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Effect of Winter Feeding Level on Brood Cow Performance

AGRICULTURAL EXPERIMENT STATION
AUBURN UNIVERSITY
E. V. SMITH, DIRECTOR/AUBURN, ALABAMA

SUMMARY OF FINDINGS

Mature beef brood cows can be wintered on hay alone provided they are in good flesh at beginning of winter and receive ample feed immediately following so that body weight losses can be recovered. Young cows were found to require special treatment, however, probably including feeding of additional protein and energy.

Specific findings are summarized here:

(1) Cows confined to a bermudagrass sod lot and full-fed medium quality grass hays lost an average of 110 pounds during winter (November 1-April 1). This weight loss was not excessive and did not adversely affect mature cow performance.

(2) Calves from cows fed 2 pounds of cottonseed meal daily and a limited amount of grass hay (17.6 pounds) on browse pasture during winter were 47 pounds heavier at weaning than those from restricted-fed cows – 484 vs. 437 pounds.

(3) Calves from the optimum-fed dams graded slightly higher at weaning, but stocker grades were not different. Optimum-fed calves were valued at $13.37 more per calf at weaning, primarily because of the 47-pound weight advantage.

(4) Replacement heifers reared under the restricted-feeding regimen were considerably smaller at 2 and 3 years of age, but about equalled the better-fed heifers by 6 years.

(5) Optimum-fed steer calves were 44 pounds heavier at weaning than those from restricted-fed dams, and this weight advantage was maintained through a post-weaning, growing-finishing program.

(6) Sixty-seven per cent of replacement females on the optimum regimen calved initially at 2 years of age, as compared with 50 per cent of those from the restricted feeding. In addition, more of the optimum-fed heifers that calved at 2 years of age also calved again the following year.

(7) The overall calving rates for cows 3 years and older were 87 and 86 per cent for optimum and restricted, respectively. Percentage calf crop weaned was 81 and 78 per cent.

(8) Feeding treatment did not affect calving date.

(9) Milk production of cows on both feeding treatments declined substantially during winter. However, restricted-fed cows responded to lush spring pasture and, after 60 days on pasture, had milk production equal to cows that were better fed during winter.

Beef cows and calves on the two levels of winter feeding at the Lower Coastal Plain Substation are shown during one test year. The optimum-fed group (top) was fed good quality grass hay along with daily feeding of 2 pounds of cottonseed meal. In addition, the animals had access to an improved river bottom pasture that provided browse in early winter and considerable early spring grazing. Cows on restricted feeding (right) were full-fed medium quality grass hay as their only feed, while confined to a small grass sod lot.

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R. R. HARRIS, *Associate Professor of Animal Science*
V. L. BROWN, *Superintendent, Lower Coastal Plain Substation*
W. B. ANTHONY, *Professor of Animal Science*

WHEN THE STUDY reported here was begun in 1957 there were approximately one million beef brood cows in Alabama. At that time there was little reliable research information available concerning different feeding regimens for wintering such cattle.

Records from the several brood cow herds of Auburn University Agricultural Experiment Station System showed that grazing was available only 8 to 9 months of the year (March-November) and that supplemental feed was needed for the remaining 3 or 4 months. However, little was known about effect of nutrition level during the winter feeding period on the subsequent performance of cows on spring-summer grazing and on the pre- and post-weaning performance of their calves.

Foster and his co-workers *(2)* at the North Carolina Agricultural Experiment Station fed varying levels of protein supplement to spring-calving cows wintered on forest range. Loss of weight was less and summer gains of the calves slightly greater in the group receiving the highest level of protein supplement. Most of the differences in winter weight changes of cows were offset during the summer.

Zimmerman *et al. (7)* at the Oklahoma Agricultural Experiment Station studied the effect of three winter levels of nutrition on the growth and reproductive performance of beef brood cows in a spring calving system. On the lowest level, the test animals made no gain during the winter as calves and lost 200 pounds each winter feeding period thereafter. They had no difficulty at first calving and there was no effect on percentage calf crop weaned. In 2 out of 3 years on this low nutritive level, birth weights of calves were reduced, and in all years the calving interval was slightly increased. On the two higher nutritive levels the weaning weight of calves was increased, but this additional weight did not offset the increased cost of winter supplement. The low nutritive level had a slight depressing effect on structural growth of the cows.

