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Fall versus spring calving

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Summary and Conclusions

Increasing interest in beef production in Mississippi and the growing tendency to market slaughter animals as calves occasioned this study by the Animal Husbandry Department of the Mississippi Experiment Station over a period of three years to determine the possibility of increasing profits by the production of fall-born calves.

Use was made of the Experiment Station beef herd and pastures, and detailed observations were made with 119 calves, 62 of which were spring born and 57 fall born, extending from the breeding of the dams through the feeding and slaughter of the calves.

The study revealed certain advantages to be derived from the production of spring-born calves; these being:

(1) A greater per cent calf crop; the difference was about 19%.
(2) Slightly less feed required per calf from birth to end of finishing period.
(3) Slightly less age from birth to the end of the finishing period; the difference was 42 days.
(4) Less trouble occurred from screw worm infestation.

The study similarly revealed certain advantages to be derived from fall-born calves; these being:

(1) A shorter finishing period; the difference was approximately 30 days.
(2) Higher price for good and choice cattle during the marketing period for finished fall-born calves. The difference was approximately $6.00 per head.
(3) A price advantage when marketed as feeders at weaning time.
(4) Dams of fall-born calves weaned in August provided a suckling period two months longer and were in better condition for wintering than dams of spring-born calves weaned in December.

Other observations made in this study show that the number of cows per bull can be materially increased by the practice of breeding some of the cows to calve in the spring and others to calve in the fall. This practice would increase by 100% the number of chances for conception and would enable the reduction in number of bulls by approximately one-half or the breeding of approximately twice as many cows without increasing the number of bulls.

From these results it is evident that consideration should be given to the production of fall-born as well as spring-born calves.

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An increasing public preference in recent years for smaller cuts of beef has caused feeders to produce relatively fewer heavy cattle and to turn their attention to cattle of lighter weights. This gradual shift has caused certain modifications to be made in the beef industry which have affected the business all the way down the line from the retailer of meats to the producer. The producer is perhaps affected most of all, because different problems are involved in producing choice beef with calves and two-year-old steers. The marketing of calves means a quicker turnover of money for the grower and allows him to carry more cows over a period of time.

Beef cattle will continue to be produced in Mississippi and the income from their sale will constitute one of the major items of Mississppi farms. It is very likely also that in the face of the facts above a large per cent of the cattle that are marketed will be sold as calves, either as veals or weanlings or as baby beeves. As a result of the Agricultural Adjustment Act, more grain is produced on Mississippi farms, and, as never before, there is a seasonable surplus of corn and oats on a great many farms of the state which no doubt will eventually be sold through calves or older cattle.

In the beginning of the beef cattle industry in this country, calves that were destined to survive were born at the season of the year when environment conditions were most favorable to the young. This season was during the spring, after the cold winters had passed and when native food was most abundant. In more recent years, however, farming systems have changed and the old practice of allowing cattle to "root hog or die" during the winter period is fast becoming history. With our present methods of livestock farming, it is a rare occasion that we find a cattle owner who has not made the necessary provision for the maintenance of his herd during the no-grass season. In a number of cases, winter feeds for the cow herd are given first consideration at the beginning of the cropping season.

In spite of the improved conditions under which beef cattle are raised, approximately 50% of all beef calves in the United States, according to Snapp[1], are born during the three months, March April, and May, while the remaining 50% are born throughout the other nine months, with a fairly even distribution except for a slight increase in September and October. As a result of this practice of breeding cows to calve in the spring, a large per cent of the feeder calves and of finishing baby beeves are placed on the market within a relatively short interval of time. This practice tends to depreciate beef cattle values. If the numbers were distributed more uniformly throughout the year, producers would receive a larger return for their product. It is known also that heavier calves will make better feeders or will finish with a shorter feeding period than is possible with March, April, and May calves put on feed the first fall.

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*The author is indebted to Dr. E. W. Sheets, Chief in Animal Husbandry, for his helpful suggestions and criticism; to Professor Henry H. Leveck, who at the beginning of this study, was Acting Head of the Mississippi Experiment Station Animal Husbandry Department, for his assistance in planning and getting the project started; to Mr. Duff Maxwell, Livestock Superintendent, for his assistance in collecting the data; and to Dr. Victor R. Berliner, Associate Professor of Animal Husbandry, for his suggestions in the preparation of this report.

[1]Snapp, Roscoe R., Beef Cattle Production, 1930, p. 117.

Plan of Experiment: Three-Year Study Made With Experiment Station Beef Herd

Because of the importance of the problem of the season of birth of beef calves, this study was undertaken at the Mississippi Experiment Station in 1933. Detailed observations were made with 119 calves, 62 of which were spring-born and 57 fall-born. Steers and heifers were used in both lots. In the fall lot, 34 heifers and 23 steers were used. In the spring group, 31 heifers and 31 steers were used. On account of a lack of numbers to select from in the fall group, it was impossible to get an equal number from each sex.

