

August 17, 1965

To the Graduate Council:

I am submitting herewith a thesis written by Condy L. Ayers entitled "The Influence of Breed and Year on Weights and Grades of Feeder Calves Produced in Warren County from 1959-1963." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Husbandry.

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THE INFLUENCE OF BREED AND YEAR ON WEIGHTS AND GRADE OF FEEDER
CALVES PRODUCED IN WARREN COUNTY FROM 1959-1963

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Condyl L. Ayers
August 1965

ACKNOWLEDGEMENT

The author wishes to express his sincere appreciation to the following persons:

To Dr. C. S. Hobbs for his guidance and counsel throughout the course of graduate study.

To Dr. L. L. Christian for his assistance with the statistical analysis of these data, his helpful suggestions and his constructive criticisms during the preparation of this manuscript.

To Dr. Harold J. Smith for his advice, encouragement, and constructive criticisms during the preparation of this thesis.

To Dr. Lewis H. Dickson for his guidance and many helpful suggestions.

To members of the faculty of the Animal Husbandry Department, fellow graduate students, secretaries, and others who made contributions to this manuscript.

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CHAPTER I

INTRODUCTION

Warren County is located in the eastern section of Middle Tennessee on the southeastern edge of the Highland Rim. The topography of the land is gently rolling to moderately steep in the foothills of the Cumberland Mountains, with coves and valleys of colluvial soils made by erosion over long periods of time from the uplands composed of heavy clay origin (Soil Survey, Warren County, Tennessee, 1963). These soils are ideal for pasture and hay production with silage and grain crops fitting in on the colluvial soils.

The average farm size in Warren County is 156 acres (U. S. Census of Agriculture, 1959), and many of the 1845 farmers in the county grow some kind of livestock (or livestock products).

Good livestock markets are available to the farmers of this area and many of them are producing beef feeder calves for demonstrational feeder calf sales. The closest such sale to Warren County producers is at Cookeville, Tennessee, which serves a sixteen county area.

Feeder calf sales in Tennessee have been conducted over a period of several years beginning in 1935 at Shouns (Walker, 1961) and spreading across the state. In 1964, 8563 head of feeder calves were sold in sixteen sales.

The purpose of this study is to examine the influence of breed and year on weights and grades of feeder calves produced in Warren County, and to characterize the relative performance of calves produced in the county.

It is hoped that from this information feeder calf producers can improve their herds and operations to better support feeder calf sales throughout the state with a greater number of high quality calves.

CHAPTER II

REVIEW OF LITERATURE

Studies dealing with factors influencing weight and grades of feeder calves sold in organized sales are limited. Much of the information available is concerned with prices and market comparisons, trends, and methods of marketing feeder calves.

Dietrick (1954) stated, "Experiments demonstrate that fast-gaining bulls are apt to sire fast-gaining calves. Bulls with short legs, heavy bone, good heads, sound feet and legs, plenty of muscle thickness and ample ruggedness are the only kind to use in modern feeder calf production."

Marlowe (1962) found from a study of Angus, Hereford, and Polled Hereford bulls that bull weight measured between 12 and 24 months of age accounted for 70.7, 69.2, and 76.7 percent of the variation in weaning weight of progeny of Angus, Hereford and Polled Hereford bulls, respectively. Corresponding values among the older bulls (2 yr.-11 yr.) were 47.6 percent for Angus, 47.7 percent for Hereford and 35.0 percent for Polled Herefords.

Breed of bull had no significant influence on weight. Angus bulls were lighter than Herefords at all ages. At maturity they were 100 lbs. lighter than Polled Herefords and 100 lbs. lighter than Herefords. There was practically no difference in weight between Herefords

and Polled Herefords at 12 to 48 months of age; however, Herefords were slightly heavier at maturity.

This study also showed that variation in the sires' type grade accounted for 43.7, 29.7, and 37.3 percent, respectively, of the variation in type grade of the progeny of Angus, Hereford and Polled Hereford bulls. Age of bull within the different breeds had no significant influence on type grade of their progeny.

Swain (1965) found breed of calf to have a significant effect on price received. Angus calves of comparable grade and weight sold for an average of 0.67 cents per hundred weight more than did Hereford calves.

Riley (1952) in a comparison of prices of feeder cattle with pricers of slaughter cattle by correlation analysis found that in all cases there appeared to be a closer relationship between prices of feeder cattle and the approximate slaughter grade they might qualify for, than there was between prices of the corresponding feeder and slaughter grade. Badenhop (1956) reported that the effect of grade on price was significant for all classes of slaughter cattle and calves. Walker (1961) reported that for steers and heifers the price differential between grades averaged \$1.65 per hundred weight and ranged from a low of 10 cents to a high of \$3.25. In general, price increased with grade but not in the same proportion, suggesting that calves in the higher grades did not sell for as much as might be expected from price differences between grades at the lower end of the grade scale.