In a later Oklahoma report *(5)*, Pinney *et al.* indicated that calf birth weights, milk yield of dams, calf weaning weights, and percentage calf crop weaned were depressed by the low nutritive level. However, differences became smaller as the cows approached maturity. The medium and high feeding rates on which the cows gained 0.5 to 1.0 pound daily during winter (November 1-April 15) resulted in the earliest conception, highest milk production, and heaviest calf weights at birth and weaning. However, the continuous high feeding rate also was detrimental in that milk production was decreased and percentage of live calves at first parturition was lowered.

Pinney *et al. (4)* reported on the effect of pre-weaning level of nutrition on subsequent feedlot performance and carcass composition of calves from the study already mentioned. Pre-weaning retardation resulted in a 30 per cent reduction in weaning weight, 11 per cent reduction in final feedlot weight, and a decrease of 11 and 14 per cent in total lean and fat, respectively; however, feed efficiency was improved and there was no adverse effect on gain during the feedlot period.

In the Alabama study reported by Smith and Grimes *(6)*, fall-calving cows were either fed protein and energy at recommended levels or at about 70 per cent of that rate. Calf weaning weight and sale price favored the better-fed dams by 42 pounds and 70¢ per hundredweight. However, economic returns were similar for the two groups.

Results from a Virginia study *(3)* indicate that calves need feed in addition to milk to make satisfactory gains. Creep-fed calves from cows restricted to 50 or 75 per cent dry matter intake of full-fed contemporaries gained approximately 2 pounds daily, whereas those getting only the dam's milk gained 0.33 pound daily.

Because of the cost of feeding large amounts of supplemental feed to brood cows, it is important to know the minimum nutritive level conducive to efficient production. This is especially true for cows nursing fall-dropped calves, because of the additional nutrient requirements of a lactating cow and the length of winter feeding period.

EXPERIMENTAL METHODS

Seven bred Hereford heifers and 10 open Hereford heifers were assigned to each of two test groups on November 1, 1957, at the Lower Coastal Plain Substation, Camden, Alabama. One group was placed on a winter feeding program designed to be optimum for cows wintered in this area. The second group was subjected to a restricted, or low level, feeding plan.

The optimum group was full-fed good quality grass hay and hand-fed 2 pounds of cottonseed meal (41 per cent) per head daily during the winter period (November 1-March 31). In addition, the animals had access to an improved river bottom pasture that furnished some browse during early winter and considerable grazing in early spring.

The restricted-fed cows were full-fed a medium quality grass hay during the winter (November 1-March 31) while confined to a 3.5-acre sod lot. This lot provided an average of 8,000 square feet per cow, with a range of 3,200 to 21,800. The cows did not receive protein supplement.

All cattle were placed together April 1 each year and grazed river bottom, clover-grass pastures until the following November 1. Performance-tested Angus bulls were placed with cows from January 1 to May 1 each year. Bulls were rotated between cow groups on an annual basis.

Steer calves of both groups were combined at weaning in a post-weaning, growing-finishing program. This consisted of 4 to 5 pounds of supplemental feed on late summer pasture, followed by cool-season annual grazing and a subsequent drylot fattening period. Steers were slaughtered and carcass data obtained.

After weaning, all heifers were managed as one group until November 1. At that time the optimum-level heifers were placed on an improved clover-grass pasture and fed a limited amount of grain until 15 months old. Heifers of the low level group were moved to a small lot November 1 and fed medium quality grass hay. For breeding, both groups were placed with their respective cow herds as they reached 15 months of age.

Replacement females were not culled, but three cows were removed from test because of sickness. Beginning in November 1965, all original cows and those that had reached 6 years of age were removed from the study. These animals were retained until all pertinent reproductive data were obtained.

Milk production data were obtained several times during the study by the oxytocin procedure developed at Auburn University Agricultural Experiment Station *(1)*. On the basis of butterfat content, the quantity of 4 per cent fat-corrected milk (FCM) was calculated and adjusted to a 12-hour value.