In this study, an attempt was made to obtain data on the following phases of this problem:

1. Breeding efficiency of cows and bulls at different seasons of the year.
2. Significance of birth weights of beef calves.
3. Performance of calves born at different seasons of the year. Included in this phase was rate of gain and feed required to produce 100 pounds of beef.

This study was made with the beef herd on the Mississippi Experiment Station farm. A period of three years was required in order to get the necessary data and to eliminate as far as possible any annual variations in season and other conditions. The cows used were mature, high grade, and of good beef type. About half of them were Hereford and one-half were Angus breeding. Purebred Hereford and Angus bulls were used and in each case the bull was mature and in good thrifty condition. In each group of calves were Herefords, Angus, and crossbreds. Both heifers and steers were used in each lot.

Since the cow herd, prior to this experiment, had calved normally in the spring, some loss of time was experienced in breeding for the first crop of fall calves. The plan was to use 21 calves in the fall lot and the same number in the spring lot. For various reasons, it was not possible to finish this number in all lots. The breeding dates were December 15 to March 15 for fall calves, and May 15 to August 15 for spring calves. Allowing 283 days for period of gestation, the cows in the two lots should normally have started calving during the latter part of September and the latter part of February.

The dams of the fall calves were maintained on pasture only during the grazing season and during part of the wintering period on stalk fields and supplemental grazing crops. The rest of the winter they were fed roughage in the form of sorghum silage and Johnson grass hay and 2 pounds cottonseed meal daily. The dams of the spring calves likewise were maintained on pasture only during the grazing season and since they were dry during the winter they were maintained on sorghum silage, Johnson grass hay, and 1 pound cottonseed meal per head per day.

Both lots of calves were creep fed corn and cottonseed meal free choice on pasture. The fall-born calves were creep fed 1½ pounds grain per head per day, composed of 8 parts corn and 1 part cottonseed meal, while they were in dry lot with their dams. The first lot of fall calves reached the desired finished weight by the end of the grazing season. It was necessary to finish some of the calves in the 1935 and 1936 fall groups in dry lot, and all calves in the spring group received dry lot feeding after grazing season and before they reached the desired finished weight. The average slaughter weight for all calves in both groups was approximately 700 pounds.

Improved pastures were available and used with the cows and calves in this experiment from March 20 to December 15. While on pasture, the source of water supply was ponds or pools and, during the dry lot or wintering periods, deep well

water was supplied in concrete tanks. Salt in the compressed or brick form was used. No other minerals were fed. Considering the difference in season, the calves and dams in the two lots were handled as nearly alike as was practicable for comparable results.

Review of Literature

The study of beef calves born at different seasons of the year has been made only in a brief way. No published data are available pertaining to this particular study.

Snapp[2] points out six advantages of spring-born calves and eight advantages of fall-born calves. Severson[3] states that fall calves are cheaper than spring calves both for breeding and feeding. Ward and Jerdan[4] found that calves too young to wean and fatten for market in the fall can be made to pay a nice profit by letting them nurse the cows during the winter, feeding them grain on grass the following summer and selling them in the fall.

In regard to other classes of livestock, Arnold and Becker[5] conclude that there is no significant difference in annual milk yield of Jersey cows calving at different seasons of the year. Ferrin and McCarty[6] found that there is no significant difference in rate of gain and feed required to produce 100 pounds gain of fall-farrowed and spring-farrowed pigs.

Birth weights and performance records are not available for calves born at different seasons of the year, but Poljakov and Polpanskii found that the birth weights of spring-born male and female calves out of milking Shorthorn cows was 33 kg. and 30 kg., respectively. White[8] reports that the average birth weight of 116 crossbred Holstein and Angus calves was 91 pounds for males and 85 pounds for females. Severson[9] gives the birth weight of Angus spring-born calves as 71.6 pounds. Other investigators have found that the rate of gain of pigs during the suckling and finishing periods was influenced by birth weights. Smith[10] brings out this fact in a table which includes the birth weights of 1429 pigs. He states that the average birth weight of pigs is approximately 2½ pounds. Pigs weighing 1 to 1½ pounds make .38 and 1.18 pounds daily gain for suckling and finishing periods, respectively, while pigs weighing from 2½ to 2¾ pounds make .52 and 1.32 pounds daily gain for the two periods.

The rate of gain of the spring calves used in this study was in line with that obtained by other investigators. Bray[11] secured an average daily gain for a four-year period of 1.93 pounds when spring calves were creep fed on pasture. Trowbridge and Moffit[12], using the same ration with steer calves that was fed in this experiment, obtained 2.13 pounds daily gain to weaning time. The writer [13] found that creep-fed steer and heifer calves made the following daily gains: 1931—1.9 and 1.8; 1932—2.1 and 1.9, respectively. Morrison [14] gives results of 14 tests of creep feeding calves with an average daily gain of 1.79 pounds.