Swaim (1965) observed a difference in sale price between Medium and Good grade calves of \$2.10 per hundred weight and a difference of only 78 cents per hundred weight between Good and Choice calves.

Average weight of calves in pens was found by Swaim (1965) to be negatively associated with price. As average weight increased from the 300-349 lb. class to the 650-699 lb. class, price per hundred weight decreased \$4.91. Walker (1961) reported a similar relationship. He observed a \$5.55 decrease in price received per hundred weight between average lot weight increased for 300-349 lb. to 650-699 lb.



CHAPTER III

EXPERIMENTAL PROCEDURE

Records were available on several Warren County calf sales as far back as 1956 when this County first became a member of the Cumberland Beef Breeders Association. This Association sponsors the feeder calf sales at Cookeville, Tennessee. In 1956, Warren County producers consigned 156 head. The membership did not increase rapidly until 1958 and 1959, and records were not available until 1959 for making a detailed study of entries from Warren County.

In 1956 only a Fall sale was held, but in 1957 sales were held in both the Spring and Fall and this procedure has continued until the present time. The number of calves consigned has been small for Spring sales; so only records of Fall sales will be considered in this analysis.

In 1959 separate days were designated for Angus and Hereford sales. Since Shorthorn cattle were so few in number in the Association area, no sales were scheduled for them.

The calves were inspected on the farms of consignors by a committee assigned by the Association Executive Committee. One dollar per head was collected as an appearance fee to be used by the Association for advertising purposes. Certain rules and regulations had to be complied with by the producer. Some of these were:

1. All consignors must be a member of the Cumberland Beef Breeders Association and their County Livestock Association.

2. All calves must be sired by registered bulls.
3. Cows producing calves must not be of dairy breeding.
4. Bull calves must be castrated with a knife and be completely recovered.
5. Herefords with horns must be dehorned and completely healed.
6. Heifer calves must be vaccinated and tagged for Brucellosis.
7. All calves must be vaccinated for Black Leg, Malignant Edema and Septicemia.
8. All calves must be produced on the farm or range of consignor.
9. All calves must grade Medium or above.

Calves that passed inspection were entered by sex on an inspection sheet. This sheet was signed by the Inspection Committee. On sale day inspected calves were delivered to the sale barn, numbered, graded and weighed. They were graded as Medium, Good or Choice by an Extension Livestock Specialist from the University of Tennessee and a Tennessee State Department of Agriculture Livestock Specialist.

After the calves were graded and weighed, they were penned according to sex (steers or heifers) and grade (Medium, Good or Choice) into the following weight groups:

251-300 lb.
301-350 lb.
351-400 lb.

401-450 lb.
451-500 lb.
501-550 lb.
551-600 lb.
601-650 lb.
651-700 lb.
701-750 lb.
751 lb. and over

In most cases, pen sizes ranged from one up to 50 head. In some instances, however, pens of the same weight group were combined making a total number of up to 190 head.

After each sale, the records of each consignors' calves were tabulated by breed, grade and weight from the barn sales sheet and filed for future use.

In this study to determine the effect of breed, the calves were classified as either Angus, Hereford, or Polled Hereford. These were further divided into grades or purebred calves.

Variation due to breed in frequency of calves of various weights and grades were tested by the chi-square method as presented by Snedecor (1956).

CHAPTER IV

RESULTS AND DISCUSSION

I. THE EFFECTS OF BREED ON FEEDER CALF PRODUCTION

Registered versus Grade Angus and Hereford Calves. The percentages of Choice, Good, and Medium calves for registered herds were 26.2, 55.7, and 18.0 percent, respectively, as compared to 15.2, 53.0, and 31.8 for grade herds (Table I). The difference in percent of calves in the Choice and Medium grades between registered and grade herds is significant ($P < .05$). This difference is believed to be due to more selection for type in registered herds and a tendency for a greater percentage of registered producers to creep feed their calves.

The average weights of Choice, Good, and Medium grade calves were 444.4, 460.3, and 428.5 lb., respectively, for calves from registered herds and 451.8, 462.9, and 454.2 lb., respectively, for grade calves. The difference in weight favored calves from grade herds. These differences could have resulted from purebred producers calving later in the season and over a longer period and/or to saving a higher proportion of their calf crop for herd replacements and to sell as purebred breeding stock. On the other hand, commercial producers may be placing more selection pressure on size and gain with less attention to type and conformation than do purebred producers.

