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FORAGE TECHNICAL BULLETIN

#2012-01

Effects of summer pastures with and without alfalfa on cow-calf productivity

Introduction

Sustainability of the beef sector is dependent on being profitable while meeting public demand for environmental stewardship. Cow-calf producers continually assess their management systems to ensure efficient use of available feed and other resources, to promote animal health and performance, and to reduce production costs. Manitoba has an abundance of natural grasslands and marginal land suited to growing forages in support of cow-calf production. Manitoba cattle operations use both native and seeded pastures for grazing, and the proportionate use of native or unimproved pasture (77%) has been higher than seeded pastures for all regions in the province except the Northwest (Small and McCaughey, 1999). Incorporating alfalfa into grass pastures was reported to improve carrying capacity and meet the requirements of lactating beef cows at no additional cost (Kopp et al., 2003). This study evaluated the impact of alfalfa in summer grass pastures on cow body weight, body condition score and weaned calf production.

Animal management

The study was done at the Agriculture and Agri-Food Canada Research Centre in Brandon, Manitoba (Legesse et al., 2012). Summer pasture and animal data were collected over five production years (1998-2003) with British-Continental crossbred cows assigned to graze one type of summer pasture for the duration of the trial. Each production year began in June with 288 cow-calf pairs (including 76 first-calf cows) assigned to graze either alfalfa-grass or grass pastures until weaning. Grazing ended when available forage and regrowth potential could no longer support continued grazing pressure. In autumn after weaning, one half of the 240 pregnant cows were assigned to extended-grazing of stockpiled pasture and swathed annual crops, and the other half were assigned to one of three diets fed in drylot: hay, straw/barley[1], and silage/straw[2,3,4]. The average start and end dates of winter (extended) grazing were September 30 and December 31, respectively. Cows were fed common diets between weaning and winter feeding system, and between pre-calving and summer grazing. All cattle were synchronized for artificial insemination on a target day, which was designated Day 0. All cattle were inseminated on Day 0, and turned out to pasture treatments, with breeding bulls introduced two days later. The bulls were removed from pasture after 40 days resulting in a February to April calving season. Cows were culled for failure to breed,

[1](70% oat straw:30% steam-rolled barley grain, dry matter (DM) basis)

[2] (40% barley silage:60% oat straw, DM basis)

[3] Effects of winter feeding strategies on cow-calf body weight gains are reported in Forage Technical Bulletin #2012-02.

[4]Effects of summer pasture and winter feeding strategies on reproductive performance are reported in Forage Technical Bulletin #2012-03.

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udder problems, calf loss, or low calf weaning weight. The herdsmen who identified cows to be culled did not know to which treatments cows had been assigned in order to prevent biasing culling based on treatment. Calves received no creep feed, but no effort was made to prevent them from consuming hay or pasture. Calf body weight was measured at birth, turnout to summer pastures and at weaning. Cow body condition score (1 = emaciated to 9 = obese) and body weight were measured at pasture turnout (breeding), weaning (early gestation), on entry to (mid-gestation) and return from (late gestation) winter feeding treatments.

Pasture management

Nine pastures each of alfalfa-grass and grass were used in the study and grazed in rotation. The average start and end dates of summer grazing were June 8 and September 15, respectively. Measurement of area grazed and clippings on entry and exit for forage disappearance rates were used to estimate total forage dry matter (DM) removed (DM disappearance). Carrying capacities of summer pasture areas were calculated in Cow Grazing Days per acre using the following formula:

Cow Grazing Days per acre =
(Number of cows × number of days)/
(Number of acres grazed in each field)

Nutrient composition of the forages in the summer pastures

Alfalfa-grass pastures contained 21%, 22%, 23%, 25% and 18 % alfalfa in Years 1998, 1999, 2000, 2001 and 2002. The differences in nutrient composition between the two types of pastures (Table 1) were reflective of the inclusion of alfalfa in the alfalfa-grass pastures.

Alfalfa-grass pasture had higher crude protein, calcium, potassium and magnesium than grass pastures whereas neutral detergent fibre concentrations were lower for alfalfa-grass than grass pastures indicating higher forage quality from alfalfa-grass pasture treatments.

Table 1. The effects of alfalfa on the average area grazed, dry matter (DM) disappearance and nutrient composition (per lb DM) of summer pastures for cow-calf production.

	Summer pasture	
Item	Alfalfa-grass	Grass
Area grazed (acres)	22.2*a*	23.7*b*
DM disappearance (lb/head/day)	46.7	45.6
Crude protein (%)	15.9*a*	15.2*b*
Acid detergent fibre (%)	35.1	35.2
Neutral detergent fibre (%)	56.8*a*	61.0*b*
Total Digestible Nutrients (TDN; %)	60.9	61.1
Calcium (%)	0.74*a*	0.44*b*
Phosphorus (%)	3.2	3.1
Magnesium (%)	0.20*a*	0.17*b*
Potassium (%)	2.70*a*	2.58*b*

a,b Averages in a row without a common letter differ ($P < 0.05$).

