance	* Less susceptible to alfalfa weevil, potato leaf-hoppers and pea aphids			* More susceptible to alfalfa weevil, potato leafhoppers and pea aphids
Pocket Gophers	* Less attractive			* More attractive
Alternate Uses	* Creeping rhizomotous roots make it a good soil stabilizer * Good for reclamation and erosion control			

So .... What Do I Seed?

Duane McCartney, Forage Beef Management Systems
Western Forage/Beef Group and AAFC
S. Bittman, AAFC, Agassiz, BC and W.F. Nuttall, AAFC, Saskatoon, SK

Three experiments were conducted at the Melfort Research Station in northeastern Saskatchewan to determine the effects of cutting management systems on pasture and hay cultivar yields. The trials were conducted on Gray Wooded Luvisolic Waitville loam soil and on deep black chernozemic Melfort silty clay soils.

Prior to seeding, 11N-22P kg/ha nitrogen and phosphate fertilizer was incorporated in to the soil. Thereafter 50 kg of N and 13 kg of P per ha were broadcast each year. On the second Gray Wooded site, 10 kg of sulphur per ha was also broadcast on a yearly basis.

The yield of grass herbage grown on the Gray Wooded sites was increased by approximately 174% over the five year period with the application of N and P fertilizer (Table 1).

The two-cut system which corresponds to typical harvesting for hay produced a significantly higher yield of 2.19 tonnes per ha compared with the four-cut system (simulating grazing) yield of 1.70 tonnes over the five year period. Meadow bromegrass, crested wheatgrass, smooth bromegrass, intermediate wheatgrass and pubescent wheatgrass ranked highest in yield overall.

On the Deep Black soil site the two-cut system produced higher herbage yields than the four-cut system, 7.08 tonnes per ha vs. 5.28 tonnes per ha. The yields on the Black soil site were substantially higher than on the Gray Wooded sites. The Black Chernozemic soils are generally more fertile with higher soil moisture holding capacity than the Gray Wooded Luvisolic soils. Intermediate wheatgrass, crested wheatgrass and Altai wild ryegrass ranked highest in yield but smooth bromegrass and Russian wild ryegrass were not significantly lower yielding than crested wheatgrass and Altai wild ryegrass. Over the five year period the yield under the two-cut system for bluegrass was 0.69 tonnes per ha higher than the four-cut system whereas the two-cut system of Parkway crested wheatgrass was 3.24 tonnes per ha higher than the four-cut system. At a third site in later years on Gray Wooded soils, Parkway crested

Table 1. The effect of management on forage DM yields

Tonne/ha* Factor	Gray Wooded 1981-1985	Black Soils 1981-1985	Gray Wooded 1987-1993
Cutting			
Hay (2 cut)	2.19	7.08	2.87
Simulated grazing (4 cut)	1.70	5.28	1.93
Fertilizer			
Unfertilized	1.42		
Fertilizer	2.47		
Species,cultivars			
Altai ryegrass *Prairieland*	1.67c	6.95a	2.64a
Smooth bromegrass *Magna*	2.21a	7.02a	
Creeping red fescue Boreal	1.61c	4.63e	
Crested wheatgrass *Parkway*	2.38a	7.12a	2.78a
Intermediate wheatgrass *Chief*	2.08a	7.28a	
Kentucky bluegrass *Troy*	1.56c	3.47f	
Meadow bromegrass *Regar*	2.36a	6.24c	2.53a
Pubescent wheatgrass *Greenleaf*	2.09a	5.94d	
Russian wildryegrass *Swift*	1.43c	6.78a	1.90a
Green needlegrass *Lodorm*	2.05a	6.37c	2.46a

Forage yields with the same letter within sites are not significantly different.

* Tonne/ha x 0.9 = lb/acre

wheatgrass, Prairieland Altai wildryegrass and Regar meadow bromegrass were significantly higher in yield than Swift Russian wild rye grass. Lodorm green needlegrass was not significantly lower in yield than Regar meadow bromegrass.

In Table 2 at the second Gray Wooded site, Parkway crested wheatgrass ranked highest in yield but wasn't significantly higher than Hycrest crested wheatgrass, Fleet and Regar meadow bromegrass, Clarke intermediate wheatgrass and Carlton and Baylor smooth bromegrass. The two-cut system yield of Carlton smooth bromegrass was 1.08 tonnes per ha greater than the four-cut system. The dry matter yields of the four-cut system were only 67.6% of the two-cut system on average. Yields of cultivars under the four-cut system generally followed a similar ranking as the two-cut system.

In summary, meadow bromegrass and pubescent wheatgrass which ranked among the highest yielding cultivars on the Gray Wooded site dropped to an intermediate yield level under the more fertile and higher soil moisture holding capacity and organic matter soils of the Deep Black Chernozemic soils. In contrast Altai wild ryegrass ranked among the highest yield on the Black Soils but was intermediate in ranking on the Gray Wooded.

Lower yields of meadow bromegrass relative to smooth bromegrass averaged over two and four-cut harvest systems were observed on the fertile Black Soils. On the Gray Wooded site, smooth bromegrass was not significantly higher in herbage yield than meadow bromegrass under the two-cut system. As well at this site, meadow bromegrass was not significantly higher in herbage yield than smooth bromegrass under the four-cut system. (It should be noted that in areas where bluegrass is an invader, altai or Russian wildryegrass do not establish well.)