All cows and calves were weighed November 1 and April 1 each year. Steers on post-weaning programs were weighed at approximately 28-day intervals. Replacement heifers were weighed November 1 and again at 15 months of age. Thereafter, the replacement heifers were treated as cows.

Calves were weaned at 250 days (±3 days) and no adjustment was made in weaning weight data for age of calf. Weights were adjusted for age of dam differences: +15, +10, and +5 per cent, respectively, for cow ages 2, 3, and 4 years. All weaning weight data also were adjusted to a steer equivalent basis by adding 25 pounds to actual weights of heifers.

RESULTS AND DISCUSSION

Hay Quality and Consumption

Hay was full-fed as the sole source of energy during winter to the restricted cows. They received an average of 24.71 pounds daily during the 9-year study, Table 1. Cows in the optimum group that received 2 pounds of cottonseed meal (CSM) daily and had access to pasture got only 17.61 pounds of hay. Thus, the 282 pounds of CSM and pasture browse replaced 1,001 pounds of hay during the 141-day winter period. Feed cost per animal was

TABLE 1. AMOUNT OF HAY FED, CRUDE PROTEIN CONTENT, AND PROTEIN INTAKE ON OPTIMUM AND RESTRICTED FEEDING

Year	Hay fed daily		Crude protein in hay		Daily protein intake[1]	
	Optimum	Restricted	Optimum	Restricted	Optimum	Restricted
	Lb.	*Lb.*	*Pct.*	*Pct.*	*Lb.*	*Lb.*
1957-58[2]	13.19	13.18	------	------	------	------
1958-59	20.24	23.44	7.02	6.65	2.16	1.47
1959-60	27.79	33.25	------	------	------	------
1960-61	12.83	23.27	10.96	8.52	2.15	1.87
1961-62	18.37	25.58	8.47	7.71	2.29	1.86
1962-63	18.87	26.90	9.45	9.26	2.50	2.35
1963-64	15.67	27.06	7.68	8.36	1.96	1.93
1964-65	15.33	23.75	7.20	6.48	1.86	1.46
1965-66	16.17	25.96	7.78	6.87	2.01	1.69
AVERAGE	17.61	24.71	8.36	7.69	2.13	1.80

[1] Includes crude protein obtained from protein supplement where applicable.
[2] Both groups wintered on pasture with some browse available.

$11.98 for cottonseed meal (@ $85 per ton) and $12.51 for hay (@ $25 per ton). Assuming no charge for pasture, costs of the two rations are comparable. However, calves from the optimum-fed cows were 47 pounds heavier at weaning, Table 3.

Crude protein contents of the two hays were not different, averaging 8.36 per cent for that fed the optimum group and 7.69 per cent for that fed to the restricted cows (dry matter basis).

An intake of 1.6 to 1.9 pounds of crude protein daily is adequate for a mature cow suckling a calf, and cows in the optimum and restricted groups averaged consuming 2.13 and 1.80 pounds per day, respectively, Table 1. For at least 2 of the 9 years, however, the restricted cows consumed insufficient protein (1958-59 and 1964-65). Although this protein deficiency probably was not sufficiently restricted to affect mature cows, it was highly undesirable for heifer replacements entering the group at 15 months of age and for 2-year-old heifers nursing calves.

Winter Weight Loss of Cows

Body weight changes were recorded for all cows; however, only those with calves on November 1 each year were considered in calculating loss of body weight during the winter period, Table 2.

The weight losses of 61 and 110 pounds for optimum and restricted, respectively, were not excessive. All cows were in good condition prior to November 1, because they all had access to good clover-grass pastures beginning April 1.