The breeding efficiency of some classes of farm animals, both males and females, is apparently influenced by weather conditions and plane of nutrition. McKenzie

[2]Snapp, Beef Cattle Production, p. 118.

[3]Severson, B. O., American Society of Animal Production, Penn. Agri. Exp. Sta., Nov. 1920, p. 14.

[4]Ward, W. F., and Jerdan, S. S., Bul. 631, Calf Feeding in Alabama and Mississippi, U. S. Dept. of Agri., p. 53, 1918.

[5]Arnold, P. T. D., and Becker, R. B., Journal Dairy Science, Fla. Agri. Exp. Sta., vol. XVIII, pp. 621-628.

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[10]Smith, William W., Pork Production, 1937, p. 113.

[11]Bray, Chas. I., American Society of Animal Production, La. Agri. Exp. Sta., 1934, p. 96.

[12]Trowbridge, E. A., and Moffit, H. C., Research Bul. 285, Mo. Exp. Sta., 1930, p. 51.

[13]Unpublished Data, Miss. Exp. Sta., 1931 and 1932.

[14]Morrison, F. B., Feeds and Feeding, 20th Edition, p. 706.

and Berliner[15] state that among other things the abnormal sperm increased during the summer with some rams and returned to normal level during the fall months. These authors found that the reproductive organs of bulls functioned in a similar way. Furthermore, it was found that overfeeding can disturb the normal spermatogenic activity in some males, while proper feeding can increase this function and inadequate care and undernutrition can impair sperm production.

Rice[17] gives the normal breeding season for cattle as any time during the year, while horses, sheep, and swine have a restricted season. Shepherds have long been aware that flushing—getting ewes in a rising condition—results in a larger lamb crop than with ewes not flushed. Horlacher[18] refers to work done along this line by the United States Department of Agriculture which shows that ewes that are flushed produce a larger number of twins and that they all breed more nearly at the same time. This results in a lamb crop of much more uniformity in age and size.

Range cattlement have found when cattle are maintained on a good plane of nutrition a larger annual calf crop is possible than with cattle that are kept on a low plane of nutrition. Green[19] points out that native range cows handled under range conditions produced a calf crop every two years, or a 50% calf crop, while cows on improved carpet grass and lespededa pasture, otherwise handled in a similar way, were in proper physical condition to calve annually.

15McKenzie, Fred F. and Berlinger, V. R., Reproductive Capacity of Rams, Bul. 265, Mo. Exp. Sta., 1937.

16McKenzie and Berliner, Unpublished Data, Mo. Exp. Sta., 1935.

17Rice, Victor Arthur, Breeding and Improvement of Farm Animals, 1st Edition, p. 87.

18Horlacher, Levi Jackson, Sheep Production, 1st Edition, 1927.

Breeding Efficiency of Cows and Bulls at Different Seasons of The Year

Although beef cows do not inherit a tendency for seasonal breeding and the reproductive organs of bulls apparently function better in cool than hot weather, it was found in these experiments that the per cent calf crop is lower when beef cows are winter-bred than when summer-bred. For each lot of fall calves, 30 cows were bred. Twenty-two calves were born in the fall of 1934, 19 in the fall of 1935, and 18 in the fall of 1936. Thus the per cent calf crop from beef cows when winter-bred averaged about 66%, while similar cows bred to similar bulls in summer will normally produce on the average 85% calf crop. The average weight of the cows that produced fall calves was 1079 pounds on December 6 and 994 pounds on March 22. This represented a decrease in weight of 85 pounds during the wintering period. Dry cows wintered in this manner will gain on the average about 50 pounds. This loss in weight, along with the effects from a lack of necessary minerals and vitamins during the no-grass period, are suggested causes for difference in calf-crop percentage from cows bred during the winter and during summer. It is apparent that this phase of the study should be further investigated for conclusive results.

Throughout the experiment, such of the cows as were bred for fall calves and failed to conceive were re-bred in the succeeding period and most of them produced spring calves.

Significance of Birth Weights of Beef Calves: Fall-Born vs. Spring-Born

The birth weights of beef calves was also given special consideration, since the calf that makes the most rapid gains usually produces the most economical beef. The weight was recorded on each calf the day it was born. Figure 1 shows the weights of three calves selected from the 1934 fall lot. It will be noted that two of these calves were born November 2 and the other born on November 4. One calf weighed 90 pounds, one 55 pounds, and the third 70 pounds, the last of which is near the average of the lot. The 90-pound calf weighed 740 pounds on October 18, the 70-pound calf 685 pounds, and the 55-pound calf 600 pounds on the same date. The daily gains from birth to October 18, 350 days, were 2.1 pounds for the 90-pound calf, 1.95 for the 70-pound calf, and 1.7 pounds for the 55-pound calf. Since these calves were fed as a group, the individual feed consumption per unit of gain could not be ascertained. It is recognized that hereditary and environmental influences can and do play an important part with beef calves before birth and during the suckling and finishing period. The illustration above, however, is representative of the results obtained in these experiments.

