

# Preweaning Performance Enhanced with Peas



*Research studies indicate that calves benefit from peas in their diet.*

Story by  
**ED HAAG**

It is no secret to seasoned dairymen that feeding pea silage, planted as a nurse crop in new alfalfa stands, will stimulate a positive response in milk production. Now, thanks to researchers in North Dakota, commercial calf producers can also profit from this highly nutritious legume.

“Our research shows that creep-feeding dry-rolled peas to calves is an ideal way to optimize nutritional intake for greater weight gain,” says Vern Anderson, animal scientist at North Dakota State University’s (NDSU’s) Carrington Research Extension Center.

His initial interest in using peas in a beef ration emerged out of a

theory that the nutrient-dense feed can have a positive effect on weight gain. He thought this might be especially true with calves whose intake capacity is limited.

“Nutrient density is important in animals that consume smaller amounts of feed,” Anderson says. “The more nutrition we can get into them, the more likely they are to reach their genetic potential.”

## More peas, new markets

Anderson was also acutely aware of the explosion in the number of pea acres in his state during the last decade. Between 1991 and 2002 North Dakota dry pea production increased from 1,600 acres to 157,000 acres.

Since the inclusion of dry peas in the Federal Agricultural Loan

program in 2002, the number of North Dakota farm acres devoted to pea production has risen even more rapidly. Between 2004 and 2006 North Dakota pea acres increased from 317,000 to 580,000.

“Even in the late 1990s we saw that pea production was quickly outstripping the human consumption market,” Anderson recalls. “With the need for a locally-produced, protein-rich feed for our growing beef industry, peas seemed like a natural.”

He notes that feeding dry peas to livestock is not a new concept. Peas have been fed to cattle in Europe for centuries; and in some countries, such as Spain, peas are preferred over barley, corn and soybeans. In North America, dry peas have made recent inroads as poultry and swine feed, but prior to Anderson’s interest, no in-country research had been done to evaluate it as a beef feed.

“There was absolutely no information on feeding peas to beef cattle in the U.S., but the little research to come out of Europe showed a great deal of promise,” he recalls.

To confirm his suspicion that peas could play an important role as a beef feed in the Northern Plains

states, Anderson and his colleagues at the Carrington Research Center embarked in 1999 on a comprehensive, two-year study to determine the nutritional effect of adding various percentages of dry-rolled peas to a preweaned calf’s diet.

Subsequently, 128 cow-calf pairs were divided into four groups. One group was fed 100% wheat midds in the form of ¼-inch (in.) pellets; the second, a ration of 33% dry-rolled peas and 67% midds; a third, 67% dry-rolled peas, 37% midds; and a fourth, 100% dry-rolled peas.

“We wanted to examine all the possible combinations,” Anderson says. “It was important to determine the best ratios.”

## Conclusion backed by studies

Calves in the study were fed from a creep feeder on pasture, starting at 120 days. The calves also had access to milk from their dams and grass. Daily intake and weight gain were recorded on all calves, and after 56 days the data were evaluated.

Anderson found that feed intake proved directly proportional to the level of peas in the diet. For example, calves that were offered 100% midds consumed an average of 5.89 pounds (lb.) of creep feed per day, while calves offered 100% peas per day

**Table 1: Tips for creep-feeding peas**

- Consider using an ionophore such as Rumensin® when feeding peas. It enhances rumen digestion and helps control feed intake.
- Begin the creep-feeding regimen when calves are 120 days old or when pasture drops off and starts to affect milk production.
- More isn’t necessarily better. Those familiar with creep-feeding peas to calves recommend mixes that contain between 20% and 60% peas. With any mix containing more than 67% peas, feed efficiency drops off dramatically.
- Extensive research has shown that dry-rolled is the best way to feed peas.
- Because field peas are nutrient-dense, the equivalent feed value should be calculated based on respective nutrient content and not on volume. Often peas are mistakenly passed over as beef feed because their nutrient density is ignored by the prospective purchaser.
- Peas should be thoroughly mixed with ingredients in the ration. This will prevent calves from cherry-picking and offers optimum feed efficiency.

**Table 2: Comparison of nutrients in field peas vs. in other feedstuffs**

Item	Field peas*	Corn**	Barley**	Wheat midds**	Sunflower meal**	Canola meal**
Dry matter, %	89	89	89	89	92	82
TDN, %	87	90	88	80	65	69
NE <sub>g</sub> , Mcal/lb.	0.67	0.70	0.63	0.58	0.40	0.45
Crude protein, %	25.3	9.8	13.2	18.7	26.0	40.9
Calcium, %	0.15	0.03	0.05	0.17	0.45	0.70
Phosphorous, %	0.44	0.32	0.35	1.01	1.02	1.20
Potassium, %	1.13	0.44	0.57	1.81	1.27	1.37

\*NRC, 1984.

\*\*NRC, 1996.



Vern Anderson, NDSU animal scientist, with pea-fed Angus.

managed to eat an average of 8.72 lb. per day.

