Summary

The results of this study suggest there is limited opportunity to apply selection pressure for increased cow productivity prior to a cow weaning her first calf; however, selecting replacement females on the basis of their 18-month adjusted weight would be of some value. Although some initial screening is necessary, under most commercial conditions similar to those in this study where the objective is to increase the productivity of the cow herd, delaying the final selection of herd replacement until after the first calf is weaned would seem justified. The general lack of correlation between classification scores and measures of productivity suggests that both classification score and performance data must be employed as selection criteria if improvement in type scores and level of performance are both goals of the breeding program.

Literature Cited

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Milk Production of Range Cows

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Story in Brief

An experiment has been initiated to determine the influence of level of milk production of brood cows on productivity, supplemental feed requirements and efficiency of beef production. Three levels of milk production will be established with three kinds of females-Herefords, Hereford and Holstein crossbreds, and Holsteins. Three levels of supplement will be fed to determine the relationship between level of milk production and feed requirements. Growth curves of heifers during their first year on test and preliminary data on milk production and calf performance from a limited number of "pilot" females are presented.

In cooperation with the Agricultural Research Service, Animal Science Research Division, USDA.

Introduction

Today, considerable pressure is being exerted to increase milk production of range cows. Performance testing programs which emphasize weaning weight automatically result in selection for higher milk production. In addition, some cow-calf operators are infusing dairy breeding into their cow herd to rapidly increase milk production to a much higher level.

Research has shown a strong correlation between level of milk production of beef cows and weaning weight of their calves. Conversion of milk to calf also is rather efficient. Within the limits of milk produced by beef cows, each additional 10 pounds of milk produces approximately an additional pound of weaned calf. Conversion may not be as efficient at higher levels of milk production.

How much milk should a range cow produce? How much milk will a cow with a very high potential for milk production actually produce under range conditions? Will the capacity of a cow's calf limit her milk production? Will additional increments of milk production at high levels of milk yield be efficiently converted to calf weight? Will a heavy milking cow rebreed under range conditions? How much more supplement will a heavy milking cow need under range conditions? How will calves which are very heavy at weaning perform in the feedlot? What will be the carcass merit of calves which are very heavy at weaning time and consequently young at slaughter? What is the relationship between level of milk production and total efficiency of production of carcass beef, considering all feed consumed by the cow, by the calf before weaning and by the calf after weaning?

These are questions being asked, and they are all related to the main question, "How much milk should a range cow produce?" There well may be several answers to this question. Under an adverse feed environment (such as sparse range) a relatively low level of milk production may be necessary to allow good reproduction, while under a plentiful feed environment (such as improved pasture) a very high level of milk production may be desirable.

Experimental Procedure

To answer basic questions about level of milk production, an experiment has been initiated at the Oklahoma Experiment Station. Three levels of milk production will be established with three kinds of females: 1. Herefords 2. Hereford x Holstein crossbreeds 3. Holsteins.

The females will be subjected to three levels of supplement, moderate, high and very high. The moderate level will consist of that amount

of supplement which will allow Hereford females to be maintained in thrifty condition and reproduce at near maximum levels. The same amount of supplement will be fed to crossbreds and Holsteins. The high level of supplement will consist of that amount necessary to maintain crossbreds in a physiological condition comparable to moderate level Herefords. The high level of supplement will also be fed to Herefords and Holsteins. The very high level of supplement will consist of that amount necessary to maintain Holstein females in a physiological condition comparable to moderate level Herefords and high level crossbreds. The very high level of nutrition will not be used for Herefords and crossbreds.

One phase of the experiment will be conducted on the range to determine the actual performance of cows varying widely in milk production potential, and to determine their response to differing levels of supplementation. Production traits of major interest will be percent calf crop and weaning weight of calves.

A second phase will be conducted entirely in drylot so that all feed consumed by both cows and calves can be measured. This will allow determination of total efficiency of feed utilization by the weaned calf, as influenced by level of milk production and level of nutrition of the dam.

