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WINTER SUPPLEMENTATION OF CATTLE: PART IV: EXPERIENCE AT SIERRA FOOTHILL RESEARCH & EXTENSION CENTER

In this month's column, Dr. Jim Oltjen, Beef Specialist in the Animal Science Department at the University of California, Davis, briefly discusses some of the research experience with supplementing the cow herd at the Sierra Foothill Research and Extension Center in Brown's Valley. This ranch is typical of much of California rangeland where cow/calf operations are common. Three years of research experience aimed at identification of optimal strategies for supplementary feeding of beef cows is summarized. Strategic supplementation must accomplish the following: (1) maximize the use of forage, (2) promote high reproductive and lactation performance, and, (3) maintain range condition.

Body Condition and Supplemental Feeding. Cattle producers have long recognized the relationship between the body condition of their cows and reproductive efficiency. Body condition scoring quantifies this relationship by placing a numeric score on the relative degree of fatness (or energy reserves) that is observed or palpated. Body condition scoring can be used by cow/calf producers to monitor nutrition programs as forage conditions and nutrient needs change. The standard body scoring system of 1-9 is outlined in Table 1. Previous research has found that cows should have good body condition at calving to ensure good reproductive performance. Those in lower condition with a score of 5 or less at weaning may require a higher plane of nutrition to perform at a level equal to their better-conditioned peers.

Separating the cowherd by body condition and feeding each group according to specific requirements is one "strategic" supplementation method that may increase the efficiency of a supplementation program. With this supplementation strategy nutritional needs can be better targeted, thereby allowing the producer the option of using a variety of energy-containing feedstuffs and/or better quality pasture to increase weight gains necessary to improve body condition, while feeding the cows with abundant flesh (body condition greater than 5) with lower quality forages to maintain condition through calving. In order to ensure cows have a body condition score of greater than 5 at calving, this strategy must be implemented several months prior to calving. Waiting too long to take action to improve body condition is cost prohibitive and, in some cases, impossible. Producers must recognize that the period of time from calving through the breeding season is the most critical period in the beef cow's production cycle, with energy requirements at their peak. For example, the average cow needs approximately 40 percent more energy and over 60 percent more protein during this period than when dry. Typically, the cow loses approximately 120 to 140 pounds at calving which should be partially regained 60 to 80 days after calving. Furthermore, she has to produce adequate milk, undergo uterine involution and meet her maintenance requirements. On the downside, there are factors cow-calf producers must ponder if considering split-feeding as an alternative supplementation strategy. Split-feeding the cowherd into multiple groups requires additional pasture, fencing, and water that must be conveniently located.

Experimental Procedure. In these experiments, three supplementation strategies (none, standard and strategic) were used in conjunction with two stocking rates (moderate and heavy), see Table 2. Stocking rates are maintained during the critical green forage availability time of year, late Fall and Winter. Measurements were aimed at defining the changes occurring in the cattle and on productivity and economic efficiency. Cattle measurements included body weight, body condition score, and ultrasound backfat at various times throughout the year. Reproduction (post-partum anestrus interval, conception and calving rates, dystocia) was monitored. All inputs and outputs are recorded to enable valid economic analyses.

Results and Discussion. Some of the results of these studies are shown in Tables 3 and 4. Clearly, cows in good condition in late summer tend to remain in good condition, but only 16% of those in poor condition gained condition with protein supplementation during the dry summer feed season. Pregnancy rate was not affected by supplement treatment for cows on the moderate stocking rate (Table 3); however, cows not supplemented and stocked heavy had only 64.7% chance of becoming pregnant compared to 77.5 and 73.8% for the standard and strategic supplementation treatments, respectively. Cows in the strategic group had pregnancy rates which differed by 6.7 percentage units between high (>5.25) and low (<5.25) body condition scores, compared to 19.5 and 17.6 percentage units for the other supplement treatments (no or standard, respectively). It appears that body condition score at calving for cows on the strategic supplementation treatment was not as influential a variable on subsequent pregnancy rate. This suggests that strategic supplementation may be beneficial and has promise.

