

WEANING WEIGHT OF CALVES AS RELATED TO AGE OF DAM, SEX AND COLOR

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Weaning weight of calves is one of the factors to consider in improving range beef cattle through a selection program. Most of the variation in weaning weight of calves is dependent upon the milk production of the cow rather than differences in inheritance of the calves; but the ability of a cow to wean heavy calves is dependent upon her inheritance and the environment under which she exists.

Correcting Weights to a Common Age Basis

Under range conditions, it is not practical to wean each calf at an exact age. Consequently, weaning weights of calves are obtained on a certain date and must be corrected to a common age to give an estimated weight of each calf at a constant weaning age. In the present study, a procedure has been developed for adjusting the weaning weight of calves to a common age basis.

The data for this analysis were gathered over a period of 6 years at the Squaw Butte-Harney Branch Station and involves 432 Hereford calves. The summer pasture on which this herd was handled consisted of desert range with mostly bunchgrass as the source of feed. The cattle were grazed in the fall on meadow grass hay stubble and run to bunched hay. During the winter they were fed meadow grass hay.

Analysis of variance and covariance was the method used to eliminate the effects of sex and color of calves; after which the coefficient of correlation and regression for weaning weight and age were calculated. The correlation between age and weight of calf was $r = 0.72$ and the regression of weight on age was 8.9 pounds per week or 1.28 pounds per day. There were some fluctuations in weights of calves but for these data the straight line is the best fit. Weights according to age of the calves are shown in Figure 1.

These data are in general agreement with those reported by Koger and Knox (1945). These workers found the regression of weight on age to be 1.33 pounds per day, but their average weaning weights were heavier than those obtained at Squaw Butte.

Age of Cow and Weaning Weight of the Calf

Before one can effectively select for heavy weaning weight of calves, the major environmental factors affecting weaning weight must be eliminated or proper adjustments made by statistical treatment.

