

## FIELD PEA HAY AND GRAIN FOR GROWING BEEF HEIFERS - PROGRESS REPORT -

(Presented at the NDSU Cow/Calf Conference in Bismarck, December 5, 1998)

[W.W. Poland](#), [P.M. Carr](#) and [L.J. Tisor](#)

**Portions of this material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 96-34216-2539**

*There is increased interest in Northern Great Plains for utilizing field pea as a feedstuff for livestock. These data suggest that oat/pea intercropped hay has an energy content similar to oat hay and that pea forage or grain can be used to replace supplemental protein sources in growing heifer diets.*

### Research Summary

Two feeding experiments were used to evaluate the feeding value of field pea forage and grain in growing beef heifers. In Exp 1, four pens of heifer calves were assigned randomly to one of two dietary treatments. Dietary treatments included either oat and mixed hay or oat/pea intercropped hay. Diets were formulated to contain 10.3% crude protein and were fed for 63 d. Neither body weights nor body condition score were affected by dietary treatment. Although heifers fed oat/pea hay consumed more feed, average daily gain and feed efficiency (gain/feed) were not different between dietary treatments. In Exp 2, heifer calves were blocked by weight, allotted randomly by block into 12 feedlot pens, and assigned one of four dietary treatments. Dietary treatments were formulated to contain 12.4% crude protein. In addition to a lower quality grass hay, dietary treatments contained either oat or oat/pea intercropped hay. A third and fourth treatment included alfalfa hay or pea grain as a replacement for the soybean meal in the oat hay treatment. Heifers were fed for 84 d. There was a tendency for final body weight to be affected by dietary treatment; however, average daily gain was not affected by dietary treatment. Dry matter intake

and feed efficiency were not affected by dietary treatment. These data suggest that oat/pea intercropped hay is readily consumed and has an energy content similar to oat hay. Additionally, pea forage or grain can be used to replace other more traditional protein supplements (e.g. soybean meal, alfalfa hay) in growing beef heifer diets.

## Introduction

There is a renewed interest in the use of pulses in crop rotations in the Northern Great Plains. Field pea (*Pisum sativum*) is one such pulse that has received considerable interest as a food, feed and forage production. Much of the forage interest has focused on cereal-pea intercropping where the pea is included to increase the value of cereal forage. There is limited data regarding the feeding value of intercropped compared to straight cereal forage and whether enhanced protein concentrations in intercropped hay can be used to offset supplemental protein needs in beef operations. The objectives of this study were to determine the feeding value of oat-pea intercropped hay compared to oat hay and to determine whether a pea component in the diet can be used to replace other supplemental protein sources.

## Materials and Methods

*Experiment 1.* Eighty, crossbred heifer calves were randomly allotted into 4 pens (20 heifers/pen). Pens were then assigned one of two dietary treatments ([Table 1](#)). Diets were formulated to contain 10.3% crude protein. Dietary treatments included either oat and mixed hay or oat/pea intercropped hay. Heifers were weighed at the beginning and end of the feeding period. Body condition scores were recorded at the end of the feeding period. Heifers were fed for 63 d. Feed was delivered daily and feed refusals were recorded weekly. Intake was calculated as the difference between cumulative feed delivery and refusal.

*Experiment 2.* Ninety-six heifer calves were blocked by weight and allotted within block into 12 feedlot pens. Four dietary treatments ([Table 1](#)) were formulated to contain 12.4% CP. In addition to a lower quality grass hay, dietary treatments contained either oat or oat/pea intercropped hay. A third and fourth treatment included alfalfa hay or pea grain as a replacement for the soybean meal in the oat hay treatment. Heifer weights and feed disappearance were recorded as in Exp 1, while body condition was recorded at the beginning and end of the experiment. Heifers were fed for 84 days. Similar dietary treatments will be used in a separate feeding experiment utilizing heifer calves in

1999.

## Results And Discussion ([Table 2](#))

*Experiment 1.* There were no differences in initial ( $P=.38$ ) or final ( $P=.61$ ) body weight or final body condition score ( $P=.67$ ). Although heifers fed oat-pea intercrop hay consumed more feed ( $P<.03$ ), average daily gain ( $P=.51$ ) and feed efficiency (gain/feed;  $P=.74$ ) were not different due to dietary treatment. It required approximately 12.5 lbs of feed to produce a lb of gain regardless of dietary composition.