Within a feeding treatment, young cows lost relatively more weight than mature cows, and weight losses became progressively

TABLE 2. MEAN WEIGHT LOSSES OF COWS DURING WINTER PERIOD ON OPTIMUM AND RESTRICTED FEEDING[1]

Year	Level of winter feeding	
	Optimum	Restricted
	Lb.	*Lb.*
1957-58	144	216
1958-59	67	119
1959-60	88	125
1960-61	24	70
1961-62	69	161
1962-63	19	76
1963-64	49	61
1964-65	55	93
1965-66	43	61
AVERAGE	61	110

[1] Only cows with calves as of November 1 considered.

less as cows approached maturity. Weight losses were rather severe (144 pounds) for the 2-year-old restricted females that weighed about 700 pounds on November 1. One-half of these restricted-fed heifers did not calve at 2 years of age, Table 9, thus allowing some compensatory weight gain.

Calf Weaning Weights

During the 8-year study, calves from the optimum-fed cows averaged 484 pounds at weaning, which was 47 pounds heavier than those from the restricted-fed cows, Table 3. This difference was highly significant ($P<.01$). The largest difference observed during the 8-year period was 68 pounds and the smallest was 24 pounds.

TABLE 3. CALF WEANING WEIGHT DATA ON OPTIMUM AND RESTRICTED FEEDING

Year[1]	Optimum		Restricted		Difference favoring optimum
	Number of calves	Adjusted weaning wt.	Number of calves	Adjusted weaning wt.	
	No.	*Lb.*	*No.*	*Lb.*	*Lb.*
1958-59	14	487	12	449	38
1959-60	14	464	13	400	64
1960-61	17	476	10	430	46
1961-62	27	475	19	445	30
1962-63	30	504	21	436	68
1963-64	33	485	25	461	24
1964-65	26	476	20	425	51
1965-66	23	504	17	450	54
TOTAL OR AV.	184	484	137	437	47

[1] Test actually was begun in 1957; however, feeding treatments were changed after first year so data for the 1957-58 calf crop were not included.

The difference in total number of calves weaned (47 more for optimum group) is partially the result of more females being born in that group (45 vs. 35 in restricted group) during the years in which replacements were being kept. Based on the number of cows available to calve, the calf crops averaged 85 per cent in the optimum group and 82 per cent in the restricted group.

Growth Rate and Mature Size of Replacement Heifers

Body weight data for replacement females at weaning (250 days), breeding (15 months), and first calving (2 years) are presented in Table 4. The optimum heifers averaged 41 pounds heavier at weaning, 106 pounds heavier at 15 months, and 50

TABLE 4. BODY WEIGHT OF REPLACEMENT FEMALES ON OPTIMUM AND RESTRICTED FEEDING[1]

Year of birth	Optimum				Restricted			
	No. of heifers	Av. wt. weaning	Av. wt. 15 mo.	Av. wt. 2 yr.	No. of heifers	Av. wt. weaning	Av. wt. 15 mo.	Av. wt. 2 yr.
	No.	*Lb.*	*Lb.*	*Lb.*	*No.*	*Lb.*	*Lb.*	*Lb.*
1958	5	422	565	766	5	380	434	659
1959	10	402	532	763	5	345	421	694
1960	7	407	507	739	4	336	438	726
1961	11	423	533	851	11	412	480	794
1962	12	452	618	757	10	388	520	716
TOTAL OR AV.	45	424	574	780	35	383	468	730
Difference		+41	+106	+50				

[1] Weight data for 2 years of age include the open heifers.

TABLE 5. COMPARATIVE GROWTH RATES OF REPLACEMENT HEIFERS ON OPTIMUM AND RESTRICTED FEEDING[1]

Cow age	Optimum	Restricted	Difference
	Lb.	*Lb.*	*Lb.*
Weaning	424	383	41
15 months	574	468	106
2 years	780	730	50
3 years	865	810	55
4 years	942	901	41
5 years	988	942	46
6 years	1,036	974	62

[1] Values shown are weighted means of all females at age indicated.

pounds heavier at 2 years. However, it is noted that body weight data reported for 2 years of age included the open heifers.

The apparent ability of the restricted-fed heifers to "catch up" in body size between 15 months and 2 years is explained in part by the fact that only 50 per cent of this group calved at 2 years of age, as compared with 67 per cent of optimum heifers.

