

Effect of Rapeseed Inclusion in Late-Summer Planted Oats Pasture on Growing Performance of Beef Steers

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Summary with Implications

Fall cover crops have been shown to be an effective way to background calves into the winter. An oat monoculture was planted in late summer at 100 lb/ac and compared to oats planted at 50 lb/ac with rapeseed included at 3 lb/ac. Initial forage yield was not affected by the inclusion of rapeseed with fall oat. Calf gain tended to be greater and cost of gain was decreased when rapeseed was included. Including rapeseed in late summer planted oats may be beneficial for producers who want to graze growing calves in the fall.

Introduction

Producers in Nebraska have significant opportunity to grow spring born calves during the fall and early winter on forages, such as cover crops, produced on cropland. Oats and brassicas (turnips and radishes) planted in mid to late-August after winter wheat harvest or early corn silage harvest have been shown to maintain quality from November through January (2018 *Nebraska Beef Cattle Report*, pp. 60–62). The energy content of the oat and brassica remained high into January even though the forage appeared low in quality. The digestibility of the brassica was especially high and appeared to be more nutritionally similar to a concentrate than forage. Previous work has shown that energy supplementation on high quality forages such as wheat pasture can improve gain of growing calves. Therefore, the greater digestibility (i.e., energy) of the brassica may improve calf gain compared to grazing oats forage alone. Additionally, the seed costs for brassicas are lower than oats. The purpose of this study

was to evaluate the inclusion of a brassica (rapeseed) with late summer planted oats and the effect on forage yield, forage quality, and growing calf gain. We hypothesized that forage yield of the oats-rapeseed mix would be similar to the oats monoculture and that growing calf performance would be improved. Therefore, the decreased seed cost of the oats-rapeseed mix would be beneficial for producers grazing cover crops in the fall because the cost of gain would be reduced.

Procedure

This 2-year study was conducted at the US Meat Animal Research Center near Clay Center, Nebraska. Following corn silage harvest or alfalfa termination, three irrigated pivots (one in year 1 and two in year 2) were divided into four quarters. Pivots were planted on August 24 in yr 1 and August 31 and September 1 in yr 2. Two quarters from each pivot were planted with 100 lb/ac oat seed (*Avena sativa*; OAT) while the other two quarters were planted with 50 lb/ac oat seed and 3 lb/ac rapeseed (*Brassica napus*; MIX).

Pivots were grazed by one-hundred and twenty spring born cross-bred steers in year 1 and two-hundred and forty in year 2. Steers were weaned and placed into drylot on a corn silage based grower ration until late October where they were weighed in the morning prior to feeding. Steers were weighed and were stratified by initial BW (583 lb.; SEM= 8.4 in year 1 and 637 lb.; SEM =6.0 in year 2) and assigned to treatment and replicate (30 steers/ 30 acre quarter). Steers were turned out to graze on November 1 in year 1 and November 13 in year 2 and grazed until forage appeared to be limiting in one quarter, with approximately 3 inches of growth remaining. Steers grazed until February 7 in year 1 (99 days) and January 23 (71 days) in year 2. Steers were weighed the morning they were pulled off of pivots.

Forage quality and biomass samples were taken prior to grazing, monthly throughout the grazing period, and post grazing. Oat and rapeseed were clipped to ground level and immediately put on ice and froze for at least 24 hours before drying in a 60° C oven. Samples were ground to a 1 mm particle size through a Wiley mill. Nutrient analysis was conducted to evaluate organic matter (OM, % of DM), crude protein (CP, % of DM) and in-vitro organic matter digestibility (IVOMD, % of OM).

A partial budget analysis was conducted to evaluate the establishment costs of each forage treatment. Seed costs for OAT was \$25/ac while cost of seed for MIX was \$15.50. Seeding costs and fencing costs were the same for all pivots at \$15/ac and \$5/ac, respectively. Fertilizer and irrigation amounts were different among pivots and were charged using N cost of \$0.42 /lb N and \$4.23/acre-inch of irrigation. Pivot 1 in yr 1 was irrigated with 3.8 inches while pivots 2 and 3 in yr 2 received 2.6 inches. Pivot 1 had no fertilizer applied while pivot 2 received 15.6 lb N/ac and pivot 3 received 31.5 lb N/ac. Total costs per acre were estimated to be \$59.33/ac for OAT and \$54.83/ac for MIX.

Results

Initial yield did not differ ($P = 0.59$; SEM = 567; Table 1) among the OAT and MIX treatments with 3,371 and 3,221 lb/ac, respectively. However, post grazing biomass tended ($P = 0.09$; SEM=106 lb/ac) to be greater for the OAT (1,553 lb/ac) than MIX (1,317 lb/ac).

The initial proportion of the MIX was 73% oat and 27% rapeseed on a DM basis. Overall CP and IVOMD, for OAT was 12.9% and 68.7%. The overall rapeseed itself was $20.3 \pm 5.6\%$ CP and $73.9 \pm 11.4\%$ IVOMD. Including the rapeseed into the MIX increased ($P = 0.02$; SEM =0.71; Table 1) CP to 15.5% compared to OAT at 12.9%; although not significant, IVOMD tended

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Table 1. Forage Yield and Quality

	OAT	MIX	SEM ¹	P-value
Pre-grazing yield, lb/ac	3,371	3,221	567	0.59
Post-grazing yield, lb/ac	1,553	1,317	106	0.09
IVOMD ² , % OM	68.7	71.4	0.01	0.07
CP, % DM	12.9	15.5	0.71	0.02

¹Standard error of the least square mean

²IVOMD = In vitro organic matter digestibility a proxy for energy content

Table 2. Growing performance

	OAT	MIX	SEM ¹	P-value
Initial BW, lb	608	611	5.83	0.49
ADG, lb	1.95	2.11	0.08	0.07
Cost of gain ² \$/lb	0.38	0.33	0.03	0.01

¹Standard error of the least square mean

²Cost of gain includes seed costs at \$25 /ac for oats or \$15.50/ac for mix, plus seeding costs at \$15/ac, fertilizer \$6.59/ac, irrigation \$12.73/ac and fencing at \$5/ac. No yardage cost was included.

to be greater ($P = 0.07$; $SEM = 0.01$) for the MIX treatment compared to OAT at 71.4% and 68.7%, respectively. Initial BW did not differ ($P = 0.49$) among the OAT or MIX treatments. Steers tended ($P = 0.07$; $SEM = 0.08$; Table 2) to gain less grazing OAT (1.95

lb/d) than MIX (2.11 lb/d). The slightly lesser gain and greater seed cost resulted in the cost of gain being greater ($P = 0.01$; $SEM = 0.03$; Table 2) for OAT (\$0.38/lb) than MIX (\$0.33/lb).

Conclusion

Planting rapeseed at 3 lb/ac in with 50 lb/ac of oats seed in late summer produced yield in November that was similar to an oat monoculture planted at 100 lb/ac. Including rapeseed in with late summer planted oats increased the CP content and tended to increase the digestibility of the available forage which appeared to result in greater gain for calves grazing the oat-rapeseed mix. Additionally, seed cost was less for the oat-rapeseed mix resulting in a \$0.05/lb decrease in cost of gain compared to oats alone. Including rapeseed in with late summer planted oats may be beneficial for producers who want to graze growing calves into the fall.

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