*Experiment 2.* Initial body weight ( $P=.75$ ) and condition score ( $P=.71$ ), final condition score ( $P=.30$ ), dry matter intake ( $P=.57$ ), and feed efficiency ( $P=.25$ ) were not affected by dietary treatment. Although final body weight ( $P=.08$ ) tended to be influenced by dietary treatment, average daily gain ( $P=.24$ ) was also not affected by dietary treatment. It required approximately 18 lbs of feed to produce a lb of gain in this experiment.

## Conclusions

Field pea forage and grain can be used quite successfully in growing heifer diets. These data suggest that oat/pea intercropped hay is readily consumed and has an energy content similar to oat hay. Furthermore, pea forage or grain can be used to replace other more traditional supplements (e.g. soybean meal, alfalfa) when diets are balanced for crude protein.

Table 1. Diet composition for oat and oat-pea hay heifer feeding studies.						
	Experiment 1		Experiment 2			
	OAT <sup>a</sup>	O/P	OAT	O/P	ALF	PEA
Ingredients						
Oat hay	43.5	-	37.0	-	35.8	37.2
Oat-pea hay		54.9	-	37.5	-	-

Mixed hay	11.9	-	-	-	14.6	-
Grass hay	-	-	37.8	37.8	30.0	38.0
Corn silage	31.1	31.2	-	-	-	-
Corn grain	10.4	10.6	18.9	19.1	18.6	10.7
Soybean meal	-	-	5.3	4.6	-	-
Pea grain	-	-	-	-	-	13.1
Supplement <sup>b</sup>	2.5	2.6	.6	.6	.6	.6
Salt	0.6	0.6	.4	.4	.4	.4
Composition						
Crude protein, %DM	10.4	10.3				
<sup>a</sup> OAT, O/P, ALF and PEA indicate dietary treatments that contained oat, oat/pea intercropped or mixed (primarily alfalfa) hay or field pea grain, respectively. <sup>b</sup> In Exp 1; Vigortone Feedlot No. 411B, Vigortone Ag Products, Inc., Cedar Rapids, IA. In Exp 2; limestone.						

Table 2. Animal performance for oat and oat-pea hay heifer feeding studies.								
	Experiment 1			Experiment 2				
	OAT <sup>a</sup>	O/P	SE	OAT	O/P	ALF	PEA	SE
Weights, lb								
Initial	651.4	663.7	7.7	792.0	801.2	800.4	793.5	7.3

Final <sup>b</sup>	806.8	810.2	4.0	887.1 <sup>w</sup>	902.0 <sup>x</sup>	897.8 <sup>w<sup>x</sup></sup>	901.8 <sup>x</sup>	3.6
Daily gain	2.47	2.33	.13	1.13	1.20	1.16	1.29	.05
Body condition								
Initial	-	-	-	6.5	6.5	6.5	6.4	.08
Final	6.6	6.8	.2	6.6	6.8	6.8	6.8	.06
DMI <sup>cd</sup> , lb/d	29.6 <sup>y</sup>	30.5 <sup>z</sup>	.11	19.1	19.1	19.3	19.1	.09
Efficiency								
Gain/feed	.08	.08	.004	.06	.06	.06	.07	.003
Feed/gain	12.9	13.4	-	18.0	16.7	20.2	17.1	-
<p><sup>a</sup> See note in table 1.</p> <p><sup>b</sup> Final weight tends to differ between treatments in Exp 2 (P=.08). <sup>w,x</sup> Means lacking common superscript differ (P&lt;.05).</p> <p><sup>c</sup> Dry matter intake.</p> <p><sup>d</sup> DMI differs between treatments in Exp 1 (P&lt;.03). <sup>y,z</sup> Means lacking common superscript differ (P&lt;.03).</p>								

[Back to 1999 Research Reports Table of Contents](#)

[Back to Research Reports](#)

[Back to Dickinson Research Extension Center \(http://www.ag.ndsu.nodak.edu/dickinso/\)](http://www.ag.ndsu.nodak.edu/dickinso/)

[Email: drec@ndsuent.nodak.edu](mailto:drec@ndsuent.nodak.edu)