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# Economics of Field Pea Supplementation for Cattle Grazing Crested Wheatgrass

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## Summary with Implications

*Heifers grazing crested wheat grass were supplemented either field peas or dried distillers grains plus solubles (DDGS) at 0.4% or 0.8% of body weight. Heifers supplemented with field peas had 10% lower daily gain compared to their DDGS supplemented counterparts. The decision to supplement field peas for producers depends on the price at which field peas can be acquired, as well as the distance that DDGS has to be hauled in order to be utilized. Field peas are a viable option in western Nebraska as a supplement for grazing cattle when DDGS is unavailable or field peas are in excess and can be obtained below the human consumption and pet food market price.*

## Introduction

Field peas, grown in rotation with wheat in western Nebraska, offer nitrogen fixation, weed control, pest control, and other benefits to crops that follow them in a rotational growing system. However, the human consumption market and the pet food industry, both of which are markets for field peas produced in the western part of Nebraska, quickly become saturated due to the slow processing procedure. Producers growing these peas are forced to either store their commodity, sell them at a discounted price, or find a way to utilize them in their own operation when markets are saturated. Field peas are a high crude protein (CP) feed (23–26% CP) that is approximately 40% rumen undegradable protein (RUP). Distillers grains plus solubles (DDGS) is a popular protein supplement in regions of Nebraska

where ethanol plants are abundant. However, DDGS often have to be shipped several hundred miles to be used as a protein supplement in western Nebraska, whereas field peas are locally available. The value of field peas in cattle diets has been evaluated in finishing diets when replacing corn, but little work has been done evaluating field peas as a protein supplement for growing cattle on grass. Also, the value of field peas as a supplement is largely unknown and needs to be evaluated. Therefore, the objectives of this study were to determine the value of field peas as a supplement to grazing cattle, and to determine a pricing mechanism relative to DDGS.

## Procedure

A two year grazing trial was conducted at the High Plains Ag Lab (HPAL) near Sidney, NE that utilized a total of 226 yearling heifers. The first year was conducted during the summer of 2016 and utilized 112 heifers [body weight (BW) = 647, standard deviation (SD) = 76 lbs] grazing from May 20 through September 19. Year 2 was conducted during the summer of 2017 and utilized 114 heifers (BW = 674, SD = 36 lbs) that grazed from May 23 through September 7. The trial was set up in a 2x2 factorial design with supplement level and supplement type being the two factors. Cattle were blocked into a light, medium, and heavy body weight. Treatments included field peas or DDGS supplemented daily at either 0.4% or 0.8% of BW. Weekly supplement amounts were prorated for 6 days of delivery and fed in bunks. Cattle were rotated every two weeks in order to remove any effect of pasture on performance. Initial BW was calculated by averaging a 2 day initial weight, and supplement level was determined based on this weight. Interim weight was collected during the middle of the trial in order to adjust the supplement amount for the remainder of the trial. Ending BW was calculated by averaging 2 day weights off of grass as well. Each treatment

was replicated 6 times (3/yr) over the 2 year study. Pasture was the experimental unit and block and year were treated as fixed effects. Effects of weight block and year were not significant ( $P \geq 0.26$ ) and were removed from the model. Average daily gain (ADG) was calculated based on initial and ending BW and economics were determined based on ADG. The economic analysis was calculated by using the percent change in the performance (ADG) of the different treatments of heifers.

## Results

There was no interaction between type and level of supplement (Figure 1;  $P = 0.27$ ). Level of supplement was not statistically significant ( $P = 0.20$ ), cattle fed field peas at 0.4 or 0.8% of BW gained 2.13 and 2.15 lbs/d, respectively. Cattle fed DDGS gained 2.25 and 2.51 lbs/d for the 0.4 and 0.8% of BW levels, respectively. There was a significant difference in ADG due to type of supplement ( $P = 0.03$ ). Field pea supplemented heifers had 10% lower ADG compared to DDGS supplemented heifers at 2.14 and 2.38 lbs/d respectively.

## Economic Analysis

Economically, the difference in heifer performance means that if corn is priced at or \$124.58/ ton of dry matter (DM), and DDGS is priced similar to corn, a producer could pay \$112.13/ ton DM, or \$2.89/ bu, for field peas. Depending on the price of corn (Table 1) the price a producer can afford to pay for field peas will vary when DDGS is priced similar to the corn. Currently field peas are entering human consumption markets at \$6.50/bu. However, the price per bushel calculated above does not include the trucking costs of either the DDGS or the field peas. Assuming DDGS is being hauled at \$3/loaded mile and peas do not require any trucking, the economics of supplementing using peas becomes much more relevant. If a producer is paying for

**Table 1. Economic value of field peas compared to dried distillers grains plus solubles (DDGS)**

Corn \$/bu (56 lb)	DDGS <sup>1</sup> \$/ton DM	Field Pea \$/bu (60 lb) <sup>2</sup>
3.00	124.58	2.89
3.50	145.35	3.38
4.00	166.11	3.86
4.50	186.88	4.34
5.00	207.64	4.82

<sup>1</sup>DDGS = dry distillers grains plus solubles; prices shown are equivalent to corn price

<sup>2</sup>Equivalent price for field peas given a 10% reduction in ADG compared to DDGS

distillers that is priced equally to \$3.00/bu corn they could only afford to haul their distillers approximately 250 miles at \$3.00/loaded mile before it became more economical to feed locally sourced field peas.

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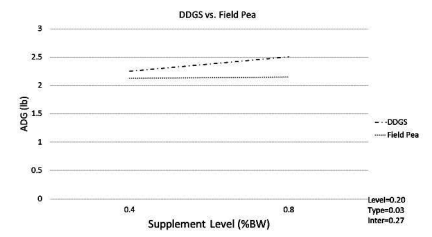


Figure 1. Average daily gain (ADG) of growing heifers supplemented with 0.4 or 0.8% of body weight with distillers grains plus solubles (DDGS) or field peas