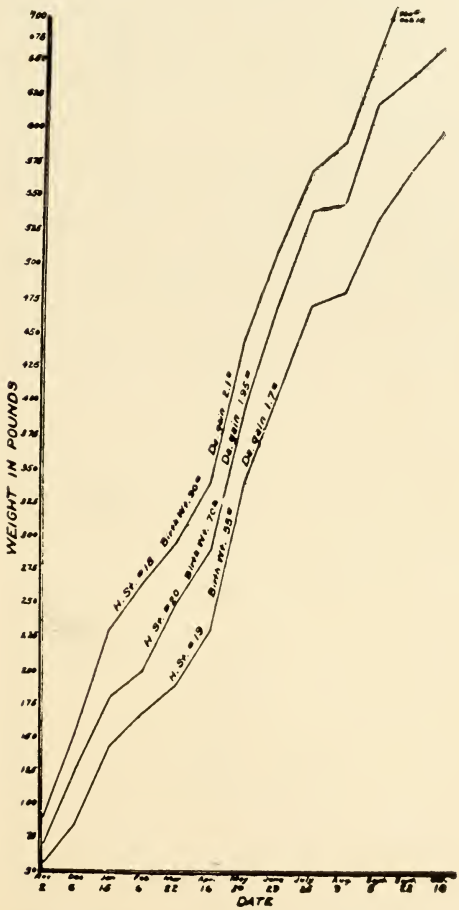

FIG. 1—INDIVIDUAL BIRTH WEIGHT, BIRTH DATE, DAILY GAIN, AND FINAL WEIGHT OF 3 CALVES FROM THE 1934 FALL LOT

It was found in these experiments that, on the average, male calves are heavier at birth than females. The average birth weight of 55 male calves was 69.9 pounds, while that of 64 female calves was 67.5 pounds. There was a difference of 2.4 pounds in favor of male calves. The average birth weight of 34 fall-born heifers was 68.8 pounds and 30 spring-born heifers was 66.1 pounds. The average birth weight of 23 fall-born males was 72.2 pounds and 32 spring-born males 68.2 pounds. There was a difference of 2.8 pounds in favor of fall-born calves. The average birth weight of 57 fall-born males and females was 70 pounds. The average birth weight of 62 spring-born males and females was 67.2 pounds.

The average birth date of the fall-born calves was about October 28, ranging from September 29 to January 9, while that of the spring-born calves was about March 22, ranging from February 1 to May 12.

Performance of Calves Born at Different Seasons of The Year

Tables 1, 2, 3, and 4 and figures 2, 3, and 4 show a summary of the results obtained with each lot of calves by years and an average of the three years. There are some slight yearly variations, but, as a whole, the results are consistent. It is noted that the calves in both lots reached the desired slaughter weight in about 12 months. On the average, the spring-born calves finished at a 42-day younger age than the fall-born calves. The rate of gain during the grain feeding period was slightly in favor of the fall-born calves.

The total grain required per calf, including the grain fed to the fall calves during the wintering period, was 1846 pounds for the fall-born calves and 1848.5 pounds for the spring-born calves. The fall calves consumed 1591 pounds of corn and 255 pounds of cottonseed meal. The spring calves consumed 1567.9 pounds of corn and 280.6 pounds of cottonseed meal. The fall calves should be charged with 95 pounds of cottonseed meal and about one-fourth of a ton of sorghum silage, which is the feed that the fall cows consumed in addition to that consumed by dry cows during the wintering period. If the small amount of roughage used and the maintenance of the dam is not taken into consideration, each calf in the fall group represents a total grain consumption of 1941 pounds and each spring calf 1848.5 pounds from birth to the end of the finishing period.

The calves in both lots had free access to corn and cottonseed meal, both of which were available in creeps while the calves were on pasture.

TABLE 1—COMPARISON OF 1934 FALL-BORN AND 1935 SPRING-BORN CALVES

	Lot 1 1934 Fall Calves	Lot 2 1935 Spring Calves
Number of calves	20	21
Average birth wts. (lbs.):		
Males	70.8	70.2
Females	65.3	65.3
All calves	68.3	67.6
Average initial wt., experimental feeding period (lbs.)	315.1	252.3
Average final wt. (lbs.)	700.0	700.7
Average total gain (lbs.)	384.9	448.4
Average daily gain (lbs.)	1.94	1.7
Average age of feeder (days)	173.0	94.0
Length of feeding period (days)	198	264
Average age at end of finishing period (days)	371	358
Average dressing per cent	61.4	62.0
Average chilling per cent	1.9	1.9
Feed consumed per calf per day (lbs.):		
Corn	7.25	7.38
Cottonseed meal	.86	1.1
Sorghum silage	....	5.6*
Johnson grass hay	....	1.9*
Feed consumed per 100 lbs. gain (lbs.):		
Corn	373.7	434
Cottonseed meal	44.3	64.7
Sorghum silage	....	125.5*
Johnson grass hay	....	44.0*

*Calculated on number of days calves were fed in the barn.