TABLE I
SUMMARY OF REGISTERED AND GRADE ANGUS AND HEREFORD FEEDER CALVES SOLD FROM
WARREN COUNTY IN COOKEVILLE FEEDER CALF SALES FROM 1959-1963

Total No.	Ave. Wt.	Percent		Average Weight (Lb.)	
		Choice	Good	Choice	Good
Registered	441.4	26.2	55.7	444.4	460.3
Grade	458.4	15.0	53.1	451.8	462.8

Comparison of Herefords with Polled Herefords. These data showed that the percentages of Choice, Good, and Medium Hereford calves were 22.5, 54.6, and 22.9 as compared to Polled Hereford calf grade percentages of 9.9, 49.8, and 40.3, respectively, (Table II). The differences in percent of Choice and Medium calves were significant ($P < .05$).

These significant differences could be due to the selling of the selected Polled Hereford bull calves to producers of manufactured milk and to veal calf Grade C dairy producers. These dairymen prefer polled bulls. This competition could cause a scarcity of good type bulls for Polled Hereford producers of feeder calves.

These data indicated no significant difference between the average weight of Hereford and Polled Hereford calves in the various grades. The weights of Choice, Good, and Medium grade Hereford calves were 464.0, 462.0, and 427.2 lb., respectively, while those of Polled Hereford calves were 463.7, 464.0, and 438.5 lb., respectively.

Calves Produced in Registered Angus Compared to Registered Hereford Herds. The data presented in Table III show the percentages of Choice, Good, and Medium calves to be 25.5, 56.2, and 18.3, respectively, for Angus and 26.0, 55.2, and 17.8, respectively, for Herefords. These differences in percent of calves of the various grades were not significant.

The weight data demonstrated a slight advantage for Hereford calves but the differences were not of significant value. Angus calves

TABLE II
SUMMARY OF HORNED AND POLLED HERFORD FEEDER CALVES PRODUCED IN
WARREN COUNTY^a FROM 1959-1963

Total No.	Ave. Wt.	Percent		Average Weight (Lb.)	
		Choice	Good	Choice	Good
Horned	454.4	22.5	54.6	463.9	461.9
Polled	453.7	9.9	49.8	463.7	464.0

^aIncludes only calves sold through the Cookeville Feeder Calf Sale.

TABLE III
SUMMARY OF FEEDER CALVES PRODUCED IN REGISTERED ANGUS AND HEREFORD HERDS OF
WARREN COUNTY^a FROM 1959-1963

Total No.	Ave. Wt.	Percent		Average Weight (Lb.)	
		Choice	Good	Choice	Good
Reg. Angus	434.7	25.5	56.2	427.5	442.3
Reg. Hereford	446.4	27.0	55.2	441.6	459.1

^aIncludes only calves sold through the Cookeville Feeder Calf Sale.

of Choice, Good, and Medium grades weighted 427.5, 442.4, and 422.0 lb., respectively, as compared to 441.6, 459.1, and 414.6 lb., respectively, for Hereford calves.

The weights of the calves of the different grades are acceptable for both breeds. Hereford calves are heavier at birth and hold a slight advantage in weight at weaning, but the weights of Angus calves are comparable to those of Herefords. This may be due to Angus cows producing more milk during the lactation period than Herefords.

Warren County feeder calves hold a slight edge in grade and weight as compared with the 16 county area of the Cumberland Beef Breeders Association. The calves from Warren County averaged 444 lb. and graded a 1.96 as compared to the Association average of 443 lb. and 1.83 on grade.

II. THE EFFECTS OF YEAR ON FEEDER CALF PRODUCTION

The Effects of Year on Number of Calves Sold. The number of calves from Warren County sold in the Cookeville sale from 1959 to 1963 is shown in Figure 1. The increase from approximately 459 head in 1961 to 924 head in 1963 indicates an increase in production of beef calves in this area and/or a more favorable acceptance of the Cookeville sale.