Calves will be placed in the feedlot at weaning time, fed to slaughter finish and critically evaluated in the carcass. This will allow determination of the total efficiency of beef production as influenced by milk production of the cow, considering all feed consumed by the cow, and by the calf before weaning and in the feedlot.

Results

Heifer calves for this experiment were obtained in the fall of 1969, wintered under range conditions on dry grass during the winter of 1969-70, and grazed on native grass during the summer of 1970. Growth curves of the heifers during the first year of the experiment are shown in Figure 1. Holsteins were heaviest and Herefords lightest initially, and breed differences in body weight increased somewhat during the year. This is as expected since ultimate mature size should rank in the order of Holsteins, Holsteins x Hereford crossbreeds, and Herefords.

Heifers were bred to one Angus bull through the use of artificial insemination; additional Angus bulls were used for cleanup pasture breeding. The heifers calved during November through February of 1970-71.

Eighteen two-year-old heifers (six Herefords, six Holstein x Hereford crossbreds, and six Holsteins) were obtained as bred yearling heifers in the fall of 1969 to serve as "pilot" females for obtaining preliminary information. The heifers calved during November through January of

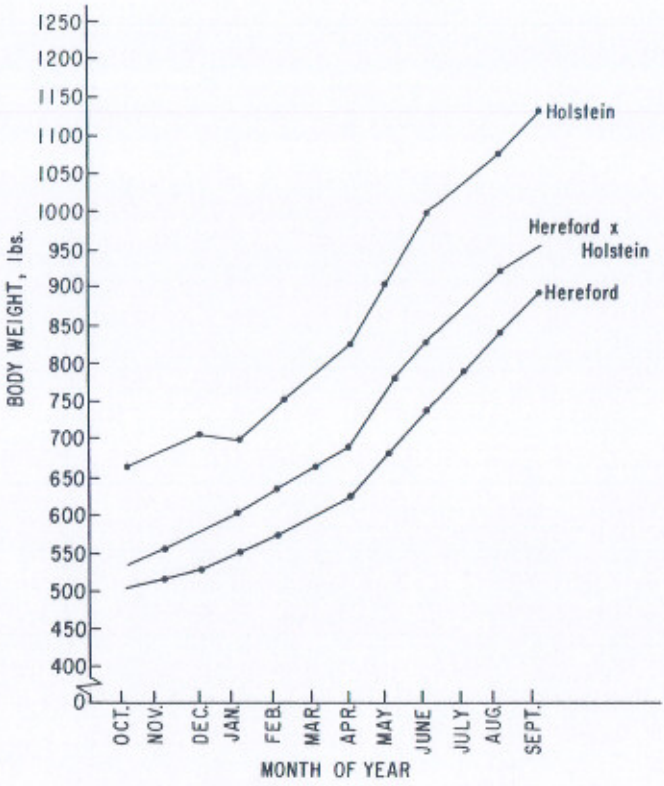

Figure 1. Body weight curves for yearling heifers.

1969-70. Changes in their body weight during the first year are shown in Table 1 and illustrated in Figure 2. It is interesting to note that the Herefords gained considerable weight, the Holstein x Hereford crossbreds gained much less weight, and the Holsteins gained very little weight, during the year which included calving and lactation. The relationship of such weight changes to rebreeding performance of females producing various levels of milk production is an important item to be determined in this experiment.

Average daily milk production to 205 and 270 days is shown in Table 1; the three types of females definitely produced three distinct levels of milk production. Monthly lactation curves are presented in Figure 3. The Hereford lactation curve illustrates the continuous decline in milk production normally observed in beef cows, while the lactation curve of the Holstein x Hereford crossbreds is more typical of a dairy

Table 1. Preliminary Data on Level of Milk Production.