TABLE 2—COMPARISON OF 1935 FALL-BORN AND 1936 SPRING-BORN CALVES

	Lot 1 1935 Fall Calves	Lot 2 1936 Spring Calves
Number of calves	19	20
Average birth wts. (lbs.):		
Males	76.0	62
Females	73.3	64
All calves	83.2	62.8
Average initial wt., experimental feeding period (lbs.)	316.3	269.1
Average final wt. (lbs.)	705.8	695.2
Average total gain (lbs.)	389.5	430.1
Average daily gain (lbs.)	2.02	1.93
Average age of feeder (days)	163	104
Length of feeding period (days)	192	222
Average age at end of finishing period (days)	355	326
Average dressing per cent	62.0	61.9
Average chilling per cent	1.5	1.4
Feed consumed per calf per day (lbs.):		
Corn	7.88	7.00
Cottonseed meal	.67	.86
Sorghum silage	....	2.83*
Johnson grass hay		1.45*
Feed consumed per 100 lbs. gain (lbs.):		
Corn	390.0	364.58
Cottonseed meal	33.16	44.78
Sorghum silage	....	52.76*
Johnson grass hay	....	26.72*

*Calculated on number of days calves were fed in the barn.

TABLE 3—COMPARISON OF 1936 FALL-BORN AND 1937 SPRING-BORN CALVES

	Lot 1 1936 Fall Calves	Lot 2 1937 Spring Calves
Number of calves	18	21
Average birth wts. (lbs.):		
Males	70.2	72.7
Females	68.5	69.0
All calves	69.0	70.9
Average initial wt., experimental feeding period (lbs.)	299.0	276.2
Average final wt. (lbs.)	695.1	687.1
Average total gain (lbs.)	396.1	410.9
Average daily gain (lbs.)	1.72	1.96
Average age of feeder (days)	165.0	99.0
Length of feeding period (days)	230	209
Average age at end of finishing period (days)	395	308
Average dressing per cent	61.4	62.5
Average chilling per cent	1.9	1.9
Feed consumed per calf per day (lbs.):		
Corn	6.32	5.81
Cottonseed meal	1.93	1.64
Johnson grass hay	.65*	3.58
Feed consumed per 100 lbs. gain (lbs.):		
Corn	367.4	296.4
Cottonseed meal	112.2	83.67
Johnson grass hay	35.0*	49.11

*Hay consumed by 7 calves while in barn.

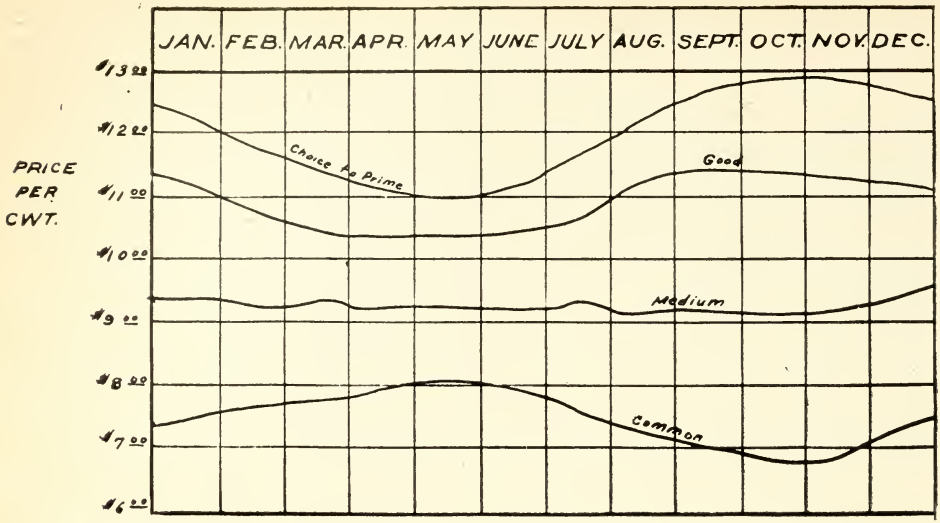

FIG. 5—AVERAGE MONTHLY PRICE OF STEERS OF THE VARIOUS GRADES AT THE CHICAGO MARKET FROM 1922 TO 1928.