This same type of data can be generated for your operation or area. Contact your livestock advisor and together with specialists at the University of California and your veterinarian, you can develop feeding and reproductive data that will make your decisions clearer, easier, and more cost-effective. Remember, "change is inevitable, progress is optional," and, "progress without data is unlikely."

Table 1. Condition scoring system for beef cows.

Score	Appearance	Description
1	Severely	All ribs and bone structure easily visible, no visible or palpable fat detectable over spinous processes,

	emaciated	transverse processes, hip bones or ribs. Tail-head and ribs project quite prominently. Animal has difficulty standing or walking.
2	Emaciated	Tail-head and ribs are less prominent. Individual spinous processes are rather sharp to the touch but some tissue cover exists along the spine. Animal not weak, but no fat detectable.
3	Very thin	Ribs are individually identifiable but not so sharp. No fat on ribs, brisket, spine and over tail-head, with some tissue cover over dorsal portion of ribs. Individual hind quarter muscles easily visible, spinous processes apparent.
4	Thin	Spinous processes can be identified individually. Ribs and pin bones are easily visible and fat is not apparent by palpation on ribs or pin bones. Individual muscles in the hindquarter are apparent.
5	Moderate	Ribs less apparent, less than .5 cm fat. At least 1 cm fat on pin bones. Last two or three ribs felt easily. No brisket fat. Hind quarter individual muscles not apparent. Area on either side of tailhead now has palpable fat cover.
6	Good	Smooth appearance throughout. Some fat deposition in brisket. Individual ribs are not visible. About 1 cm of fat on the pin bones and on the last two to three ribs. Fat evident around tailhead.
7	Very good	Brisket full, tailhead and pin bones have protruding fat deposits. Back square. Indentation over spinal cord. Between 1 and 2 cm fat on last two to three ribs. Some fat around vulva and in crotch.
8	Obese	Very fleshy and over-conditioned. Back very square. Protruding deposits on tailhead and pin bones. Brisket distended. Neck thick. Large spinal cord indentation. 3 to 4 cm fat on last two to three ribs.
9	Very obese	Extremely wasty, patchy and blocky. Tail-head and hips buried in fatty tissue. Bone structure no longer visible and barely palpable. Motility may be impaired.

Table 2. Experimental groups.

Treatment	Description
<i>Supplementation</i>	
None	No supplement given
Standard	Supplement fed during entire dry feed season
Strategic	Supplement given only to meet condition targets
<i>Stocking rate (Nov. 16 - Feb. 28)</i>	
Moderate	approx. .75 cows/acre; >800 lb/acre residue (Oct. 1)
Heavy	approx. 1.0 cows/acre, 625-800 lb/acre residue

Table 3. Effect of Supplement Treatment and Stocking Rate on Subsequent Pregnancy Rate.

Supplement Treatment	Stocking Rate	
	Moderate	Heavy
Pregnancy Rate, %		
None	74.0 ^{ab}	64.7 ^b
Standard	77.5 ^a	77.5 ^a
Strategic	75.9 ^a	73.8 ^{ab}

^{ab}Means without a common superscript are statistically different (P<.05).

Table 4. Effect of Supplement Treatment and Condition Score at Calving on Subsequent Pregnancy Rate.

Supplement Treatment	Calving Condition Score	
	<5.25	>5.25

		Pregnancy Rate, %
None	54.7 ^d	74.2 ^{abc}
Standard	65.2 ^{cd}	82.8 ^a
Strategic	70.8 ^{bc}	77.5 ^{ab}

^{abcd}Means without a common superscript are statistically different (P<.05).

James W. Oltjen, PhD, PAS
Extension Beef and Livestock Systems Specialist
Department of Animal Science
University of California, Davis

John Maas, DVM, MS
Diplomate, ACVN & ACVIM
Extension Veterinarian
School of Veterinary Medicine
University of California, Davis

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