The relatively poor yield of meadow bromegrass compared with smooth bromegrass on the richer Black soils at Melfort was unexpected based on the general view that meadow bromegrass is less drought tolerant than smooth bromegrass.

In conclusion several cultivars are suitable for hay or pasture production in northeastern Saskatchewan soils. Depending upon local traditional rainfall patterns, this information can now be used by forage producers in other related areas of the Aspen Parkland in choosing suitable species for their farms.

For more information contact Duane McCartney at 403-782-8104.

Table 2. Effect of simulated grazing management on grass species yield over years at gray wooded pasture area (tonne/ac)

Species, Cultivars	Dry Matter Yield 1987-1993 2 cut	4 cut
Smooth bromegrass		
Baylor	2.91a	1.90a
Carlton	3.12a	2.04a
Crested wheatgrass		
Ephraim	2.33b	1.56b
Hycrest	3.26a	1.83a
Parkway	3.47a	2.08a
Intermediate wheatgrass		
Clarke	2.87a	2.13a
Meadow bromegrass		
Fleet	3.09a	2.14a
Regar	2.84a	2.23a
Russian wildryegrass		
Swift	2.21b	1.59b
Green needlegrass		
Lodorm	2.91a	2.02a
Northern wheatgrass		
Elbee	2.75a	2.05a
Wheatgrass hybrid		
RS1	2.66b	1.68b
Western wheatgrass		
Walsh	2.49b	1.74a
Means	2.84	1.92

Yields with the letter "a" are not significantly different from Carlton smooth bromegrass.

Coming Events

Manitoba Grazing School

December 3 & 4, 2001
Winnipeg, MB
Contact Fraser Stewart @ 204-268-6014 for more information

Western Canadian Forage & Grazing Conference: Opportunities and Profit

December 6 & 7, 2001
Saskatoon, SK
Contact Zoheir Abouguendia @ 306-651-4182 for more information

Kura Clover - Could It Have Potential in Alberta?

Kura clover may have potential as a long lived pasture legume in Alberta and for that reason it is being tested by members of the WFBG. Kura clover (*Trifolium ambiguum*) is sometimes called Caucasian clover. The names relate to its region of origin; i.e. the Kura River in Georgia and the Caucasian Mountains which are both north and east of the Black Sea.

Kura clover has been tested some in the USA where it has shown good longevity and satisfactory yield for pasture. The WFBG has included this legume in simulated grazing trials with frequent clipping, and initial results are encouraging. After two production years kura and red clover have given the greatest yield compared to several varieties of alfalfa, alsike clover, white clover, cicer milkvetch and birdsfoot trefoil. After the two years of testing the stand density of kura clover is higher than that of red clover.

Attributes of kura clover include the following:

- It is long lived. This still has to be proven for Alberta conditions.

- It is very tolerant of grazing. It has good tolerance to trampling and grazing although it does need adequate rest between grazings. The presence of rhizomes may explain why it is more tolerant to grazing than most legumes.

- Creeping rhizomes also enable it to thicken in a stand. It has a much branched tap root up to 60 cm. deep. Kura clover has a very high root to shoot ratio.

- The plants are very leafy resulting in high digestibility and protein content.

- To date it has had high yield in test plots located near Bentley (gray wooded soil) and Lacombe (black soil) which have been clipped 4 or 5 times per year for two years.

Disadvantages:

- Kura clover is reported to be very slow establishing needing two years to establish. Slow establishment is thought to be related to the growth of rhizomes and a large root system. At Lacombe and Bentley it established vigorously and we began clipping it frequently on the second year (i.e. 12 months following seeding). It should be noted that we did seed it alone without nurse crops into good seed beds and provided P, K and S fertilizer according to soil test recommendations. Our best stands were seeded in late June when soil was warm (but not too warm) for fast emergence. A July seeding was not as good due to hot, dry weather. Weed control was good.

- It is reported to be about equal to other common clovers, such as white, red and alsike in causing bloat.

- Seed is expected to be more costly than other clovers. This is normally the case with new crops due to initial seed shortages. However, initial kura clover varieties are not expected to be as high in seed yield as other common clovers. This is due to the production of fewer blossoms. This will affect seed cost.

Special Requirements:

- Kura clover should have Trifolium Special 3 inoculant (kura clover is in rhizobia sub-group H). This is different from that of other common clovers. It nodulates very well with the correct inoculant.

- Acid tolerance is a bit uncertain but it will probably have decreased yield at pH values below about 6.0.

The next steps in determining the suitability of kura clover to Alberta conditions are to see how it survives our trials this winter and to test it in a farm pasture comparison under actual grazing conditions. Its use in mixtures needs to be observed.

Kura clover did ok in a mixture demo with Kentucky bluegrass at Bentley and Lacombe although that is the only mixture we tried. Tests in other locations indicate it should do ok with various grasses. Kura clover has been reported to be slow establishing so that aggressive grasses (e.g. orchardgrass) could dominate the stand if Kura clover starts slowly.

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We're on the Web!
www.agric.gov.ab.ca/crops/forage/wfbg/index.html

Western Forage/Beef Group's Mission Statement:
"To improve the profitability and sustainability of the forage-based beef industry through development, integration and transfer of knowledge and technology"

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