TABLE 4—COMPARISON OF FALL-BORN AND SPRING-BORN CALVES—THREE-YEAR AVERAGE

	Lot 1 Fall Calves	Lot 2 Spring Calves
Number of calves (total)	57	62
Average birth wt. (lbs.):		
All calves	70.0	67.2
Average initial wt. (lbs.)	310.1	265.9
Average final wt. (lbs.)	700.3	694.3
Average total gain (lbs.)	390.2	428.4
Average daily gain (lbs.)	1.88	1.83
Average age of feeder (days)	167	99
Length of feeding period (days)	207	233
Average age at end of finishing period (days)	374	332
Average dressing per cent	61.6	62.1
Average chilling per cent	1.8	1.7
Slaughter grade:		
Number choice calves	27	29.
Number good calves	30	32
Number medium calves		1
Feed consumed per calf per day (lbs.):		
Corn	7.15	6.73
Cottonseed meal	1.15	1.20
Sorghum silage	.....	*4.22
Johnson grass hay	.65	2.31
Feed consumed per 100 lbs. gain (lbs.):		
Corn	379.3	366.0
Cottonseed meal	61.0	65.5
Sorghum silage	.....	39.1
Johnson grass hay	35.0	39.9

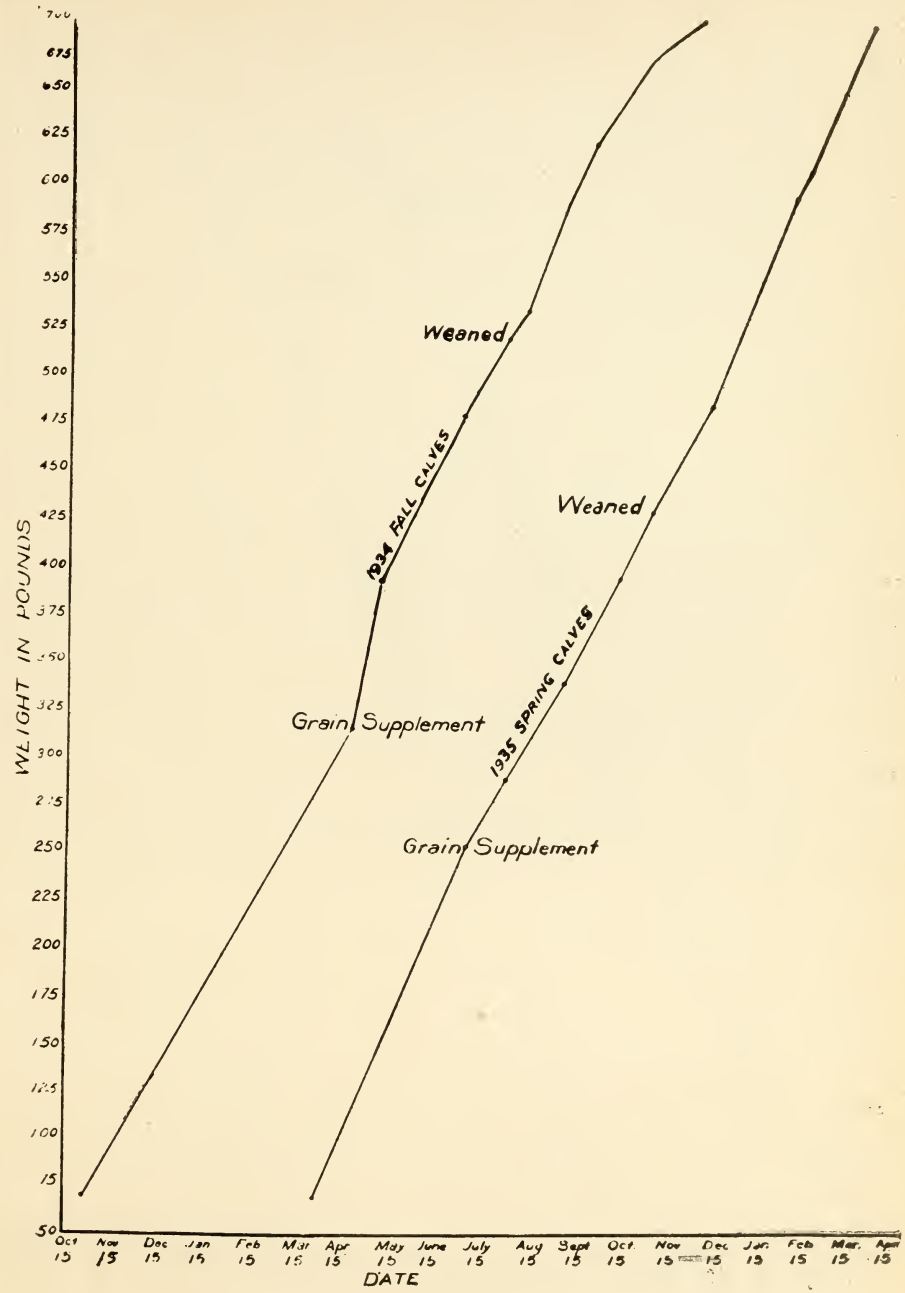

FIGURE 2—COMPARISON OF 1934 FALL-BORN AND 1935 SPRING-BORN CALVES

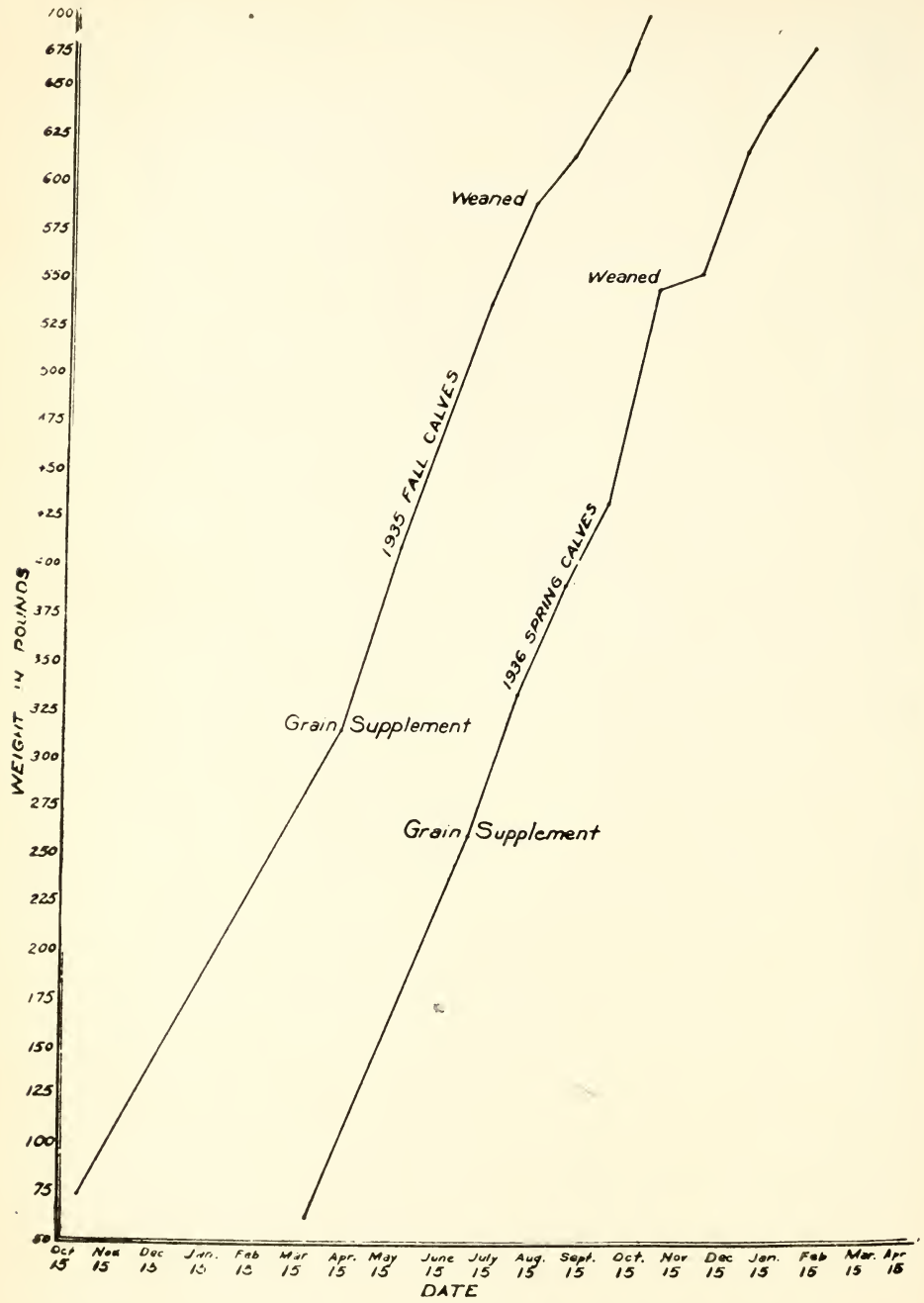

