LOW COST COW/CALF PRODUCTION

The Bulletin ***For Alumni Of The School***

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Corpulent Taurus

In both the School and Bulletin, we've hammered the practice of feeding heifers supplemental energy. The extra calories serve to start the heifer cycling at a younger age so that she will conceive and calve by her second birthday. It works! There is a risk associated with the practice, however. Accelerated fat-cell formation can prevent the formation of milk producing cells in the udder - thus, less milk. The impediment is with the old gal the rest of her life. How about the **bull**? In order to better estimate the performance of a bull's offspring, it is common to "performance test" the bull while he is a growing calf. Commonly, a high-energy diet is fed for 140 to 200 days postweaning. Bulls scoring in the upper decile are the biggest per day of age and had the highest rate of gain, best conformation (includes fat cover) and the biggest testicles (scrotal circumference). More $$$.

Bucks For Infertility

Dr. G. H. Coulter, along with other scientists at the Research Center in Lethbridge, AB, has been studying fertility of bulls fed high energy diets since the early 1980's. In all of the studies, weaned calves (six to seven months of age) were fed either a moderate-energy (100% forage) (**mod**) or high-energy (80% grain, 20% forage) (**high**) diet for 168 days. The studies also included breed comparisons. From an early study, it was observed that daily sperm production was 9% greater by bulls fed the **mod** than by those bulls fed the **high** diet (1980). When the same comparison was made a year later, the **mod** group produced 30% more sperm each day. To better estimate the rate of spermatogenesis, epididymal sperm reserves were measured. In the 1980 study, Hereford bulls fed the **mod** diet had 76% greater reserves than those from the **high** group. In the same study, epididymal sperm reserves were nearly the same for both groups of Angus bulls. The study conducted the following year revealed 89% greater reserves for both breeds when fed the **mod** diet vs. those fed the **high** diet. It is obvious that there are interactions with dietary energy level and breed and year (environment). Realizing that "postweaning dietary energy profoundly affects spermatogenesis," Coulter, *et al*[1], conducted another study that was reported earlier this year. They were searching for the underlying physiological cause of this reduced fertility.

Sperm Audit

The Simmental breed was introduced into this study, along with the British breeds and various crosses thereof. Because Continental breeds are later maturing, the impact of the high-energy diet was minimized when the data were averaged for all breeds. The average physical characteristics of the bulls, after the 168 day feeding period, are shown in the following table.

Physical Characteristics of Bulls

Diet energy level	Mod	High
Body Wt, lb	831	935
Back fat, mm	1.8	4.4
Scrotal circum, cm	31.1	32.2
Testicular tone, mm*	19.6	19.4

* displacement

Calves fed the **high** diet were obviously heavier and fatter. Scrotal circumference was 2.1 cm greater for this group. Testicular tone was less, however. Sperm motility and morphology are given in the next table. Sperm motility was greatest from the bulls fed the **mod** diet. Similarly, sperm morphology was more normal for these same bulls. Primary defects (defects of the sperm head) were less as were secondary defects (tail defects).

Sperm Characteristics

Diet energy level	Mod	High
Sperm motility, %	53.4	44.5
Normal cells, %	68.8	62.5
Primary defects, %	17.3	20.2
Secondary defects, %	13.9	17.3

Chestnuts Roasting ----

The scientists measured the temperature at the top and bottom of the scrotum. The differences were small. There was a significant difference, however, in temperature gradient from the top to bottom of the scrotum. The **mod** group had a higher gradient temperature. This led to yet another study. Only bulls that had achieved a score of satisfactory (on the standard breeding soundness examination) were selected. Their testicles were scanned to establish an infrared temperature thermogram for each bull. The bulls were divided into two groups - those having a normal thermogram and those reflecting an abnormal thermogram. Fertility was tested with 18 heifers (16 mo of age) per bull during a 45-day pasture breeding period. Results are shown in the following table. The key to fertility appears to be the temperature gradient from the top to the bottom of the testicle. **Fatty tissue is an excellent insulator**.

Scrotal Temp Relative to Fertility

	Thermogram class	
Scrotal area	Normal	Abnorm
Top °F	82.4	82.8
Bottom °F	77.0	81.1
Gradient °F	37.4	33.6
Scrotal Circum	34.4cm	36.6cm
Fertility		
Cows/bull	17.7	17.3
Pregnancy rate	83.4%	68.3%
Rate range	72-100%	38-85%

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[1] Coulter, G.H., R.B. Cook and J.P. Kastelic. 1997. Effects of dietary energy on scrotal surface temperature, seminal quality and sperm production in young beef bulls. J. Anim. Sci. 75:1048.

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