Table 2. The effects of summer pasture on the performance of beef cows and their calves.

	Summer pasture	
	Alfalfa-grass	Grass
Cow body weight gain on pasture (lb)	55.1a	44.1b
Calf body weight gain on pasture (lb)	265a	256b
Cow body weight at weaning (lb)	1385a	1371b
Calf body weight at weaning (lb)	567a	556b
Cow body condition score at weaning	5.15	5.11

a,b Averages in a row without a common letter differ ($P < 0.05$).

Cow-Calf Performance

The body weight gains from pasture turnout to weaning and consequently the body weights at weaning were greater for alfalfa-grass than grass pastures (Table 2) for both cows and calves, and the differences were most apparent in the first two production years (Figures 1 and 2) where no fertilizer application occurred and precipitation was abundant. Despite these differences in body weight, average body condition score of cows at weaning was similar among summer pastures (Table 2).

Effects of summer pastures with and without alfalfa on cow-calf productivity

Figure 1. The body weight gain of cows from turnout to weaning.

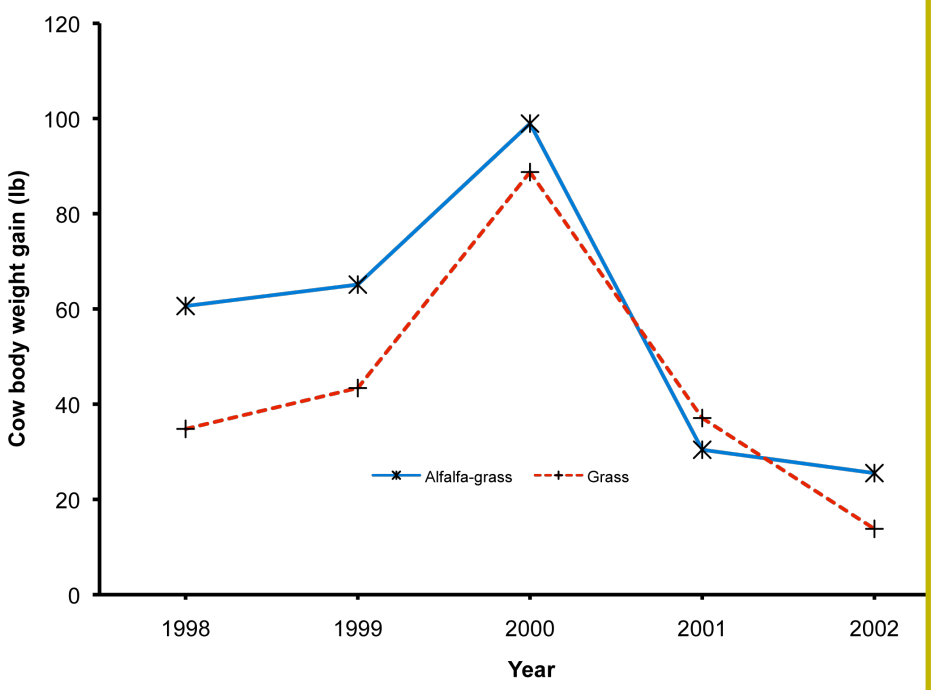
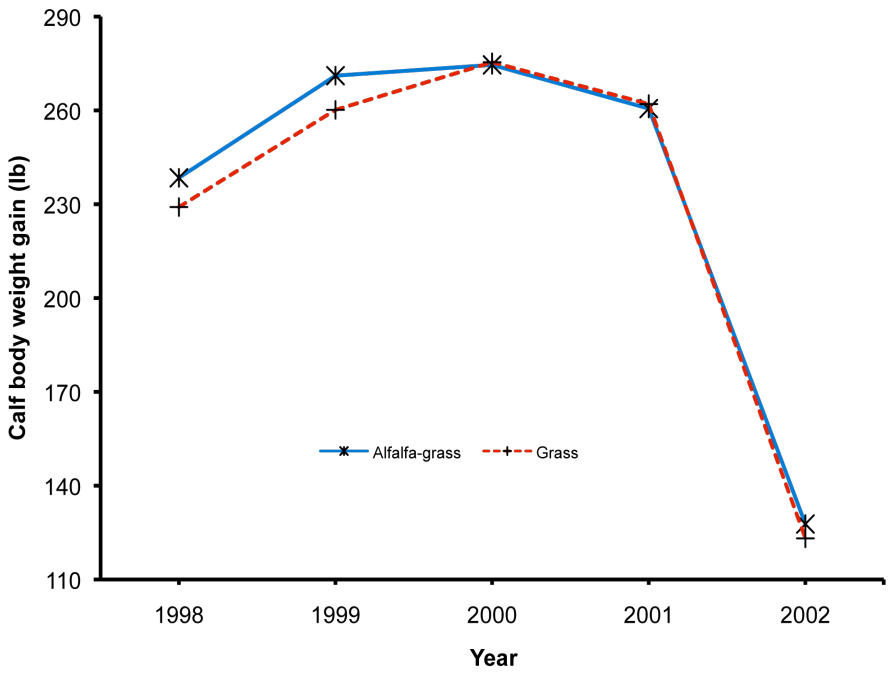


Figure 2. The body weight gain of calves from turnout to weaning.