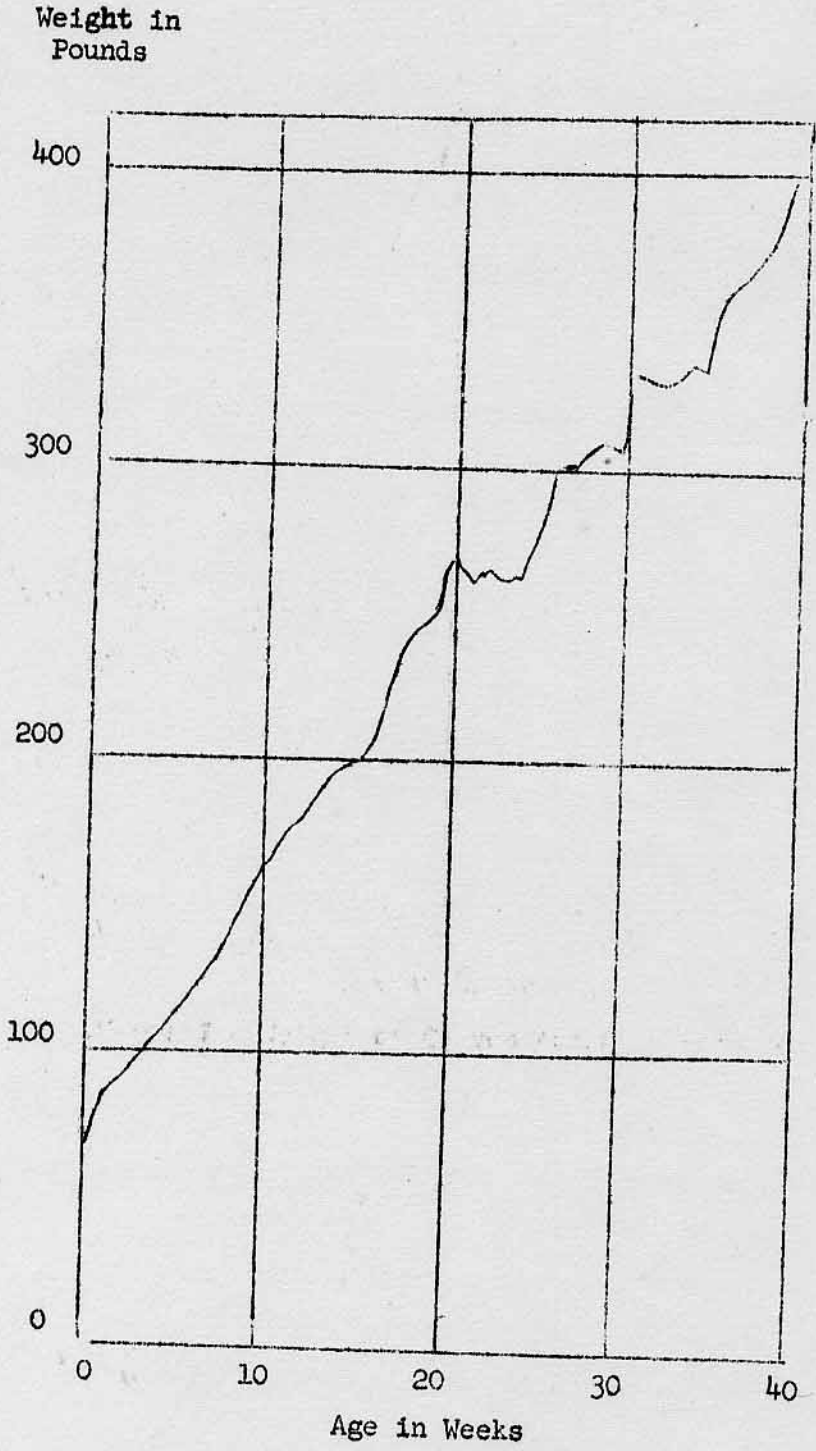


Figure I - Weight of Calves According to Age

Two factors, the age of the dam, and sex of calf have been analyzed for their effects upon weaning weight.

Four hundred and thirty-two calves from cows varying in ages from 2 to 14 years were used in this study. Analysis of variance showed a significant effect of age of the cow on weaning weight of the calves.

Table 1. Analysis of variance showing significance of age of dam on weaning weight of calf.

Source of Variance	D/F	Variance
Total	431	2,472
Between Age Groups of Cows	7	39,318**
Remainder	424	1,856

**Highly significant.

The weaning weight of calves increased with increasing age of the dam through 8 years and then declined (Table 2). There were not sufficient numbers to determine the decline in weaning weight of calves with increasing age of cows 9 years old and older but the group of cows 9 years old and over weaned calves intermediate between calves from 4 and 5 year old cows.

Table 2. Weaning weight of calves (corrected to 32 weeks of age) according to age of dam.

Age of Dam	Number	Corrected Weaning Weight
2	44	272
3	67	296
4	61	322
5	40	343
6	51	339
7	42	348
8	47	355
9 and over	80	336

Necessary difference, $\sqrt{N} \cdot \sqrt{2} \cdot t_p = 0.01, = 5.8$ pounds.

Two year old cows weaned calves that lacked 83 pounds weighing as much as calves produced by 8 year old cows. Cows four years old were approaching the mature status in ability to wean heavy calves.

Sex of Calf and Its Weaning Weight

The sex of the calf had no influence on weaning weight in the present study. The difference was slightly in favor of heifer

calves (Table 3) but analysis of variance showed that this difference lacked significance.

Table 3. Weaning weight of calves (corrected to 32 weeks of age) according to sex of calf.

<u>Sex of Calf</u>	<u>Number</u>	<u>Corrected Weaning Weight</u>
Male	166	323
Female	266	328

Koger and Knox (1945) and Knapp and Black (1941) reported a significant effect of sex on weaning weight with heifers lighter than bulls or steers; but Johnson (1943) concluded that there was no difference between the sexes in gains made by calves running with their dams on summer range.

Our calves were much smaller at weaning than the ones reported by Koger and Knox in which steers weighed 32 pounds more at weaning. Perhaps our calves do not show a sex difference because other factors have such a large effect on weaning weights that the sex effect never becomes operative.