Body weight data for replacement heifers at intervals until maturity (6 years) are reported in Table 5. These data indicate that at 5 or 6 years of age the difference in body size was negligible and that the mature body size of the restricted-fed replacement females was not affected. The fact that the optimum-fed cows weaned an average of 4.16 calves during the study to the restricted cows 3.62 probably contributed to the lack of effect on mature body size. Also, the summer feeding level was adequate to allow some compensatory growth of the young, restricted-fed cows.

Cows were heaviest in the fall, Table 6, and about 150 pounds lighter the following April 1, Table 7. All cows had access to quality pasture and regained winter weight loss by November 1.

TABLE 6. COW WEIGHTS ON NOVEMBER 1 ON OPTIMUM AND RESTRICTED FEEDING[1]

Year born and feeding treatment	Weight by age (years)							
	2	3	4	5	6	7	8	9
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
1955-56								
Optimum	1,036	988	1,023	999	1,142	1,103	1,143	1,205
Restricted	1,013	985	1,030	1,042	1,093	1,049	1,115	1,162
1956-57								
Optimum	908	956	999	1,044	1,073	1,135	1,116	-------
Restricted	938	941	1,030	1,099	1,104	1,135	1,073	-------
1958-59								
Optimum	780	894	949	1,011	1,039	-------	-------	-------
Restricted	-------	892	867	942	1,008	-------	-------	-------
1959-60								
Optimum	760	836	996	995	-------	-------	-------	-------
Restricted	800	866	908	934	-------	-------	-------	-------
1960-61								
Optimum	784	857	871	964	-------	-------	-------	-------
Restricted	830	803	899	943	-------	-------	-------	-------
1961-62								
Optimum	885	911	939	-------	-------	-------	-------	-------
Restricted	849	845	919	-------	-------	-------	-------	-------
1962-63								
Optimum	795	868	-------	-------	-------	-------	-------	-------
Restricted	732	735	-------	-------	-------	-------	-------	-------

[1] Includes cows that had calved by November 1 and those that were pregnant; does not include open cows.

TABLE 7. COW WEIGHTS ON APRIL 1 ON OPTIMUM AND RESTRICTED FEEDING[1]

Year born and feeding treatment	Weight by age (years)						
	2	3	4	5	6	7	8
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
1955-56							
Optimum	891	914	918	1,004	1,041	1,123	1,173
Restricted	797	888	883	991	926	1,009	1,100
1956-57							
Optimum	841	896	942	969	1,041	1,058	------
Restricted	842	876	977	902	993	1,049	------
1958-59							
Optimum	741	822	916	1,004	------	------	------
Restricted	737	705	793	863	------	------	------
1959-60							
Optimum	714	802	892	910	------	------	------
Restricted	674	764	857	863	------	------	------
1960-61							
Optimum	699	748	836	893	------	------	------
Restricted	706	802	794	865	------	------	------
1961-62							
Optimum	800	892	904	------	------	------	------
Restricted	728	792	828	------	------	------	------
1962-63							
Optimum	744	794	------	------	------	------	------
Restricted	621	732	------	------	------	------	------

[1] Includes only cows with calves at side; open cows not included.

Post-Weaning Steer Performance

Steers from the two groups were combined after weaning and their post-weaning performance measured during a growing-finishing program. Cool-season annual grazing, such as oats and clover, followed by a drylot fattening period was the system used.

The optimum steer calves were 44 pounds heavier at weaning, 39 pounds heavier at beginning of drylot fattening, and 43 pounds heavier at slaughter, Table 8. That the heavier calves maintained their weight advantage throughout the growing-finishing period is important to commercial cattlemen.

TABLE 8. POST-WEANING STEER PERFORMANCE ON OPTIMUM AND RESTRICTED FEEDING, 5-YEAR WEIGHTED MEANS

Performance measure	Optimum	Restricted	Difference
Total number of steers	55	37	
Weaning weight, lb.	456	412	44**
Begin feedlot weight, lb.	772	733	39
Final feedlot weight, lb.	964	921	43

** Highly significant (probability less than .01).

Reproductive Rate of 2-Year-Old Heifers

All replacement heifers were exposed to breeding at 15 months of age for initial calving at approximately 2 years.