The 924 calves marketed through the Cookeville market in 1963 represented approximately 15 percent of the total beef calves produced in the county. Although these calves no doubt were among the top

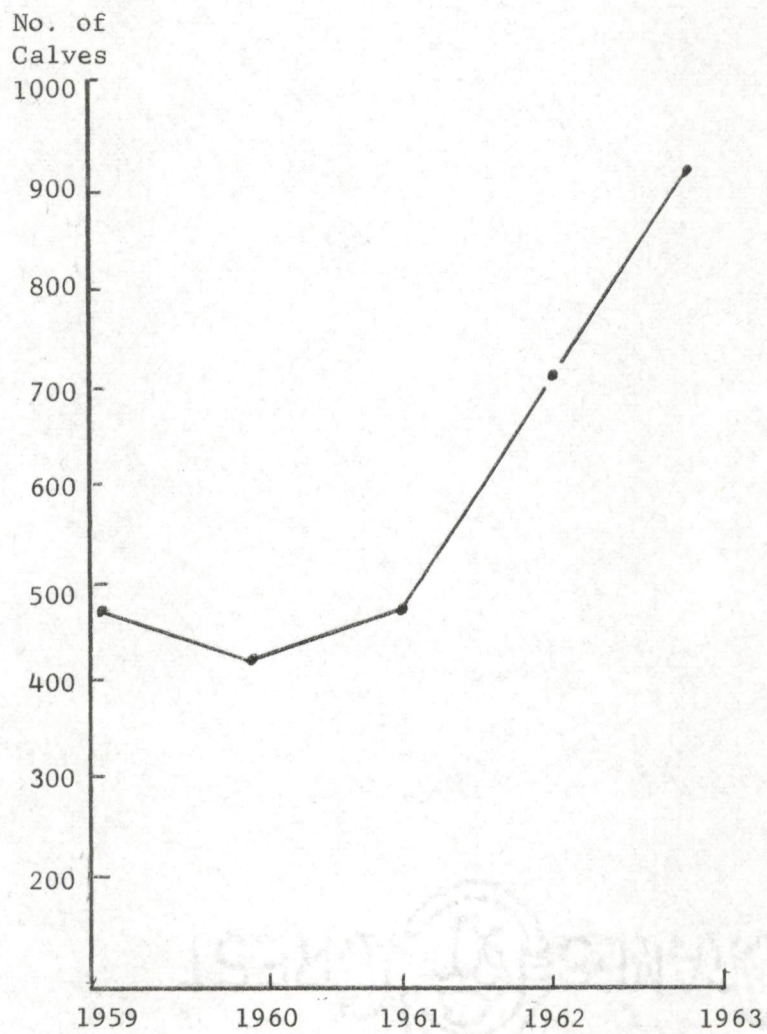


FIGURE 1

NUMBER OF CALVES MARKETING FROM WARREN COUNTY IN
COOKEVILLE FEEDER CALF SALES FROM 1959-1963

performing calves produced, their records indicate the potential for future production.

The increase in number of calves sold was slow from 1959-61, although the membership in the Association increased. The new members apparently needed time to cull low producing cows and add better herd sires before a high percentage of these calves could be marketed favorably in this sale.

The Effect of Year on Weight of Calves. The average weights of Warren County calves sold from 1959-63 is presented in Figure 2. The average weights remained steady for 1959-61 at about 400 lb. per head. The low for the 5-year period is 1962 and the high is for 1963 when the maximum number of calves were sold.

The average weight of calves for 1962 was 441.0 lb. which was the lowest yearly average of the 5-year period. This could have been caused by drought limiting the production of pasture and to an increase in new members that had not taken advantage of good production practices and who did not see the advantage of producing quality feeder calves.

The Effect of Year on Grade of Calves. The average grade of calves sold from Warren County for 1959-63 is shown in Figure 3. Only slight variations are noted in yearly changes of average grade. Average grade remained close to the Good grade for the 5-year period. There seems to be a close association between average yearly grade and weight (Figure 2 versus Figure 3).

