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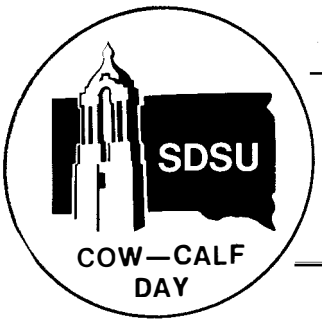

RELATIONSHIPS OF COW HEIGHT TO PRODUCTION TRAITS IN ANGUS, CHAROLAIS AND RECIPROCAL CROSS COWS

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Summary

Records on 115 Angus, Charolais and reciprocal cross cows and their 423 calves born from 1972 to 1976 were used to evaluate the relationships between cow height at the withers and cow and calf traits. Taller cows tended to be heavier, in higher condition and produce calves heavier at birth with higher postweaning ADG. Four of these five strongest correlations of cow height with other cow and calf traits were in an unfavorable direction. Cow height was unrelated to milk production and calf postweaning feed efficiency and lowly associated ($-.10 < \text{correlation} < .10$) with calf 205-day weight, cow and calf TDN per weaning weight, calf postweaning TDN consumption, calf slaughter age, calf slaughter weight and calf retail product yield. The association of cow height with cow and calf TDN per unit slaughter weight (.15) and cow and calf TDN per unit retail product (.14) suggests a small and unfavorable relationship.

Introduction

In recent years there has been a trend to select taller animals for replacement in the breeding herd. This trend is probably a result of the introduction of European breeds into the United States and the subsequent competition among the breeds. There is a need to evaluate what might be expected from taller cows in terms of both cow traits and calf performance traits. The purpose of this research was to evaluate associations between cow height at the withers and other cow and calf traits using correlation analysis.

Procedures

Records from 423 calves born from 1972 to 1976 from 115 cows were used in this study. These calves were part of a project designed to evaluate the effect of cow size and breeding on efficiency of beef production. Four breed groups of cows were utilized, Angus (A), Angus x Charolais (AC), Charolais x Angus (CA) and Charolais (C), where the first named breed in the crossbreds designates breed of sire. Cows from each group were randomly allotted to either a drylot management regime or a pasture management regime. Cows in drylot were individually fed chopped alfalfa hay, alfalfa pellets and ground ear corn during lactation. The alfalfa pellets were varied so that weight changes of drylot cows in a particular breed group and age matched weight changes of a similar half-sib group on pasture. This was done to match TDN consumption of both management groups as closely as possible. Calves in drylot were allowed access to creep feed twice daily and overnight during the preweaning phase. This was done to compensate for

pasture calves having access to grass. Cows in pasture management were pastured on alfalfa-brome, Reed canarygrass and sudan grass as needed from around the middle of May to the first of November. Pasture cows were lotted during the winter months and fed a ration of alfalfa hay, oat straw or grass hay and corn silage at levels designed to result in recommended weight changes for the different ages of cows. Calves in pasture were allowed access to creep feed approximately 3 weeks prior to weaning. All cows in both management groups were bred to the same bull in a given year. Polled Hereford bulls were used for the 1972 to 1974 calf crops, a Salers bull was used for the 1975 calf crop and a Limousin bull was used for the 1976 calf crop.

Birth and weaning weights were taken on all calves. Cows were weighed and height at withers taken when their calves were weaned in late October each year. Milk production of the cows was estimated in June, July, August and September at approximately the same time each year. After weaning each year, a total of 72 calves were individually fed to slaughter with each management group being represented. Calves were fed a 20% roughage starter ration to a fixed weight (heifers = 625 lb, steers = 700 lb) and a 10% finishing ration for a fixed number of days (heifers = 119 days, steers = 140 days). Calves were weighed 1 day prior to slaughter and carcass data were taken on each calf slaughtered.

Results

Phenotypic correlations between cow height and 14 other cow and calf traits are given in table 1. These are due to both genetic and environmental causes and may or may not be indicative of genetic change in one trait as another is selected. These should be used to give general expectations of cows in a herd at a given point in time. Traits for which the cow-calf operator might not want large values (cow weight, cow condition, calf birth weight, cow and calf TDN per unit weaning weight) are ranked 1, 2, 3 and 8 in strength of association with cow height in an unfavorable direction. Traits for which the cow-calf operator might want large values (weaning weight, milk production) are ranked 11 and 13 in strength of association. It appears that the only benefit to the cow-calf operator in having taller cows would be to have fewer of them and therefore lower variable costs.

Relationships between cow height and traits of interest to a backgrounder-feeder suggest that taller cows have a tendency to produce calves that gain faster and are slaughtered younger and heavier with higher retail cut yield, although these relationships were not strong. The relative association of these traits with cow height were 4, 7, 9 and 10, respectively, of 14 traits. Conversely, cow height was unrelated to postweaning efficiency (rank = 14th of 14 traits) and lowly and unfavorably related to cow and calf TDN per unit slaughter weight and per unit retail product yield. The relative rank of these associations were 5th and 6th of 14 traits.

It appears then that there are few benefits to be derived from keeping taller cows as replacements and culling shorter cows. A sound selection program should be based on selecting for desirable traits so that both direct and correlated response to selection result in a net increase in value to the producer. If the phenotypic relationships in this report are

indicative of the genetic relationships, it does not seem reasonable to classify cow height as an especially desirable trait. Also, since productive cows will be both short and tall, undue attention to cow height would result in slower selection progress in traits of economic importance. Since these results contain both genetic and environmental influences, prediction of direction of long-term response in other traits as a result of selection for cow height is speculative. Further work is needed to evaluate the genetic relationships between cow height and other traits.

Table 1. Correlations Between Cow Height and Cow and Calf Traits in Angus, Charolais and Reciprocal Cross Cows

Trait	Correlation	Rank
Cow weight	.54**	1
Cow weight to height ratio (condition)	.23**	2
Milk production	-.01	13
Calf birth weight	.18*	3
Calf 205-day weight	.08	11
Cow and calf TDN/weaning weight	.10	8
Calf postweaning TDN	-.04	12
Calf postweaning ADG	.15+	4
Postweaning TDN/gain	.01	14
Calf slaughter age	-.10	7
Calf slaughter weight	.10	9
Calf retail cut yield	.08	10
Cow and calf TDN/slaughter weight	.15	5
Cow and calf TDN/retail cuts	.14	6

** Significantly different from zero (P<.01).
* Significantly different from zero (P<.05).
+ Significantly different from zero (P<.10).