Perhaps the most important result from the study was that 29 of 43 (67 per cent) optimum heifers raised in the study calved initially at 2 years of age, as compared with only 17 of 34 (50 per cent) of the restricted heifers, Table 9. Also, 53 per cent of the restricted-fed heifers that calved initially at 2 years of age failed to calve at 3 years. Among the optimum group, only 24 per cent that calved at 2 years failed to calve again at 3 years. Perhaps the most important implication of this result for the live-

TABLE 9. CALVING RATE OF REPLACEMENT HEIFERS ON OPTIMUM AND RESTRICTED FEEDING

Calving measurement	Optimum		Restricted		Chi-square probability
	Number	Per cent	Number	Per cent	
Calved at 2 years	29/43	67	17/34	50	<.12
Calved at 2 years—open at 3 years	7/29	24	9/17	53	<.01
Calved at 2 and 3 years	21/43	49	6/34	18	<.01
Calved at 3 years—open at 2 years	12/43	28	17/34	50	<.02
Open at 2 and 3 years	2/43	5	1/34	3	----

TABLE 10. PER CENT CALVING BY COW-AGE GROUPS ON OPTIMUM AND RESTRICTED FEEDING

Cow-age, years	Optimum		Restricted	
	Number	Per cent	Number	Per cent
2	46/60	77	33/49	67
3	48/61	79	36/48	75
4	52/60	87	42/48	88
5	44/48	92	34/39	87
6	36/37	97	26/28	93
7	8/11	73	9/10	90
8	8/8	100	6/6	100
9	3/3	100	4/4	100
TOTAL	245/288	85	190/232	82
2 + 3	94/121	78	69/97	71
4-9	151/167	90	121/135	90

stock producer is that 49 per cent of the better-fed heifers calved at both 2 and 3 years of age, but only 18 per cent of the restricted group, Table 9. The percentage of all optimum-fed and restricted-fed heifers calving at 3 years of age were 79 and 75, respectively, Table 10.

Reproduction of All Cows

This study was not designed to measure lifetime reproductive efficiency, but the data provide some information of interest. Similar calving rates of 85 and 82 per cent were obtained for optimum and restricted, respectively. These rates were definitely lowered by the poor performance of the 2- and 3-year-old cows that had calving rates of 78 per cent for the optimum and 71 per cent for the restricted.

The overall calving percentage of cows 4 years and older was 90 per cent in both groups, Table 10. The year-to-year variation in percentage of cows calving was comparable for both groups except for 1960-61. During that year all of the better-fed cows conceived, but only 73 per cent of the restricted group. There is no obvious explanation for that year's difference.

The most important measure of reproduction to the cattleman is the number of calves actually weaned. The optimum-fed cows weaned 234 calves out of a possible 288, or 81.25 per cent. Comparable values for restricted dams were 181 weaned out of a possible 232, or 78.02 per cent. These production differences were essentially differences in calving rate, since 95.5 per cent of the pregnant optimum-fed cows weaned a calf, as compared with 95.2 per cent of the restricted cows.

Average calving dates ranged from October 29 to November 20, essentially the same for feeding treatments. Apparently treatments did not delay conception.

Blood Composition

Blood composition data for cows and their calves were collected during the 1960-61 winter test. Vitamin A, calcium, and phosphorus blood levels were all within the normal range for both cows and calves, Table 11 and 12. The hemoglobin level of the restricted-fed cows averaged below normal (12 g./100 ml. blood is considered normal). Hemoglobin levels of both groups of calves and the optimum-fed cows were essentially normal.

TABLE 11. INFLUENCE OF WINTER RATION OF LACTATING BEEF COWS ON BLOOD CONSTITUENTS

Constituent	Optimum		Restricted[1]	
	2/17/61	3/31/61	2/17/61	3/31/61
Vitamin A, ug./100 ml.	69.34	112.06	52.37	42.99[2]
Carotene, ug./100 ml.	641	573	449	93
Hemoglobin, g./100 cc.	12.42	13.90	9.96	9.40
Calcium, mg./100 cc.	11.36	11.70	9.88	13.00
Phosphorus, mg./100 cc.	6.20	5.56	5.99	5.59

[1] These cows were carried on a johnsongrass sod until February 17, but were then confined to a bare lot until March 31.
[2] Probably reflects insufficient carotene intake.

