



RESEARCH FACTS

RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

Beef Science Cluster



Forage Seed Mixtures for Different Regions of Canada

Project Title:

Performance of Forage Mixtures under a Beef Grazing Management System in the Northern Latitudes

Researchers:

Dr. Yousef Papadopoulos papadopoulosy@agr.gc.ca

Dr. Yousef Papadopoulos (AAFC Truro), Dr. John Duynisveld (AAFC Nappan), Dr. Robert Berthiaume (AAFC Lennoxville), Dr. Carole Lafreniere (AAFC Kapuskasing), Drs. Gilles Belanger and Gaetan Tremblay (AAFC Quebec City), Dr. Alan Fredeen (Nova Scotia Agricultural College) Dr. Hushton Block and Dr. Shannon Scott (AAFC Brandon), Bill Thomas (Agri-Point International), Les Halliday (PEIDA), and Sherry Fillmore (AAFC Kentville)

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Background:

Although most forage production in Canada is comprised of species mixtures, there is limited research on identifying the best species to include within pasture mixtures. Recommended forage mixtures usually contain a maximum of three species, including both grasses and legumes. Most forage breeders evaluate and develop cultivars for hay management systems. Recent research concludes that the best hay types are not necessarily the best pasture types and vice versa. Furthermore, although new grass species have been recommended in Canada, their performance when grown with other species under grazing has not yet been determined. An assessment of mixtures with these new species is essential to improve the long-term sustainability of beef production. Managing pastures for greater diversity of plant species could increase forage yield and stabilize yield. In Atlantic Canada, a recent study shows that more complex mixtures result in more resilient pastures that are ultimately more productive. These studies confirm the benefits of using complex mixtures in pastures but further research is needed to identify the most suitable species for the diverse conditions of eastern Canada and for different grazing management strategies.

Objective:

1. To determine the best combination of a single grass species with one legume species (white clover, birdsfoot trefoil, or grazing-type alfalfa); and
2. To compare four grass mixtures combined with two forage legumes (trefoil and grazing-type alfalfa) that form a set of 12 distinct mixtures.

What they did:

Simple mixtures: Pastures containing one of six grasses (timothy, Kentucky bluegrass, tall fescue, orchardgrass, meadow fescue, and meadow brome) and one of three legume (white clover, grazing alfalfa, and birdsfoot trefoil) were established at Nappan, NS, Lévis and Normandin, PQ, and Kapuskasing, ON, for a total of 18 simple forage mixtures. Three cultivars of each grass were established at Nappan. Forage yield and quality data were evaluated. Plots were grazed in Nova Scotia and Ontario and clipped in Québec.

Complex mixtures: Four grass mixtures were seeded with either birdsfoot trefoil or alfalfa at the same locations as above, with an additional site at Brandon, MB. The grass mixtures were

1. timothy, meadow fescue, reed canarygrass, and Kentucky bluegrass,
2. tall fescue, meadow brome, orchardgrass, and Kentucky bluegrass,
3. timothy, meadow fescue, and Kentucky bluegrass, and
4. tall fescue, meadow brome, reed canarygrass, and Kentucky bluegrass.

Each mixture was seeded with trefoil or alfalfa. Forage yield and quality were evaluated at all sites, and animal productivity was measured at Nappan, Kapuskasing, and Brandon. Plots were clipped at the Québec locations.

What they learned:

Simple mixtures: In each year, some simple mixtures were high yielding with good nutritive value, but the mixtures that combined high yield and high digestibility differed between the two grazing years. Simple mixtures of meadow fescue with any legume species, but especially with alfalfa, had the best combination of forage yield with a greater carbohydrate to protein ratio.

Complex mixtures: High yielding complex mixtures tended to be low in nutritive value, while low yielding complex mixtures tended to have high nutritive value. Unlike the simple mixtures, no complex mixtures have been identified with both high yielding with good nutritive value. Complex mixtures with alfalfa, timothy and meadow fescue provided the best combination of a high carbohydrate:protein ratio with greater yield. This confirms that forage mixture selection can help to optimize the energy:protein ratio with higher forage yield.

In the first grazing season, cattle grazed on trefoil pastures had numerically greater animal weight gain per hectare. In the second production year, the alfalfa treatment had numerically greater gains per hectare. Many of the grazing sites experienced a period of extended dry weather in the second production year, which may have affected results.

What it means:

Results from the first two years indicate that mixture selection can be used to optimize the energy:protein ratio with forage yield and animal gain. However, results to date have not identified complex mixtures that provide high yield, nutritive value, and animal performance. This [trial will be continued for five more years](#) to gather additional yield, nutrient content and grazing performance data as the pasture compositions stabilize.



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For More Information Contact:

Beef Cattle Research Council

#180, 6815 - 8th St. NE

Calgary, AB T2E 7H7

Tel: (403) 275-8558 Fax: (403) 274-5686

info@beefresearch.ca

For More Information Visit:

www.beefresearch.ca

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