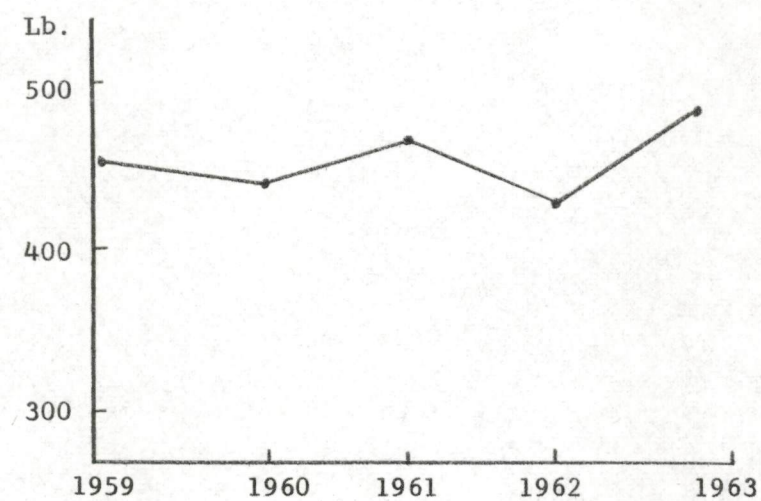


FIGURE 2

AVERAGE WEIGHT OF CALVES SOLD FROM WARREN COUNTY IN
COOKEVILLE FEEDER CALF SALES FROM 1959-1963

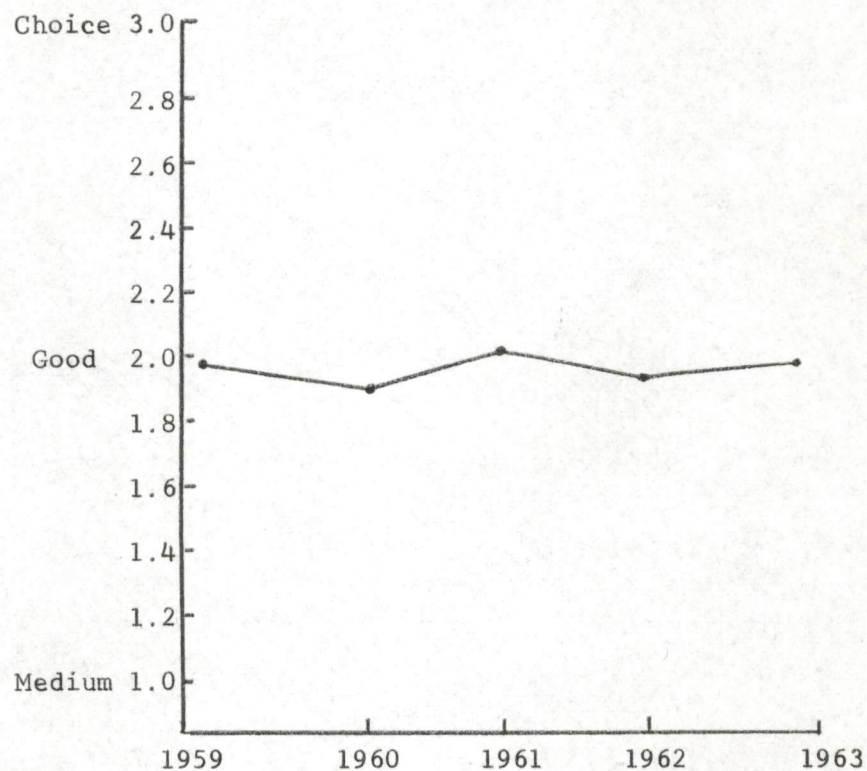


FIGURE 3

AVERAGE GRADE^a OF CALVES SOLD FROM WARREN COUNTY IN
COOKEVILLE FEEDER CALF SALES FROM 1959-1963

^aAssigned value of 1 for Medium, 2 for Good, and 3 for Choice grades.

Progress in the feeder calf program is evidenced by an increasing membership and the number of calves marketed with a constant or slightly improving level of performance of the calves consigned.

CHAPTER V

SUMMARY AND CONCLUSIONS

Records of 2998 steer and heifer beef calves from Warren County sold in the Cookeville Feeder Calf Sales from 1959 through 1963 were studied to determine the effects of breed and year on grade, weight, and number of calves marketed. The number of calves increased from 459 in 1959 to 924 in 1963.

Differences in percentage of Choice and Medium grades of calves were significant between grade and registered herds, and between Hereford and Polled Hereford herds. The portion of calves grading Choice and Medium from registered herds was 26.2 percent, and 18.0 percent, while calves from grade herds graded 15.0 percent and 31.7 percent, respectively. The percentage of calves grading Good was comparable for the two groups. The calves of Choice and Medium grades were 22.5 percent and 22.9 percent for Herefords and 9.9 percent and 40.3 percent for Polled Herefords, respectively.

The differences in average weight of calves from registered and grade herds and between registered Angus and Hereford herds were not significant. There was only a 17 lb. difference between average weights of calves from registered and grade herds. This difference was in favor of the grade herds.

The difference in weight of calves from registered Angus and Hereford herds was not significant.

The effects of year on number of calves sold in the Cookeville feeder calf sales shows that in 1959, 459 head were sold and 924 head in 1963. The number sold in 1959, 1960, and 1961 remained about constant at the 450 to 460 level. The number of calves sold increased to 710 in 1962 and to 924 in 1963. The performance of calves marketed has also improved over this five-year period, indicating that farmers are striving to improve their level of management and quality of their seedstock.

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