**Gestating Cow Nutrition Important to Calf Performance**

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For many ranches, dry conditions this year resulted in thinner cows, limited and lower quality range, and potential winter feed shortages. A planned winter feeding program that is based on individual ranch resources will be critical to producing a healthy calf and a fertile cow next spring. Working with an Extension Educator or consulting nutritionist on a custom program for your ranch is important.

While working on a winter feed plan reducing costs always a consideration. However, gestation, especially late gestation, is not the time to be making cuts if it compromises cow nutrition. There is increasing evidence that nutrition during late gestation has profound effects on the calf which affect subsequent performance throughout life.

Nutritional recommendations for gestating cows have generally been based on insuring cows were in body condition score (BCS) 5 at calving. Considerable research indicates that cows that calve in BCS 5 tend to have healthier calves and breed back earlier. However, the trend to get cows fat early in winter and allow them to lose weight before calving to get to BCS 5 may not be a good idea. Similarly, allowing cows to consume low protein range or hay without supplementation may cause problems for the calf.

**Maternal nutrition and calf health.**

It is well established that maternal nutrition during gestation impacts fetal growth and calf vigor. Cows consuming high energy diets during late gestation give birth to calves weighing 5 to 8 lbs more than calves from restricted fed dams. Contrary to conventional thinking, late gestation reduction in energy does not decrease calving difficulty or dramatically decrease calf birth weight. Severe reduction in gestation nutrition may compromise calf survival especially in heifers. Calves from undernourished dams are more susceptible to hypothermia, respiratory disease, and scours.

Cows consuming range or hay that is low in protein (< 10% CP) may or may not lose weight depending on the energy content of the forage. However, these cows can produce “weak calf syndrome” calves. Low protein decreases the ability of the cow to efficiently digest forage which results in less energy reaching the calf. Calves from protein deficient cows are unable to generate body heat from brown fat as effectively as calves from well fed cows. Therefore, the calves from protein deficient cows are more susceptible to hypothermia.

**Effects of nutrition during gestation may last well beyond early calfhood.**

Research indicates that the nutritional environment in utero may affect an offspring’s long-term growth, health, and reproductive ability. Often called “fetal programming”, it appears that fetal nutrition may activate different genes which affect biological processes later in life. For example, steers born to cows that were supplemented with protein during late gestation were heavier at weaning, produced heavier carcasses, and had better marbling than steers from unsupplemented cows (Table 1).

While an ever expanding volume of research is giving insight into how prenatal nutrition affects growth and metabolic functions in the postnatal animal, limited information is available on the long-term effects on female offspring. Recently, a study by Nebraska researchers discovered that protein deficiency in late gestation results in heifers having greater difficulty becoming pregnant (Table 2). Heifers from dams that were protein supplemented were heavier at pre-breeding, pregnancy exam and the beginning of the second breeding season. Interestingly, heifers from protein deficient dams were the same age at puberty as heifers from the protein supplemented dams, but fewer of these fetally undernourished heifers became pregnant or calved during the first 21 days of the calving season. In another study, more heifers from unsupplemented dams failed to reach puberty before the breeding season compared to heifers from protein supplemented dams. Therefore, in the Nebraska studies undernutrition during late gestation produced heifers that were smaller and more reproductively inefficient.

This year's protein supplementation program on cattle wintering on range or low quality feeds can have an impact on next year's calf weights and replacement heifer performance. An additional 10 to 15 lbs. of calf or 10% more heifers becoming pregnant will help offset the pain of supplementation costs.

**Keys for late gestation nutrition**

- Cows should gain 1.0 lbs per day; 1st calf heifers should gain 2.0 lbs per day.
- Supplement protein and/or energy as needed
- Available supplements vary greatly in cost and convenience; choose wisely and don't over-supplement
- Cows should calve in BCS 5
- High quality mineral that is formulated for your area should be fed free-choice

Table 1. Effect of maternal protein supplementation on steer progeny performance.

| | Dietary Treatment | | | | | |
|---|---|---|---|---|---|---|
| | Stalker et al., 2006 | | Stalker et al., 2007 | | Larson et al., 2007 | |
| Item | No Supp. | Supp. | No Supp. | Supp. | No Supp. | Supp. |
| Adj. 205-day weaning wt, lb. | ---- | ---- | ---- | ---- | 494 | 505 |
| Feedlot Performance | | | | | | |
| Initial wt., lb | 462[a] | 475[b] | 462[a] | 488[b] | 508[x] | 522[y] |
| DMI, lb | 18.7 | 18.8 | 24.6[a] | 26.6[b] | 19.8[x] | 20.3[y] |
| ADG, lb | 3.45 | 3.44 | 3.52 | 3.70 | 3.66[x] | 3.75[y] |
| Feed:Gain | 5.41 | 5.46 | 6.97 | 7.19 | 5.37 | 5.38 |
| Carcass wt., lb | 800 | 814 | 764[a] | 805[b] | 804[a] | 822[b] |
| Marbling[1] | 467 | 479 | 449 | 461 | 445[a] | 492[b] |
| % Choice | 85 | 96 | ---- | ---- | 71[a] | 85[b] |

[a,b] Means within a study differ with different superscripts (P ≤ 0.05).
[x,y] Means within a study differ with different superscripts (P ≤ 0.10).
[1]400 = Small[0].
Adapted from Stalker et al., 2006; Stalker et al., 2007; Larson et al., 2007; and Funston et al., 2010a.

Table 2. Effect of maternal protein supplementation on reproductive performance of heifers.

| | No Supplement | Supplement |
|---|---|---|
| **Age at Puberty (d)** | **334** | **339** |
| **% Cycling** | **67** | **61** |
| **Calved 1st 21 days (%)** | **49[a]** | **77[b]** |
| **Final % Pregnant** | **80[a]** | **93[b]** |
| **Calving date (d of yr)** | **75** | **71** |
| **% Unassisted births** | **64** | **78** |

a,b Supplement improved trait. Adapted from Funston et al., 2010