

SUMMARY REPORTS ON OTHER PROJECTS

Cow-Calf

Problems Associated with Induced Superovulation and Superfetation in Beef Cows

E. J. Turman, D. B. Laster, D. F. Stephens and R. E. Renbarger

Four trials involving 55 cows and 80 yearling heifers have been completed during the year. All trials involved the study of the effect of two PMS injections and one HCG injection on ovulation rate as determined by laparotomy or slaughter. No cows were allowed to calve.

These trials have indicated that the best practical treatment for inducing multiple pregnancies may be: (1) synchronization of estrus by use of an oral progestogen; (2) all cows injected on the same day with 1500 iu PMS on the fifth day and 2000 iu PMS on the seventeenth day after the average date of estrus following withdrawal of the progestogen; (3) injecting 4000 iu HCG intravenously on day-3 following the second PMS injection. The percentages of 38 yearling heifers and 19 cows so treated that were in each ovulation rate group were, respectively: 0 or 1 egg, 37 and 26 percent; 2 or 3 eggs, 50 and 37 percent; 4 or more eggs, 13 and 37 percent. This treatment will be imposed on a group of cows this spring that will be allowed to calve to study its effectiveness in inducing multiple births.

Publications

- Laster, D. B., E. J. Turman, B. H. Johnson, D. F. Stephens and R. E. Renbarger. 1970. Effect of sex ration on degree of transformation and chimerism in freemartins. *J. Animal Sci.* 30:322 (abstr.)
- Laster, D. B., E. J. Turman, D. F. Stephens and R. E. Renbarger. 1970. Ovulation rate of beef heifers treated with PMS. *J. Animal Sci.* 30:323 (abstr.)
- Johnson, B. H., D. B. Laster, L. L. Ewing, E. J. Turman and D. F. Stephens. 1970. Hormonal steroid levels in peripheral plasma of freemartins. *J. Animal Sci.* 30:321. (abstr.)

The Effect of an Anthelmintic Upon Performance of Spring-Calving Cows Grazing Bermudagrass

J. E. McCroskey, S. L. Armbruster, D. F. Stephens and R. Renbarger

In view of the general feeling that cattle grazing bermudagrass continuously are often heavily parasitized, a study was conducted to determine the effect of an anthelmintic upon performance of beef cows. Forty-eight grade Hereford cows which had been divided into three level-of-wintering treatment groups were used in the study. One-half of the cows in each of the three level-of-wintering groups were treated with an anthelmintic (thiabendazole) bi-monthly from May, 1968 to October, 1969. One-half of the cows served as controls and were not treated. The treated cattle were given 5 gm. thiabendazole per 100 lb. body weight at 60-day intervals. All cows grazed together in the same pasture.

Thiabendazole treated cows were heavier at weaning time and their calves averaged two pounds heavier at birth than controls. However, there was no apparent beneficial effect upon winter weight loss, milk production or weaning weights of their calves.

The Influence of Level of Milk Production of Brood Cows on Productivity, Supplemental Feed Requirements, and Efficiency of Beef Production¹

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L. E. Walters and J. V. Whiteman

Weaning weight is one of four major factors which influence profit from a cow-calf operation (the other three are percent calf crop, selling price per pound of calf, and annual cow cost). Research has shown a strong correlation between level of milk production of beef cows and weaning weight of the calves. Within the limits of milk produced by beef cows, each additional 10 pounds of milk produces approximately an additional pound of weaned calf weight.

¹ In cooperation with USDA, Agricultural Research Service, Animal Husbandry Research Division.

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.

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 will 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.

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 crossbreeds and Holsteins. The high level of supplement will consist of that amount necessary to maintain crossbreeds 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 crossbreeds. The very high level of nutrition will not be used for Herefords and crossbreeds.

One phase of the experiment will be conducted on the range to determine the actual performance of cows varying widely in milk produc-

tion 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.

One point should be emphasized. This research project is not a demonstration, because the results cannot be predicted. The question "How much milk should a range cow produce?" is a vital one to the beef cattle industry in charting the direction of future genetic change. This experiment is intended to help answer the question.