	Breed		
	Hereford	Hereford x Holstein	Holstein
No. of heifers	5	6	6
Wt., October, 1969, lbs.	718	820	988
Wt., September, 1970, lbs.	882	855	1000
Ave. daily milk, 205 days, lbs.	12.2	21.6	28.4
Ave. daily milk, 270 days, lbs.	10.8	20.4	27.1
Ave. wt. of calves, 205 days, lbs.	390	456	504
Ave. wt. of calves, 270 days, lbs.	486	565	636

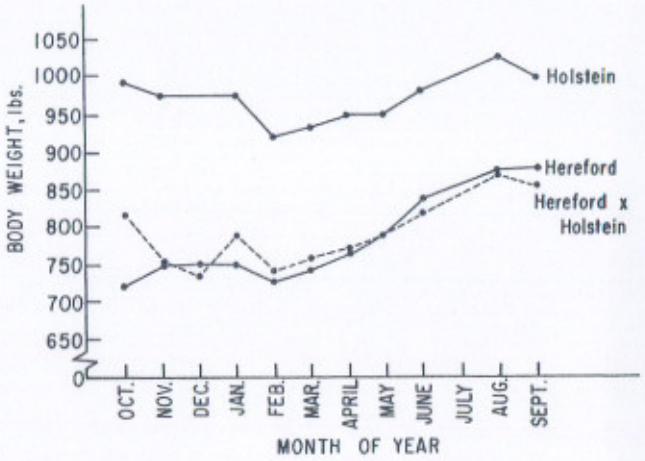

Figure 2. Body weight curves for two-year-old heifers.

lactation curve. The Holsteins produce more milk in late lactation than in early lactation. This was probably a reflection of an increasing capacity for milk by the calves as they increased in age, along with the potential of the cows to produce an increasing quantity of milk.

Differences in milk production were reflected in differences in weaning weight (Table 1). Calves from the Holstein x Hereford crossbreds were 66 and 79 pounds heavier than those from the Herefords at 205 and 270 days, respectively. The advantage for the calves produced by the Holsteins over those produced by the crossbreds at 205 and 270 days was 48 and 71 pounds, respectively. Determining whether such increases in weaning weight resulting from high levels of milk production are efficient and profitable is the major objective of this experiment.

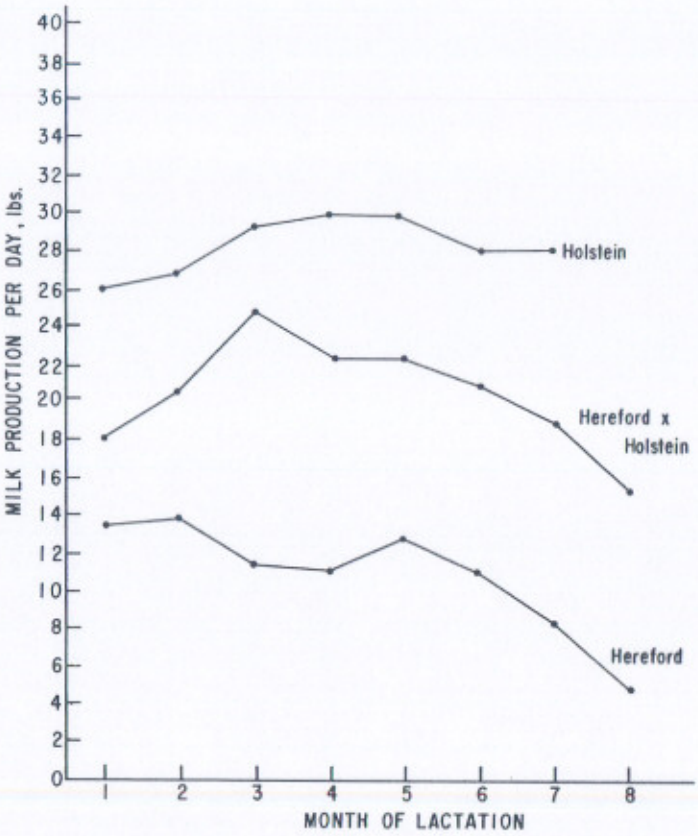

Figure 3. Milk production curves for two-year-old heifers.