FIGURE 3—COMPARISON OF 1935 FALL-BORN AND 1936 SPRING-BORN CALVES

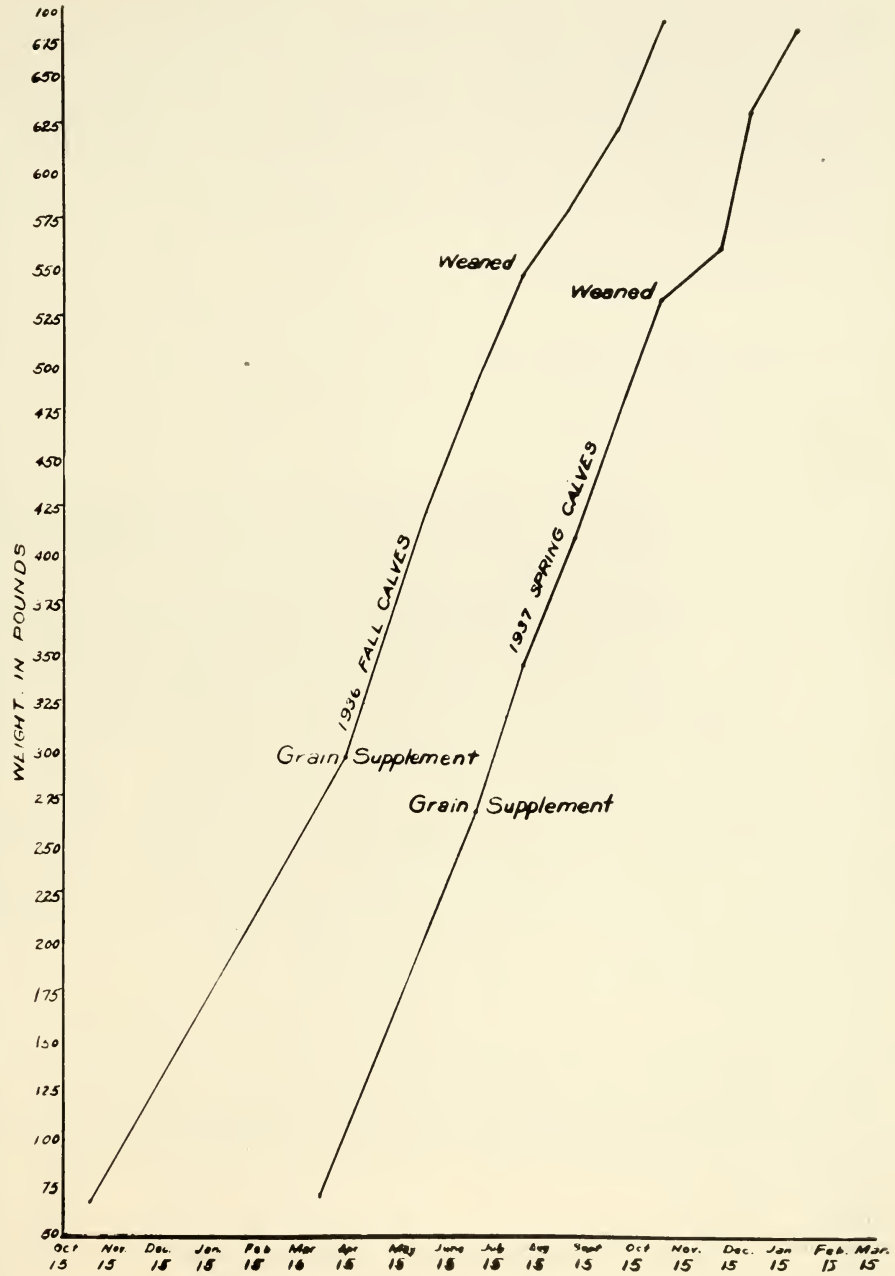

FIGURE 4—COMPARISON OF 1936 FALL-BORN AND 1937 SPRING-BORN CALVES

On account of the seasonal variation in market price of cattle of these grades, the fall-born calves could be sold at a better price per pound than spring-born calves. It is noted (fig. 5) that good and choice cattle sell at a higher price per hundred pounds in October and November than in February and March. The price of feeder cattle and butcher cattle of the lower grades is usually less at this season due to the heavy run of grass cattle and the cull dairy cows on all central markets.

Since all calves used in this study were slaughtered locally and the carcasses disposed of locally, it was not possible to obtain a comparative selling price for the two lots. Detailed carcass studies were made of each animal and a rib cut from each carcass was shipped to Washington, D. C., where detailed cooking and palatability studies were made of the meat. Differences between carcasses of fall-born and spring-born calves were not significant.

Observations pertaining to the health of the animals used in this study should be given some consideration. None of the spring-born calves that were used in the test became ill or were infested with parasites, while the navels of some of the fall-born calves each year became infested with Calliphorine myiasis, commonly known as screw-worms. This trouble usually occurred with the first calves born or those that were born before frost. The fall-born calves were probably not disturbed as much by flies and mosquitoes as the spring-born calves. The male calves in each lot were castrated at about two months of age. This operation apparently did not affect their health or rate of gain.

The cows that produced fall calves, having been dry since August, were carrying more flesh at calving time than the cows that produced spring calves. It was found to be advisable to keep the fall calves with their dams approximately two months longer than was the practice with spring calves because of the abundance of forage during the summer.

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