Weight gain was also proportional to the level of peas in the diet, but feed efficiency decreased markedly when the percentage of peas fed went above 67%. Calves that were fed 100% midds gained 2.82 lb. per day, while those that received 33% peas gained 3.11 lb. per day. The weight gains for calves that received 67% and 100% peas were the same, at 3.17 lb. per day.

“That tells us that at 100% there is more nutrition in the peas than the calves’ genetics can utilize,” Anderson says. “We can conclude the percentage of peas for optimum feed efficiency is between 33% and 67%.”

At the time of the study the cost of the midds was \$60 per ton, while the cost of the dry peas was \$2.20 per 60-lb. bushel (bu.). With an average price received for weaned calves of \$90 per hundredweight (cwt.), Anderson found that the additional weight gain attributed to the peas translated into a net return of \$5.20 per bu. on the 33%-pea mix, \$8.06 on the 67%-pea mix, and \$3.38 on 100% peas.

“What the data tells us is that peas work very well from an economic perspective when they are creep-fed to calves at levels of 67% or less,” he says.

### Palatability key to success

Anderson believes that an important attribute that gives peas an edge over other high-protein feeds is their palatability.

“Calves love it,” he says. “That’s why they will eat so much of it.”

He notes that the pea’s palatability is not only responsible for the superior weight gain he documented in his study but also for improved calf health. In a 2000 Colorado State University study, pea-fed cattle had a mortality rate of 0.75%, while the control group had a mortality rate of 6.75%. Anderson concludes that with a highly palatable feed such as peas, calves are more likely to have a stable fermentation pattern, which reduces the digestive disturbances that are responsible for a variation in feed intake.

He adds that this also applies to periods of severe stress, such as immediately after weaning. Research Anderson conducted in 2004 showed the inclusion of peas in a receiving ration affected overall calf performance. The 42-day study on 294 head showed that those calves that were fed peas in their ration consumed more than the control group, and that daily intake increased linearly with increasing pea levels.

### The right balance

Dewayne Siebrasse, beef nutritionist and operator of Cattle Cents Consulting Inc. of Aberdeen, S.D., agrees with Anderson’s assessment of peas as cattle feed. He has been a longtime proponent of feeding peas to calves and is actively working with commercial cow-calf operators to integrate the practice into their herds. In particular, he likes how pea protein is digested in the rumen.

*(Continued on page 128)*

**Table 3: Performance of beef cattle fed field peas or soybean meal as protein supplements in diets based on corn silage**

Trial	Cattle type	% peas	Gain ratio	Intake ratio	Feed efficiency ratio
1	Normandy	29	103	99	95
2	Normandy	26	101	103	104
3	Holstein cross	25	103	104	103
4	Charolais	23	100	102	100
5	Charolais	23	103	101	96
Mean			102	102	100

Adapted from Weiss and Raymond, 1989.

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“The field pea is six times more slowly digested in the rumen than soy meal,” Siebrasse says. “That means that when it is blended with something like distillers’ grains, a product with high levels of bypass protein, you get digestion going in the rumen and in the true stomach at the same time.”

Siebrasse adds that slow fermentation of starch and protein in the rumen is beneficial for growth of rumen microbes and has a positive influence on rumen pH and feed efficiency. Besides having a slower rumen fermentation rate than other feedgrains, Siebrasse supports Anderson’s view that dry peas offer an ideal balance of protein and energy for optimum digestibility.

He notes that dry peas work particularly well in conjunction with an ionophore rumen modifier such as Rumensin®. “Because peas are so palatable, some calves will overeat unless their intake is externally controlled,” Siebrasse says. “Rumensin controls that intake.”

**The future of peas as calf feed**

Kurt Braunwart, operator of ProGene Plant Research, Othello, Wash., is encouraged by the growing acceptance of peas by the cattle industry. He notes that there are now high-yielding winter and spring peas specifically developed for animal consumption. One such pea variety is Whistler.

“Because of the greenish-yellow seedcoat, Whistler is aimed at the feed market,” he says, adding that the Pacific Northwest, like the Northern Plains, is a feed-protein-deficient region.

Whistler has been developed for rainfall zones ranging from 12 to 28 in., and yields vary from 1,700 lb. per acre on re-crop ground to 3,400 lb. per acre on summer fallow.

An added incentive to bring new varieties of feed peas to the market, Braunwart says, is the important role peas are now playing in sustainable crop rotation systems. “Peas are now being direct-seeded in rotation with grains,” he explains. “Research clearly shows that peas grown before grain can help reduce the costs and increase the yields in the subsequent crop.”

Anderson believes that as crop developers such as Braunwart introduce more feed pea varieties adapted to specific growing regions, and as calf producers learn more about the benefits of feeding peas to their young livestock, the practice of growing peas specifically for cattle feed will increase in the northern tier states.

“This is an opportunity for the beef producer to raise his own protein in the Northern states and not have to import soybean products from the Midwest,” he says. “With cost of shipping rising, the time to use locally grown peas as an ingredient in calf feed has arrived.”