Effect of Wintering Ration on Reproductive Phenomena in Beef Cows on Range

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Data are available to indicate proper wintering rations for beef cows under dry lot conditions, but few are available under range management for Kansas. This is our first attempt to determine adequate winter rations for reproductive efficiency in Kansas and to notice reproductive inefficiencies for future study.

We used 45 Polled Hereford cows, each with access to a basic ration of Bluestem winter pasture and 3 lbs. of alfalfa hay per day. November 1, 1967, the cows were randomly divided into four groups receiving these supplements:

Group 1 -- 3 lbs. milo and 1.5 lbs. soybean meal (high energy-high protein)

Group 2 -- 3 lbs. milo (high energy-low protein)

Group 3 -- 1.5 lbs. soybean meal (low energy-high protein)

Group 4 -- basic ration (low energy-low protein)

The high energy-high protein ration was slightly higher than National Research Council (NRC) requirements for energy and protein; the low energy-low protein ration was approximately half of NRC recommendations. The rations were calculated to allow the high energy-high protein group to gain weight and the low energy-low protein group to lose weight between November 1, 1967, to May 1, 1968. No attempt was made to estimate the amount of winter pasture consumed.

All cows were corralled and their reproductive tracts palpated via rectum once a week after calving until the second heat or rebreeding. Time of ovulation and size of pregnant and nonpregnant uterine horns were recorded each week. Daily observations were made to detect heat, and heat mount detectors were kept on all cows to help detect heat.

All cows calved between February 14 and May 12, 1968; average calving date was April 15. Bulls were placed with the cows May 8. Data were statistically analyzed. Statistical corrections were used to compensate for cows not exposed to a bull during first heat.

Results

The effect of nutrition on postpartum conception is shown in table 7 , and effects on ovulation, estrus and uterine involution, in table 8 . Conception rate of cows on the low energy-low protein ration was 63%. Rates of the other groups were 90, 100 and 91%. Although not statistically different in all cases, the low energy groups generally rebred later than other groups. Although the low energy-high protein group required longer to rebreed in one analysis, that was not true when all cows were included. They recovered more rapidly and rebred earlier than the low-low group when cows that calved late and had access to succulent grass before first heat were included.

The rations had no statistical significant effect on uterine involution (return of the uterus to a nonpregnant size), although the low energy-low protein group involuted slightly earlier. Rather than meaning that the uteri of those cows were capable of maintaining pregnancy earlier after parturition, they took longer to rebreed. The low energy-high protein group took longer to ovulate and return to heat; however, that effect was not clear cut because neither of the other low energy or high protein groups had so long an interval from calving to ovulation or heat.

Twenty-five of 45 cows ovulated within 20 days after calving but 40% of the 25 had no detectable sign of heat. Ninety-two percent of the 45 cows ovulated on the ovary contralateral to the previously pregnant uterine horn. Averages for ovulating, exhibiting heat and rebreeding were 22.7, 31.4 and 60 days, respectively after calving. Theoretically, we could expect a cow under similar conditions to ovulate without heat approximately 15 days after calving, have short cycles and second ovulations to coincide with their first heat. Conception was only 20% at the first heat. It appeared that approximately 45 days, two heats or three ovulations needed to lapse for an acceptable conception rate. The postpartum period of infertility may be a potential for increasing beef production, particularly in confinement production if the interval can be shortened. Methods of reducing the calving-to-rebreeding interval and to determine best treatment for postpartum uterine dysfunction are being studied.

Milo (energy) appeared to be more advantageous in the winter ration than soybean meal (protein) for efficient future reproductive performance. Cows receiving only winter pasture and 3 lbs. of alfalfa had lower conception rates than cows receiving either milo, soybean meal or both. The data indicate that cows need an energy or protein supplement in addition to Bluestem winter pasture and 3 lbs. of alfalfa in a spring calving program for maximum conception rate. Additional energy is required for a short calving-to-conception interval. If spring calving is late enough so cows have succulent grass, the energy requirement appears to be less critical and protein or energy protein is an adequate winter supplement. However, if calving is earlier, energy appears to be more critical in regard to rebreeding early.

Table 7

Effect of Winter Ration on
Postpartum Conception in Polled Hereford Cows

Treatment group	% Conception	Days from calving to conception $\pm$SE*	Days from calving to conception**
High energy -high protein	92	52.0 ± 4.05^{a}	47.6 ± 3.69^{a}
High energy -low protein	100	58.0 ± 4.25^{ab}	40.1 ± 4.62^{a}
Low energy -high protein	91	59.2 ± 4.36^{ab}	58.1 ± 4.42^{b}
Low energy -low protein	73	69.2 ± 4.68	53.4 ± 5.41^{ab}

* First analysis includes all cows that rebred.
** Second analysis does not include cows that did not rebreed or cows that had access to succulent grass before first heat.
a,b,ab Means with the same letter superscript do not differ statistically ($P>.05$).

Table 8

Effect of Winter Ration on
Postpartum Ovulation, Heat and Uterine
Involution

Treatment group	Days postpartum to ovulation $\pm$	Days postpartum to meat	Days to uterine involution*
High energy -high protein	18.6 ± 2.78^{a}	27.2 ± 3.84^{a}	31.0
High energy -low protein	23.2 ± 3.08^{ab}	29.5 ± 3.60^{ab}	29.6
Low energy -high protein	30.4 ± 2.73^{b}	39.3 ± 3.62^{b}	31.5
Low energy -low protein	18.4 ± 3.10^{a}	29.6 ± 3.73^{ab}	25.5

* Return of pregnant horn to nonpregnant size (approximately 35 mm diameter) or to size of nonpregnant horn.
a,b,ab Means with the same letter superscript do not differ statistically ($P>.05$).