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**Beef Section**

**Dickinson Research Extension Center**
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# Evaluation of Intake Restricted Creep Diets Among Calves Grazing Western North Dakota Native Range

## Interim Progress Report

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## Introduction

Utilization of peas in livestock supplements was identified as an important research focus and priority among North Dakota field pea producers in a January 2000 survey. Development of novel uses for both new and existing crops, like field peas, was also identified as a research priority area by the USDA/CSREES Alternative Crops Program. Because of the large number of beef cows relative to other species, the state's cow/calf industry holds particular promise as a market for various field pea uses.

Nutrient requirements for nursing calves grazing native range during late summer and fall may not be met due to advancing forage maturity (Johnson et al., 1996). Creep feeding is commonly practiced by beef cattle producers to alleviate nutrient deficiencies in forages, increase weaning weight, and potentially to increase profit. Stroh et al. (2000) evaluated creep feed restriction and reported calves allowed free choice access to creep feed consumed 2.2 times more creep feed but growth due to supplementation was only slightly improved when compared to calves receiving a salt restricted creep diet. In a subsequent investigation at the DREC, Landblom et al. (2000) evaluated salt restricted creep diets formulated with 33, 67, and 100% peas in pea-wheat midd creep diets. A diet containing two-thirds peas and one-third wheat midds resulted in the most favorable creep to gain efficiency. Data from southeastern North Dakota (Loy et al., 1999) suggests

energy to be the first limiting nutrient for nursing calves grazing native range and that small amounts (1.5 Lb./hd/da) of supplement did not affect forage intake. Limited research information is available relating to the effect of creep feed on forage intake and interactions between declining forage quality and the level of protein/energy enhancement provided by supplemental creep feed in the nursing calf grazing native range.

The purpose of the present investigation is to evaluate the application of intake restricted high and low protein pea creep diets on growth and creep supplement efficiency, and to investigate changes in forage intake and nutrient supply from pea creep supplement as range condition changes over time from mid-summer to mid-fall. This progress report summarizes the first year's creep feeding data. In the second year of the study, creep feeding treatments will be repeated and rumen fistulated calves will be used to evaluate the effect of creep supplementation on forage intake and nutrient supply.

## Project Objectives

1. Using ruminally cannulated nursing calves, measure seasonal changes in nutritive value of native range, the effect of pea creep supplement on forage intake, ruminal digestion, and total tract digestibility.

2. Using cows and calves grazing western North Dakota native range, evaluate supplement protein level and level of salt restriction on pea creep feed intake, and the interrelationship between calf growth, and gain to creep efficiency with respect to advancing forage maturity.

3. Evaluate the economics of salt-restricted pea creep feed intake under varying ingredient and calf prices, beef price slides, forage maturities, labor availability and cost scenarios.

## Materials and Methods

Forty-eight Angus x Hereford cow/calf pairs nursing Angus, Red Angus, and Hereford sired calves are being used to evaluate pea/wheat midd and pea/soybean meal creep diets formulated to contain two levels of protein (19 and 33.5%) and two levels of salt restriction (8 and 16%) in a randomized complete block design. Cows and calves were put on replicated native pastures June 25 without creep feed. Three phase pelleted complete creep diets were fed from July 26 to November 6 (105 da) in portable creep feeders equipped with creep panels that allowed calves continuous access to creep feed but restricted cows. The creep feeding season was divided into three 35 day periods (Phase 1: July 25-Aug 29; Phase 2: Aug 30-Oct 3; Oct 4-Nov 7) . In the first 35 day period, creep feeds were fed without salt to insure the calves would locate the feeders and begin consuming creep feed aggressively. Salt was added to the creep diet formulations during the second and third phases. A schedule of salt restriction is shown in Table 1. Initially, 8% salt was added to all treatment formulations. At the end of phase two one of the groups continued to receive the 8% salt-limited creep (Pea-LS) and the other two study groups (Pea-HS and Pea-HiPro) received formulations prepared with 16% added salt. Creep diet formulations are shown in Table 2.

## Results

Growth, feed efficiency and economic efficiency are summarized in Table 3. Unsupplemented control calves gained 2.67 lbs/hd/da. Calves receiving creep grew faster than the unsupplemented control calves gaining 3.24, 3.10, and 2.95 lb/hd/da for the Pea-LS, Pea-HS, and Pea-HiPro, respectively. Average daily gain, total calf gain due to creep, creep/head/day, and creep to gain efficiency were 3.24, 59.1, 6.91, and 12.29; 3.10, 44.5, 4.15, and 9.8; 2.95, 29.0, 2.88, and 10.44 for the Pea-LS, Pea-HS, and Pea-HiPro, respectively. While preliminary, these data suggest energy rather than protein is the first limiting nutrient (Fig. 1). Economically, supplemental creep feeding did not yield positive returns. In an analysis of the first years results, creep diets were priced differentially based on ingredient composition and salt level. Average creep cost for the combined phases within treatment was $131.56, $134.92, and $185.42/Ton for the Pea-LS, Pea-HS, and Pea-HiPro, respectively. Using these values, creep feed cost/head totaled $47.77 for the Pea-LS, $29.43 for the Pea-HS, and $28.06 for the Pea-HiPro. Pricing the additional gain was conducted using actual feeder calf prices for October and November from the two livestock sales barns in Dickinson, North Dakota. Regression analysis of the seven sales occurring in October and November determined the seven week average price slide to be $7.261per cwt. Using the computed price slide and calf weaning weight, the value of added gain due to creep feeding was $12.18 for the Pea-LS, $17.65 for the Pea-HS, and $8.27 for the Pea-HiPro. Deducting creep feeding returns from the cost of creep feed within each treatment resulted in net losses of -$35.59 for the Pea-LS, -$11.78, and -$19.79 for the Pea-HiPro.