TABLE 12. INFLUENCE OF WINTER RATION OF LACTATING BEEF COWS ON BLOOD CONSTITUENTS OF THEIR CALVES

Constituent	Optimum		Restricted[1]	
	2/17/61	3/31/61	2/17/61	3/31/61
Vitamin A, ug./100 ml.	42.68	75.67	49.03	41.81[2]
Carotene, ug./100 ml.	631	472	571	140[2]
Hemoglobin, g./100 cc.	11.26	13.60	11.46	13.70
Calcium, mg./100 cc.	11.36	12.90	10.84	13.70
Phosphorus, mg./100 cc.	8.95	9.08	8.49	9.08

[1] The cows and their calves were on a johnsongrass sod until February 17 at which time they were moved to a bare lot until March 31.
[2] Probably reflects insufficient carotene intake.

The marginal level of protein intake (1.87 pounds crude protein daily) probably accounts for the low hemoglobin level in the restricted-fed cows. They recovered rapidly when turned on lush pasture April 1, and no clinical symptoms of anemia occurred. The milk protein probably contributed to the maintenance of the hemoglobin level of the restricted-fed calves.

TABLE 13. INFLUENCE OF LEVEL OF WINTER FEEDING ON MILK PRODUCTION OF BEEF COWS

Year and feeding treatment	12-hour FCM		
	Start of winter, November 1	End of winter, April 1	56 days after end of winter test
	Lb.	*Lb.*	*Lb.*
1958-59			
Optimum	------	5.23	3.63
Restricted	------	3.47	4.50
1959-60			
Optimum	5.35	4.14	4.12
Restricted	5.18	2.22	4.01
1960-61			
Optimum	6.31	4.39	5.60
Restricted	5.64	3.35	5.01

Milk Production

Cows were milked in an effort to determine effect of winter ration on milk production. All lactating females were milked at the beginning and end of the winter period and approximately 56 days later. The latter time was chosen to determine effect of lush pasture following the winter feeding treatments.

Cows on both feeding treatments declined materially in milk production by the end of winter feeding (26.52 per cent for optimum and 48.87 per cent for restricted). However, restricted-fed cows responded when given access to lush spring pasture and, after 60 days on pasture, their milk production was equal to that of cows fed better during the winter, Table 13.

A study of the composition of milk produced showed that it was low in dry matter and energy when cows were on the test winter rations, Table 14. However, both dry matter and energy increased when cows were shifted to good pasture.

TABLE 14. DRY MATTER AND ENERGY CONTENT OF MILK PRODUCED DURING WINTER AND SPRING ON OPTIMUM AND RESTRICTED FEEDING

Content measured, three dates	Optimum	Restricted
No. of cows		
2/17/61	17	10
3/30/61	17	10
5/26/61	15	10
DM content of milk, per cent		
2/17/61	12.47	12.26
3/30/61	14.65	13.49
5/26/61	13.39	13.41
Energy value of FCM, C/lb.		
2/17/61	312	307
3/30/61	332	349
5/26/61	340	336

TABLE 15. MILK PRODUCTION OF ORIGINAL AND RAISED COWS ON OPTIMUM AND RESTRICTED FEEDING[1]

Dates milked	Optimum				Restricted			
	Cows raised		Original cows		Cows raised		Original cows	
	Cows milked	12-hr. FCM	Cows milked	12-hr. FCM	Cows milked	12-hr. FCM	Cows milked	12-hr. FCM
	No.	*Lb.*	*No.*	*Lb.*	*No.*	*Lb.*	*No.*	*Lb.*
1/29/64	24	5.19	8	5.49	18	4.33	7	4.66
4/1/64	25	5.04	8	5.43	19	4.14	7	4.18
11/20/64	19	6.44	----	----	13	5.52	----	----
4/1/65	25	4.89	----	----	20	3.35	----	----
1958-61 av.								
11/1	----	----	----	5.85	----	----	----	5.36
4/1	----	----	----	4.59	----	----	----	2.96
56 days later	----	----	----	4.42	----	----	----	4.46

[1] Replacement females were Angus-Hereford crosses, whereas original cows were Hereford.

