

THE FEEDING VALUE OF FIELD PEAS

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Introduction

Livestock producers have many feed choices in North Dakota. Increasing acreage and the availability of feed peas plus the positive research and producer experiences bode well for the future of field pea grain as a feed. The most frequently asked question is what are respective feeds worth, especially field pea grain. North Dakota lacks cattle numbers to utilize all the feed grains and co-products produced in the state, a situation that creates a buyers market. Most co-products are good protein sources as the starch component has been removed for flour, pasta, ethanol or other end product. Before deciding to use one feed or another, one must weigh the pros and cons of the particular feeds. Factors include the nutritional needs of the respective animals, feed on hand or home grown, distance to source, moisture content, availability throughout the year, shelf life, but most importantly, price. Feeds should reflect a value for their cost and feeds with the greatest value should demand the greatest prices. Producers are at an advantage if they can purchase high value feeds for less than equivalent price based on nutrient value.

Materials and Methods

Price per Bushel Basis

Field pea grain weighs 60 lbs. per bushel in comparison to 56 lbs. for corn, 48 lbs. for barley and 36 lbs. for oats. Most other commodities are sold on a price per ton basis. This measure is used as a method of trade and does not reflect nutritional value for the dollar. Pricing all feeds on a hundred-weight basis would simplify comparison.

Replacement Mix

A simple way of comparing the price of peas to corn and soybean meal is to calculate the proportion of corn and soybean meal it would take to equal the nutritional value of peas (Table 1). Assume corn is 89% TDN and 8.5% crude protein (common values from analysis) and soybean meal is 85% TDN and 46% crude protein (also common values). If field pea grain is 88% TDN and 25% crude protein, we would need 57.9 lbs. of corn and 42.1 lbs. of soybean meal to replace 100 lbs. of field pea grain. With corn at \$2.00 per bushel and soybean meal at \$200/ton, pea grain is worth \$3.77/ bushel (60 lbs.). Table 1, column 3, contains the pea value (per 60 lb. bushel) for this method of comparison. This method could be used to compare with other feeds as well, however, some feed combinations may not combine to achieve the same nutrient level as peas due to both being lower or higher in nutrient content than field pea grain.

Table 1. Estimated economic value of field pea grain in relation to corn and soybean meal using two methods of comparison.

Base Ingredients and Prices		Replacment Mix	Substitution Equation
Corn Price Per Bushel, \$	SBM Price Per Ton, \$	Pea Value Per Bushel, \$	Pea Value Per Bushel, \$
1.50	150	2.83	2.93
2.00	150	3.14	3.24
2.50	150	3.45	3.56
3.00	150	3.76	3.88
1.50	200	3.46	3.58
2.00	200	3.77	3.90
2.50	200	4.08	4.22
3.00	200	4.39	4.54
1.50	250	4.09	4.24
2.00	250	4.40	4.56
2.50	250	4.71	4.88
3.00	250	5.02	5.19

Note: The following nutrient values were used in making the above calculations.

	Field Peas	Corn	Soybean Meal
Crude Protein Content, %	25.00	8.50	46.00
Energy Value, TDN	88.00	88.00	86.00

Substitution Equation Basis

Knowing the protein and energy content is critical to determining nutritional value. Mineral content may add modestly to the value of a feed, as well. One must again determine the baseline feeds for comparison and use the respective nutrient contents plus other factors for this analysis. A substitution equation that equalizes value for feeds in question can be used (See Table 1, column 4). There are two methods of doing these calculations: 1) with a calculator or computer spreadsheet or 2) using a software package developed for this purpose. The software generally uses a substitution equation for the calculations as well and makes it easier to alter the baseline feeds. Column 4 is derived from the substitution equations done with a spreadsheet. The baseline feeds used in this comparison are corn and soybean meal with the same nutritional values as the replacement mix example.

Discussion

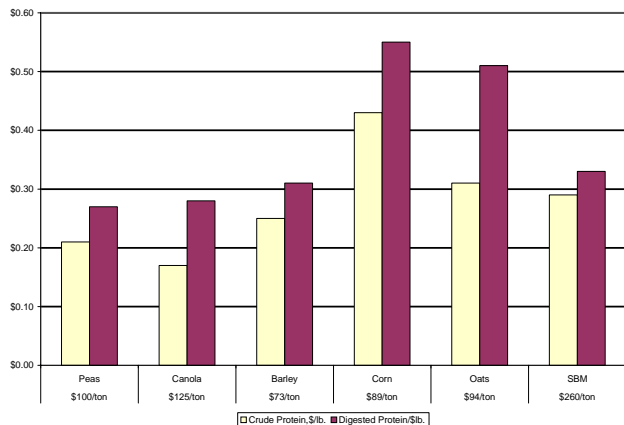
The buyer of peas should be in an advantageous position if he can purchase peas for less than the price in the respective columns when corn and soybean meal are at the given prices. The difference in current market price for feed peas and the value listed in Table 1 is often \$1.00 per bushel or more. This situation occurs when a new feed is available and there is a lack of awareness of nutritional value. Bear in mind that as the level of peas increases in the diet above where the protein requirements are met, the net value of peas decreases as energy is the only value being captured.

Market prices are dynamic, so a range of unit prices for both baseline commodities are provided. Typically prices will cycle together, so high priced corn occurs when soybean meal is in the high end of the range also. Prices between the values in the table can be determined by interpolation. Note that there are small differences in the calculation of the value of field pea grain from the two methods. This

is the result of subtle differences in the way nutrients are valued based on the pricing scale used and credit given for minerals by the software package.

The thorough digestibility of peas compared to some of the other commonly used feedstuffs may change their true economic value (see Figure 1). For example, the effective digestibility of peas is considered to be 88% (reference). Considering the price of peas at \$80/ton or \$2.40 /bushel, crude protein in peas cost \$.166 cents /lb. but at 88% digested, the cost of digestible protein is \$.203 / lb. If canola meal (36% crude protein) is priced at \$127/ton, the cost of crude protein is \$.180 /lb. but at a 62.5% digestibility, the cost of digestible protein is \$.28 cents/lb. of protein.

Figure 1. Relative cost per pound of crude protein vs. digestible protein in ruminant animals.



The prices on the chart are prices in western North Dakota on August 18, 2006. The prices may vary for these commodities at different locations with transportation added to the cost of the feedstuff.

The other factors to consider that are harder to evaluate in dollars and cents are the intrinsic properties of peas. Example, weaned calves fed peas start on feed faster and gain faster during the first few weeks on feed. (Anderson and Stoltenow, 2004; Anderson and Schoonmaker, 2005). Creep feed with peas at 33 to 67% of the formulation increased intake and gain (Anderson, 1999; Landblom and Poland, 2000). Finishing steers fed peas had increased juiciness and tenderness in the rib steaks (Karlín et al., 2006). Each of these results could be positive in net returns.

Peas are very palatable and digest very thoroughly, leading to increased intake and gain in some of the studies summarized in the NDSU publication “Field Pea Grain for Beef Cattle”, AS-1301. In every case, peas provided equal or improved performance of animals. This publication includes a discussion of several research areas and gives recommendations for feeding peas to all classes of beef cattle.

In conclusion, peas have been highly undervalued in the marketplace. The advantage is with the feeder when he can purchase peas for less than comparative value with other feeds based on nutrient content. Virtually all producers who have tried peas in their livestock diets see positive results and appreciate the nutrition, safety, and palatability of this new grain legume. Increasing acres will bring more peas to the feed market.

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