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## Literature Cited

**Johnson, J., J. Caton, C. Poland, and D. Kirby. 1996.** Influence of advancing season on intake, digestion, and dietary composition of cattle grazing mixed-grass prairie. In ND Cow/Calf Conference and Beef Cattle and Range Research Report, pp 19-30.

**Landblom, D.G., W.W. Poland, and G.P. Lardy. 2000.** Application of salt-limited pea/wheat midd creep diets in southwestern North Dakota. In ND Cow/Calf Conference and Beef Cattle and Range Research Report, pp 8-12.

**Loy, T. W., G. P. Lardy, M. L. Bauer, and J.S. Caton. 1999.** Determination of the first limiting nutrient for gain in nursing beef calves. In ND Cow/Calf Conference and Beef Cattle and Range Research Report, pp 3-4.

**Stroh, T. L., K. A. Ringwall, J. L. Nelson, K. J. Helmuth, and D.L. Landblom. 2000.** Evaluation of digestible fiber-based creep feed diets, 28-day complete pelleted starting feed performance, and final feedlot closeout. In Dickinson Research Extension Center Annual Report, Sec. 2, pp 65- 73.

**Table 1.** Salt intake restriction schedule.

| | Control | Pea-LS | Pea-HS | Pea-HiPro |
|---|---|---|---|---|
| Phase 1 (35 da)[a] | --- | No Salt | No Salt | No Salt |
| Phase 2 (35 da) | --- | 8% | 8% | 8% |
| Phase 3 (35 da) | --- | 8% | 16% | 16% |

[a] Thirty-five day adjustment period. Creep formulation without salt fed initially to allow calves adequate time to locate self feeders and begin consuming the experimental formulations.

**Table 2.** Experimental As Fed Pea/Wheat Midd Creep Diets (91% dry matter)

| | Pea Low Salt | | | Pea Hi Salt | | | Pea HI Protein | | |
|---|---|---|---|---|---|---|---|---|---|
| **Phase** | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** |
| **Salt Level** | **0** | **8%** | **8%** | **0** | **8%** | **16%** | **0** | **8%** | **16%** |
| Peas | 61.00 | 56.27 | 56.27 | 61.00 | 56.27 | 50.96 | 37.90 | 30.59 | 18.30 |
| Wheat Midds | 26.30 | 24.33 | 24.33 | 26.30 | 24.33 | 22.03 | 0 | 0 | 0 |
| Molasses | 5.88 | 5.88 | 5.88 | 5.88 | 5.88 | 5.88 | 5.87 | 5.87 | 5.87 |
| Limestone | 1.16 | 1.16 | 1.16 | 1.16 | 1.16 | 1.16 | 1.2 | 1.2 | 1.2 |
| Salt | 0 | 7.3 | 7.3 | 0 | 7.3 | 14.63 | 0 | 7.3 | 14.6 |
| Soybean Meal | 5.35 | 4.894 | 4.894 | 5.35 | 4.894 | 4.44 | 54.0 | 54 | 59 |
| Dical | .86 | .86 | .86 | .86 | .86 | .86 | 1.0 | 1.0 | 1.0 |
| Other[a] | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 |
| | 100.6 | 100.7 | 100.7 | 100.6 | 100.7 | 100 | 100 | 100 | 100 |

[a] Includes Trace mineral .018%. Vitamin E .018%. and Vitamin A. D .005%.

