Increasing pasture productivity and profit potential

Growing and finishing cattle on pasture rather than on conserved forage (e.g. hay, silage) can be more profitable due to lower cost per kilogram of weight gain in livestock. To ensure higher profitable, pasture productivity must be optimized which can be accomplished using a grass/legume species mix when establishing or renovating a pasture.

Factors influencing pasture productivity
Soil nitrogen is an important factor influencing pasture productivity. Without being supplemented, soil nitrogen declines as a forage stand ages due to constant harvest (through grazing or haying) or because it is tied up in unutilized/dead leaves and stems or other organic material. Replenishing the lost nitrogen helps the forage system remain sustainable.

Pasture productivity is also affected by late season declines in palatability and nutrition. The challenge here is that weight gain may become only marginal or unprofitable as forage nutrition and palatability decreases. Finding forage species that hold their quality after seed set are therefore of great interest to producers and would be a valuable component in a grazing system.

Using legumes to supplement soil nitrogen levels
Legumes, when grown with forage grasses, can contribute to soil nitrogen through biological nitrogen fixation. Alfalfa (*Medicago sativa* L.) is often the legume of choice to provide this biological nitrogen and thereby increase forage yield and quality. However, there is an increased risk of frothy pasture bloat associated with alfalfa. In addition, poor alfalfa persistence under grazing conditions limits the longevity of seeded grass/alfalfa pastures.

Sainfoin (*Onobrychis vicifolia* Scop.) is a legume with comparable nutrition and yield to alfalfa but does not cause bloat. It can be grown in place of or in combination with alfalfa in a grass-legume or legume-legume mix pastures.

Legumes for grass/legume pasture mixes
Sainfoin, because of good leaf persistence after seed set (better than alfalfa), is a good choice. A new sainfoin introduction from Agriculture and Agri-Food Canada (AAFC), ‘AC Mountainview’, stands apart from earlier Canadian sainfoin cultivars with higher forage biomass production, rapid regrowth and good persistence in mixtures with alfalfa.
Despite its potential to cause bloat, alfalfa should not be disregarded because it has many excellent forage quality characteristics. ‘AC Yellowhead’ alfalfa (*M. sativa* ssp. *falcate*), another AAFC introduction, is a good choice because of its extreme cold tolerance, increased winter survival and good persistence in pasture systems and single-cut hay fields.

**Grasses for grass/legume pasture mixes**

Russian wildrye (*Psathyrostachys junceus*), well suited to semi-arid conditions, maintains its forage quality even when mature. Because of its high nitrogen requirements, it benefits from growing in mixture with legumes. ‘Tom’, a recent introduction from AAFC, is an improvement over older varieties with good seedling vigour and high yields.

Hybrid bromegrass (*Bromus inermis* x *riparius*) combines the best of each of its parent species (meadow and smooth bromegrass) with higher feed quality than either, higher yielding than meadow bromegrass and better regrowth than smooth bromegrass. ‘AC Success’ is a recent AAFC introduction.

**Ongoing research**

Starting in 2015, Dr. Alan Iwaasa, grazing management and ruminant nutrition researcher with Agriculture and Agri-Food Canada (AAFC), will collaborate in a study evaluating novel legume and grass mix options.

The study will involve AAFC researchers in Swift Current, Saskatchewan, and Lethbridge, Alberta in collaboration with the Western Beef Development Centre in Lanigan, Saskatchewan. The species to be used in this study include those described above (i.e. ‘AC Mountainview’ sainfoin, ‘AC Yellowhead’ alfalfa, ‘Tom’ Russian wildrye and ‘AC Success’ hybrid bromegrass). Mixtures will be grazed by yearling steers in August and September.

Forage yield and quality; beef cattle weight gain; and sainfoin and alfalfa persistence in mixtures with Russian wild ryegrass and hybrid brome will be evaluated starting in 2015; results will be available by 2018. Funding for this project is through the Saskatchewan Agriculture Development Fund.

**Grasses to consider for grass/legume mixtures**

- **‘Tom’ Russian wildrye**: improved seedling vigour, high yielding, does very well when mixed with a legume, holds quality for late season grazing
- **‘AC Success’ hybrid bromegrass**: higher yielding than meadow brome; better regrowth and less aggressive creeping nature than smooth brome

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_A good time to rejuvenate/reseed pastures to increase pasture productivity for improved livestock weight gains is when beef prices are up_