As was found with spring calves, the implantation of suckling calves did not have any detrimental effect on subsequent feed-lot gains. The two-year average 128-day feed-lot gains were 267, 262, and 265 lbs. for those not implanted as calves, those implanted with 6 mg. of stilbestrol and those implanted with 12 mg., respectively. All calves were implanted with 24 mg. of stilbestrol at the beginning of the feedlot period.

Summary

Weight gains of fall calves have been increased an average of 10 lbs. by implanting with 6 mg. of stilbestrol and 18 lbs. by implanting with 12 mg. of stilbestrol. There was only a small difference in gain response of steers and heifers. Implanting calves did not have any detrimental effect on subsequent feed-lot gain.

Carcass Composition as Influenced by Animal Age[1]

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Introduction

The age of the beef animal at slaughter is an important feature influencing carcass composition. At birth, the carcass possesses a high percentage of lean with little fat. However, as age advances, the percent lean decreases and fatty deposition increases. Since lean (muscle) is the principle product of the beef industry, effort should be made to slaughter the animal at a time when muscle development is at its maximum. This would seem to be at an age when the animal slows down in muscle development and fat deposition tends to be more rapid. Generally, lean meat is produced more efficiently than fat. However, the age at which maximum muscling and efficiency of growth occur is not generally known.

Some evidence tends to indicate that all parts of the animal body do not mature at the same rate. Consequently, muscular development of the various wholesale cuts can be reached at different age levels. One may conclude that the most appropriate age to slaughter would be when the majority of the high priced cuts reach a point of maximum development or maximum development which is economically feasible.

This report is devoted to providing information on the absolute and relative differences which exist in carcass composition between young females and their aged counterpart. A comparison of data from animals varying in age should provide information for a sounder approach to more detailed research related to the optimum slaughter age.

[1] Financed in part by a contract from the Agricultural Marketing Service, United States Department of Agriculture.

Procedure

Sixteen (16) Hereford females of four different ages were used. Carcasses included are those which by visual appraisal had or approached a marbling score of "slight amount", as determined by an official meat grader of the United States Department of Agriculture. The 18-month-old cattle averaged slightly greater than the desired marbling score, while those at 6-months were slightly under the desired marbling level. The 18-, 42-, and 90-month age groups received similar nutrition and management. They were pastured on native grasses and supplemented *ad libitum* with cottonseed hulls and milo. The 6-month-old calves were creep-fed a ration consisting predominantly of ground milo, while obtaining milk from nurse cows that were on dry pasture.

Slaughtering and cutting were done following the recommended research procedures. Both sides of the carcasses were divided into wholesale cuts and each cut weighed to the nearest one-tenth pound. Percent high priced cuts were calculated by combining the weights of the round, rump, loin, and rib from both sides of the carcass. All percentage figures are expressed as a percent of the chilled carcass weight.

Physical separation of the 9-10-11th rib sections were made. The composition of this portion of the carcass was then used to estimate the composition of lean, fat, and bone in the carcass. Rib sections from both sides were separated to reduce possible error that may have resulted from splitting the carcass.

Results and Discussion

A review of these data points out the fact that dressing percent will increase with advancing age when all animals are kept at a comparable degree of marbling. The greatest change occurred between six and 42 months of age.

Age at slaughter did not greatly influence the percent of high priced cuts but did have a significant effect upon the percent hindquarter. As shown in Table 1, the percent hindquarter decreased with advancing animal age. A difference in the percent round (rump on) was also found to be significant. Calf carcasses were found to have the highest percent round with a progressive decline with advancing age.

A highly significant difference in percent loin was found. Changes in percent loin favored an increase with advancing age. The difference in percent rib was not great, but some increase was evident as age advanced.

These data pointed out that the percent chuck from the 90-month old cows was slightly greater than in the other three age groups. The percent chuck for the 6-, 18-, and 42-month age groups increased with animal age, but the difference was small.