**Figure 1.** Creep feeding ADG .

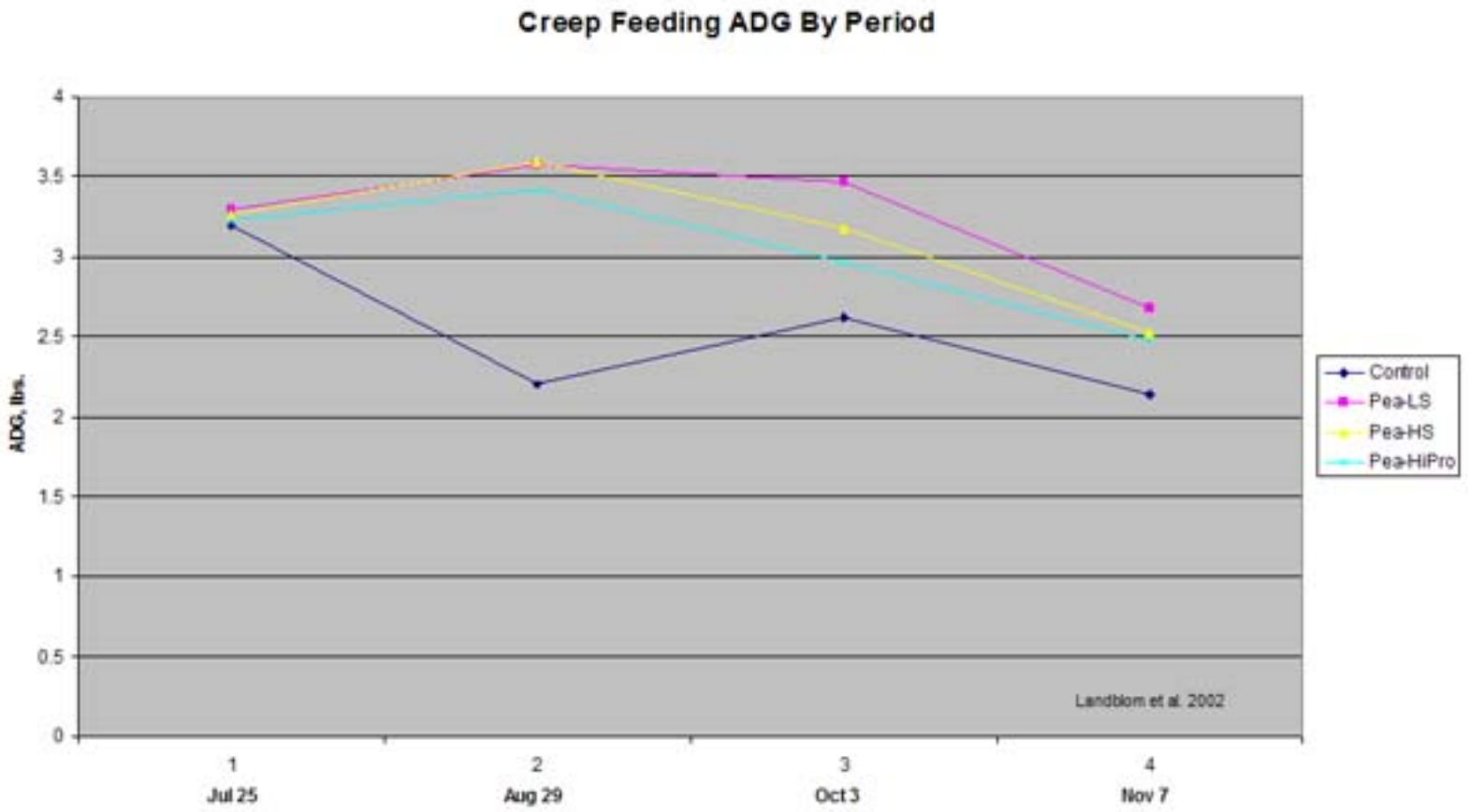


**Table 3.** Creep diet calf growth, efficiency, and economic analysis.

| Creep Growth | Control | Pea-LS | Pea-HS | Pea-HiPro |
|---|---|---|---|---|
| No Calves Fed | 12 | 12 | 12 | 12 |

| | | | | |
|---|---|---|---|---|
| Days Creep Fed | 0 | 105 | 105 | 105 |
| Calf Initial Wt, lb. | 414.83 | 394.58 | 426.83 | 411.83 |
| Calf Weaning Wt., lb. | 695.67 | 734.50 | 752.17 | 721.67 |
| Gain, lb. | 280.83 | 339.92 | 325.33 | 309.83 |
| ADG, lb. | 2.67 | 3.24 | 3.10 | 2.95 |
| **Creep Summary** | | | | |
| Creep/Head, lb. | 0 | 726.00 | 436.20 | 302.70 |
| Creep/Head/Day, lb. | 0 | 6.91 | 4.15 | 2.88 |
| Creep Gain/Head, lb. | 0 | 59.08 | 44.50 | 29.0 |
| AD Creep Gain, lb. | 0 | .56 | .42 | .28 |
| Creep:Gain, lb. | 0 | 12.29 | 9.80 | 10.44 |
| **Creep Economics** | | | | |
| Creep Cost/Cwt, $ | 0 | 6.58 | 5.75 | 9.27 |
| Creep Cost/Hd, $ | 0 | 47.77 | 29.43 | 29.06 |
| Weaning Wt., lb. | 695.67 | 734.50 | 752.17 | 721.67 |
| Calf Selling Price/Cwt.[a], $ | 86.22 | 83.32 | 82.09 | 84.26 |
| Calf Value, $ | 599.81 | 611.99 | 617.46 | 608.08 |
| Added Calf Value From Creep, | 0 | 12.18 | 17.65 | 8.27 |
| Net Return From Creep, $ | 0 | -35.59 | -11.78 | -19.79 |

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