Data in Table 15 show that females raised in this study produced slightly more milk than their dams at comparable age and feeding condition. Winter feeding had no permanent adverse effect on milk production. It is noted that the replacement females were Hereford-Angus crosses, whereas the original cows were Hereford.

Evaluation of Weaned Calves

Calves were weaned within the week they reached 250 days of age. They were then evaluated for slaughter grade, stocker grade, and market price, Table 16.

Calves from the optimum-fed dams had higher slaughter grades than those from restricted-fed cows, but stocker grades were not different. The 8-year average selling price per hundredweight was $24.51 for calves from optimum-fed dams and $24.08 for those from the restricted group. Since the optimum-fed dams weaned heavier calves, the 8-year average market value of their calves was $13.37 per head more than that of calves from restricted-fed dams, Table 16.

TABLE 16. EVALUATION OF CALVES AT WEANING ON OPTIMUM AND RESTRICTED FEEDING

Year born and feeding treatment	No. of calves	Adj. wean wt., lb.	Slaughter grade[1]	Stocker grade[1]	Price per cwt.[2]	Value[3]
1958-59						
Optimum	14	488	8.6	10.7	$29.71	$145.56
Restricted	12	449	7.5	10.3	28.46	128.13
1959-60						
Optimum	14	464	8.9	11.1	22.68	105.53
Restricted	13	400	8.1	11.0	24.12	95.97
1960-61						
Optimum	17	476	9.8	12.0	24.68	117.41
Restricted	10	430	9.2	11.8	24.25	104.81
1961-62						
Optimum	27	475	9.8	11.8	25.47	121.06
Restricted	19	445	9.5	11.9	25.25	112.79
1962-63						
Optimum	30	504	10.4	12.3	25.03	126.26
Restricted	21	436	9.0	11.6	25.10	109.21
1963-64						
Optimum	33	485	10.9	11.8	21.80	105.83
Restricted	25	461	10.6	11.4	21.45	99.07
1964-65						
Optimum	26	476	10.4	12.2	23.01	110.33
Restricted	20	425	9.4	11.4	21.92	93.56
1965-66						
Optimum	23	504	11.4	13.1	26.07	131.19
Restricted	17	450	9.6	11.6	24.68	111.21
8-year mean						
Optimum	184	486	10.21	11.99	24.51	119.27
Restricted	137	439	9.30	11.42	24.08	105.90

[1] 9 = low Good, 10 = Good, 11 = high Good, 12 = low Choice.
[2] Evaluation of market value or actual sale price.
[3] Actual weaning weight @ price shown.

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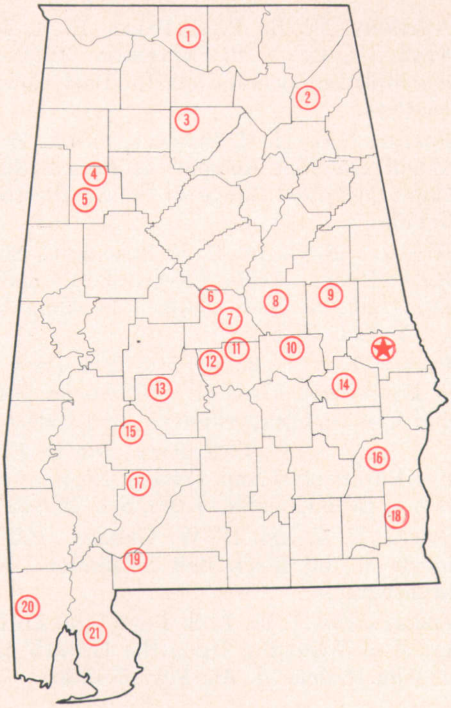
AGRICULTURAL EXPERIMENT STATION SYSTEM OF ALABAMA'S LAND-GRANT UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.