Table 1.—Percentage Difference in Various Cuts as Influenced by Animal Age.[1]

Age mo.	Hind Quarter	High Priced	Round[2]	Loin	Rib	Chuck
6	50.4	47.1	25.3	13.8	7.9	24.1
18	49.1	46.8	23.4	15.0	8.4	24.5
42	48.5	46.7	23.8	14.4	8.5	24.8
90	47.8	46.4	22.0	15.7	8.7	26.1

[1] Marbling levels similar.
[2] Rump is included with the round.

The percentage of lean meat in the carcass tended to decrease as the age of the animal advanced (Table 2). It is of interest to note that approximately 50 percent of the carcass is actually edible red meat. When expressed in terms of pounds, the total amount of lean does increase, but the quantity is relatively small once the animal reaches 42 months of age. The cost involved in obtaining these extra pounds would determine the desirability of feeding at such advanced age levels. These data further point up the fact that additional work is needed to determine the age at which the beef animal ceases to provide maximum muscular development which is economically feasible. Rate of gain in some cattle indicate that maximum growth may occur prior to one year of age.

The percentage of fat increases quite rapidly with advancing age. This further indicates that the total fatty composition of the carcass is not directly associated with marbling as appraised in the rib eye. This fact would permit rapid progress in selecting against the undesired fat cover.

Meat or muscle development must be bred into cattle. The size of a muscle is influenced to a great degree by the number of fibers in the muscle. Ample research evidence now indicates that the number

Table 2.—Differences in Carcass Composition as Influenced by Animal Age.

Age mo.	Pounds in Carcass[2]			Percent in Carcass[1]			Loin Eye Area
	Lean	Fat	Bone	Lean	Fat	Bone	
6	146.8	91.3	35.7	55.2	32.3	13.0	5.9
18	234.2	172.9	59.2	51.4	35.7	12.9	9.2
42	361.6	250.5	85.0	50.3	37.4	12.5	11.2
90	370.1	319.8	87.5	48.6	39.7	11.8	11.7

[1] Estimated from the 9-10-11th rib separation.
[2] Calculations based on the carcass weight and the estimate obtained from the 9-10-11th rib section.

of muscle fibers is determined when the egg cell is fertilized. Consequently, good feeding or management practices can only exploit the potential muscular development. It is quite evident then, that the cows and bulls used for breeding purpose must have the potential for transmitting these muscle development characteristics.

Aside from visual appraisal, one may use carcass indices for appraising muscle development. Size of the loin eye muscle is one of the practical indications of the degree to which muscle has development. A correlation of .85 between the surface of the eye muscle and the separable lean in the carcass has been reported to exist. Heritability estimates have been reported to account for three-fourths of the variation in the size of the loin eye muscle. Consequently, the surface area of the loin muscle of animals at a given age may serve as a production tool.

The loin eye size is also influenced by animal age. Evidence in Table 2 indicates that the loin eye area increased rather rapidly up to 42 months with little increase between 42 and 90 months. This would indicate that maximum muscular development would likely occur prior to the time the animal reaches 42 months. These and other data indicate that such a point occurs between 12 to 18 months. Breed and animal differences will cause some variation. Further work is now planned to investigate the rate of muscle development as influenced by age.

The Growth and Development of Beef Calves From Weaning to Slaughter Weight with Reference to the Effect of Plane of Nutrition

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During the last decade, advances in our living standards, working conditions, human nutrition, and medical science have brought about drastic changes in the eating habits of most Americans. As far as the livestock industry is concerned, the most important of these changes has been the great "purge" of fat from our diets—particularly animal fats. The "modern" consumer is demanding, and getting, retail cuts with an absolute minimum of waste or external fat. The retailer, in turn, is exerting considerable pressure upon meat packers to supply him with trim wholesale cuts and the packer, naturally, is letting this pressure fall squarely on the shoulders of the producer. Consequently,