Females for this experiment were obtained in the fall of 1969, wintered under range conditions in the winter of 1969-70, and bred to calve in the winter of 1970-71.

Beef Cattle Selection Studies

R. R. Frahm

A selection study is being conducted at the Ft. Reno Livestock Research Station for the purpose of measuring how much increase can be realized from selection based on weaning weight and yearling weight performance under typical Oklahoma conditions. Of particular interest is the genetic relationship that exists between growth rate during the pre- and postweaning periods. If the genetic relationship is high between weaning weight and yearling weight, then selection of breeding stock can be made at weaning time and the breeder can be assured of selecting stock that are genetically superior for growth rate over the entire growing period.

To accomplish these objectives, 300 head of purebred Angus and Hereford cows are maintained in six different selection lines of 50 cows each. Two of the selection lines, one Hereford and one Angus, are being selected for increased weaning weight performance. Two other lines,

one Hereford and one Angus, are being selected for increased yearling weight. In these four lines, the herd sires and replacement females selected are those animals having the heaviest weaning weight or yearling weight depending on which line they are in. Another line of Angus cattle is being selected for weaning weight performance in which the bulls are selected based upon progeny test information. One line of Angus cattle is being maintained in which no selection is practiced. The purpose of this line is to serve as a control line to which the other lines will be compared as a basis for determining how much performance has been increased by selection.

Although this project is only in its early stages and it will be several years before conclusions can be reached concerning its primary objectives, the data collected to date have been used to answer other questions on problems confronting the beef industry.

Publications

The following articles have been published from this project during the past year:

- Frahm, R. R., L. E. Walters and G. V. Odell. 1969. Prediction of lean in yearling bulls by live K⁴⁰ count. *J. Animal Sci.* 30:2 (abstract)
- McLellan, C. R. Jr. 1967. Analysis of a permian potassium-40 counter as a predictor of lean in beef cattle. MS Thesis, Oklahoma State University.
- McLellan, C. R. Jr., J. V. Whiteman, L. E. Walters and G. V. Odell. 1969. Prediction of fat-free lean from live K⁴⁰ count. *J. Animal Sci.* 29:1 (abstract)
- Pherigo, D. L., J. V. Whiteman, R. L. Willham and D. F. Stephens. 1969. Association between day of birth and corrected weaning weight in beef cattle. *J. Animal Sci.* 29:1.
- Tanner, J. E. 1969. Sire-sex interactions and sex differences in growth and carcass traits of cattle and carcass traits of lambs. PhD Thesis, Oklahoma State University.
- Tanner, J. E., R. R. Frahm and J. V. Whiteman. 1969. Sire-sex interactions and sex differences in cattle. *J. Animal Sci.* 29:1 (abstract)
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Mouse Selection Studies

I. T. Omtvedt and R. R. Frahm

Project 1405 was initiated in 1969 to measure the direct and correlated response to selection for preweaning and postweaning rate of gain in mice. Growth rate is of considerable economic importance in all types of livestock and it is highly desirable in a breeding program to select animals at the earliest age possible. This project is designed to obtain information relative to the basic genetic relationship between early and late growth periods in mice which will provide a basis of application to other species.

Four different lines of breeding were crossed to form the foundation population from which six selected lines of 20 litters each (three lines selected on basis of individual weaning weight and three lines selected on basis of individual growth rate from three to six weeks of age) were formed. An additional 40 litters are maintained as a random mating control line for measuring genetic changes in the selection lines. Since the project is just in the first generation of selection, no results are available at this time.

Meats

The Desirability of Pork Products Processed Prior to Chilling

R. L. Henrickson, I. T. Omtvedt, and Robert Clary

High temperature curing of porcine muscle appears to have practical value for the meat industry. Data are available which support the view that muscle processed prior to chilling has a greater water-holding capacity than muscle processed post-chill. Total moisture, press fluid, and free fluids in the can all cause one to review rapid processing of meat with renewed vision. Pre-chilled processed muscle tended to take up the cure more rapidly and provided a more stable cured tissue as evident by nitrosopigment content. Shear force values indicated that pre-chilled canned muscle is not as tender as post-chilled muscle. This may be a practical advantage since canned ham is often over heated resulting in