Color of Calf and Size at Weaning

Several producers believe that color is associated with growth rate of calves and the ability of cows to wean heavy calves. Stanley and McCall (1945) found that light coat color in Herefords was associated with greater gains and carcass grade in one group of animals whereas in a second group little difference in gains was noted and the darker ones graded higher in the carcass.

In the present study calves were rated yellow, light red, medium red and dark red. Analysis of variance showed no significant differences in weaning weight associated with color of calves (Table 4).

Table 4. Analysis of variance for weaning weight of calves.

Source of variance	D/F	Mean Square
Total	431	4,993
Between sexes	1	14,538
Between calf colors within sex	6	8,070
Remainder	424	4,927

The means of weaning weight according to calf color within each sex indicates that both the yellow and the dark red, particularly the latter, are heavier than the intermediates (Table 5). The numbers are too few to show statistical significance, but data have been

collected which indicate that in herds in which yellow and rapid gaining ability have been introduced together, there is a tendency to find yellow associated with greater gains. Likewise, in herds in which dark red and rapid gains have been introduced together, there is a tendency to find rapid gains associated with dark color.

Table 5. Weaning weight of calves (corrected to 32 weeks of age) according to calf color.

<u>Calf Color</u>	<u>Males</u>		<u>Females</u>	
	<u>Number</u>	<u>Weight</u>	<u>Number</u>	<u>Weight</u>
Yellow	6	319	8	336
Light red	53	309	88	323
Medium red	93	327	140	326
Dark red	14	350	30	358

Color of Dam and Weaning Weight of Her Calf

The color of the cow in relation to weaning weight of calf showed a significant difference in weaning weights between steers and heifers within cow color (Table 6). Dark red cows weaned heavier steers and lighter heifers whereas yellow cows weaned heavier heifers and lighter steers. When the sexes were combined, the effect of color of the dam was eliminated and when the colors were combined, the effect of sex on weaning weight was eliminated (Table 7).

Table 6. Analysis of variance showing the interaction of color of dam and sex of calf on weaning weight.

Source of variance	D/F	Mean Square
Total	406	4,987
Between colors of dams	3	7,376
Sex of calf within colors of dams	4	24,219**
Remainder	399	4,777

**Highly significant.

Table 7. Weaning weight of calves (corrected to 32 weeks of age) according to color of dam and sex of calf.

<u>Color of dam</u>	<u>Males</u>		<u>Females</u>		<u>Total</u>	
	<u>No.</u>	<u>Wt.</u>	<u>No.</u>	<u>Wt.</u>	<u>No.</u>	<u>Wt.</u>
Yellow	7	308	8	351	15	331
Light red	53	335	88	326	141	329
Medium red	83	314	107	323	190	319
Dark red	22	331	39	318	61	323

Size of Cow and Weaning Weight of Her Calf

The weaning weight of 648 calves was correlated with the weight of their dams on a non-pregnant basis. Only calves from mature cows were used in the study. The average cow weight was 886 pounds and the average calf weight corrected to 32 weeks of age was 348 pounds. The correlation of calf weight with cow weight was $r = 0.67$ and the regression of calf weaning weight on weight of dam was .33 pounds. Thus, for each increase or decrease from the mean of 10 pounds in size of cow, there was a corresponding change of 3.3 pounds in weaning weight of calf.

It appears, then, that the range beef producer must keep his cows large if he expects to produce heavy calves at weaning time.

SUMMARY AND CONCLUSIONS

1. Range calves gained approximately nine pounds per week. It was possible to correct the weaning weight to a common age basis by use of this factor.
2. Weaning weight of calf increased with age of dam from two through eight years of age and then showed some decline. Calves from 2 and 3 year old cows were considerably smaller than from 4 - 8 year old cows.
3. Sex of calf did not influence weaning weight.
4. Although dark red calves were heavier at weaning than others, this difference lacked statistical significance.
5. Dark red cows weaned heavier steers and lighter heifers whereas yellow cows weaned heavier heifers and lighter steers.
6. Bigger cows weaned heavier calves than smaller ones even on a mature size, non-pregnant basis. Cows weighing 1,000 pounds produced calves weighing about 33 pounds more than those produced by 900 pound cows.

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