The carrying capacity of summer pastures declined as spring/summer moisture conditions diminished (Figure 3). The dry condition may have influenced soil nutrient use by forages as well as forage utilization by cattle.

Carrying capacity (cow-days per acre) of alfalfa-grass pasture and grass pasture plotted with the monthly total precipitation (mm) received in the transition (FEB, MAR, APR and MAY) and summer pasture gazing (JUN, JUL, AUG and SEP) period across the production years.

Carrying capacity did not differ between alfalfa-grass and grass pastures from year 2000 (Figure 3). However, the grass pastures required more nitrogen fertilizer to achieve the comparable carrying capacity and forage quality as the alfalfa-grass pastures. Information on the effects of summer pastures on reproductive parameters is reported in a subsequent bulletin.

Conclusions

Cows on the alfalfa-grass pastures gained more weight, were heavier at weaning, and had better body condition score than the cows on grass pastures. The calves of cows on alfalfa-grass pastures had higher weight gains and weaning weight. These benefits did vary from year-to-year, because year-to-year differences in the amount of precipitation, especially

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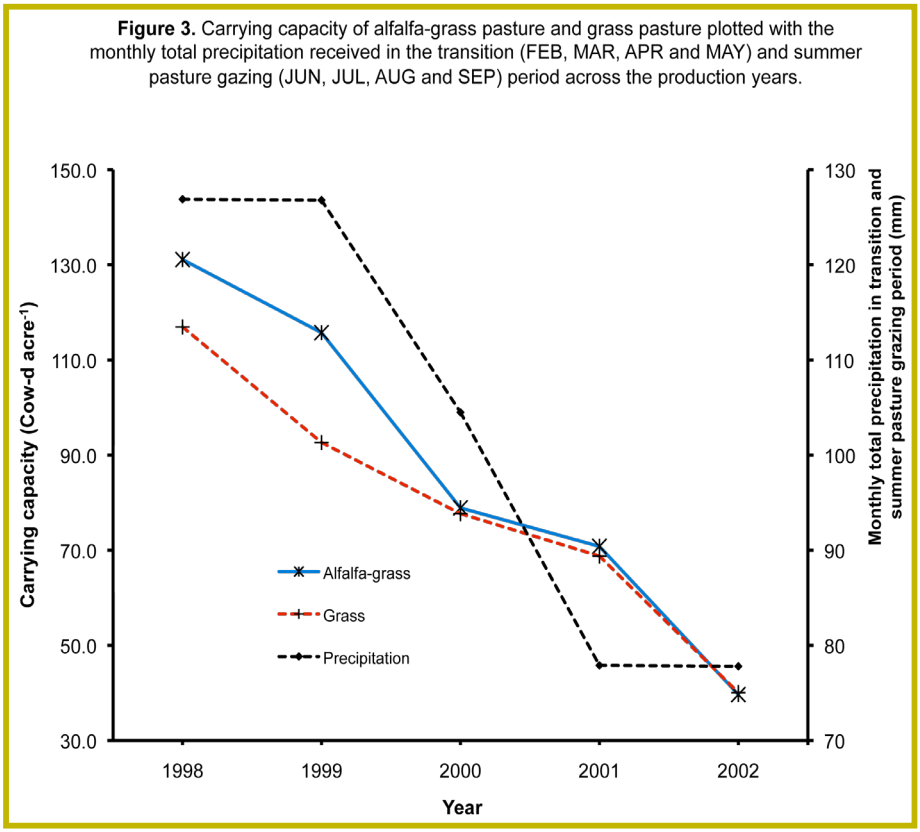

Figure 3. Carrying capacity of alfalfa-grass pasture and grass pasture plotted with the monthly total precipitation received in the transition (FEB, MAR, APR and MAY) and summer pasture gazing (JUN, JUL, AUG and SEP) period across the production years.

in the spring, caused year-to-year differences in the availability and quality of forages. The present study shows that incorporating alfalfa into summer pastures is an effective means to increase beef cow-calf productivity in western Canada. Further analysis is underway to determine the effects of introducing alfalfa into grass pastures on profitability of cow-calf operations.

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This publication is a series of three published in March of 2012. For more information contact:
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