

# AGRICULTURAL EXPERIMENT STATION of The Alabama Polytechnic Institute, Auburn, Ala.

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## YEAR-ROUND USE of LAND for GRAZING GRADE STEERS in the TENNESSEE VALLEY\*

(Three-Year Report, July 1, 1948-June 30, 1951)

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Reported here are three-year results from year-round use of pasture and forage crops for fattening grade steers bought and sold on local open markets.

What was done, crops grown, cash expenses, weight gains, sales, and money left after paying all cash expenses are summarized in this preliminary report. While no conclusions can be drawn this early in the experiment, results do indicate possibilities for profitable use of land that is producing little or no income.

### Experiment and Purpose

Cotton provides the major part of the agricultural income on Tennessee Valley farms. The acreage of row crops that can be grown on most farms in the area has been restricted somewhat by labor supply. On many farms, land is now available for which some type of agriculture must be developed if supplemental income is provided.

In this experiment grade steers are bought on open local markets, fattened on forage crops and pasture, and sold on the local market.

The purpose is to explore the possibilities of a steer-fattening enterprise that uses available or idle land on a farm for supplemental income. In particular, the experiment is aimed at developing a system of pastures and forage crops that supplies necessary hay and maximum grazing for beef cattle; and to determine: (1) maximum amount of beef that can be produced efficiently; (2) best time to buy and sell steers in such an enterprise; (3) type or grade of steer that yields the most profit in such a grazing system; (4) if spring calves can be bought in the fall, grazed through the winter, and sold in the spring at a profit; and (5) relative value of well-known grasses and clovers and their use in various combinations for grazing.

The experiment includes 240 acres, consisting of 182 acres of pastures and forage crops, 15 acres of open slough and roads, and 43 acres in woods. This acreage is a part of 480 acres purchased with funds appropriated by the 1945 State Legislature for expansion of livestock research at the Tennessee Valley Substation.

Practically the entire acreage is a gravel creek bottom soil, with a thin topsoil varying from 3 to 10 inches deep. Yields of corn before the

\*Original, report of first year, published March 1950.

acreage was acquired by the Substation did not exceed 12 bushels per acre, indicating the state of low fertility.

Two years of preliminary work (previously reported) was done on portions of the area previous to establishment of the steer-fattening experiment in July 1948. Results from forage crop and utilization experiments by this Substation were applied to the new area. However, it was necessary to determine production and management requirements of the forage crops because of the difference in character and fertility of the soil of the new area.

Results of First Three Years

The total cash balance at the end of the first three year's operation, July 1, 1948 to June 30, 1951, was \$14,878.77 after taking out all expenses for seed, fertilizer, labor, machinery hire, medicine and veterinary services, and sales commission, insurance and hauling. This balance represents the return to management and capital. The cash balance for each year is given in the following data:

	<u>1948-49</u>	<u>1949-50</u>	<u>1950-51</u>
Total sales .....	\$21,575.91	\$21,309.85	\$32,230.65
Total expenses .....	<u>17,336.21</u>	<u>17,020.36</u>	<u>25,881.07</u>
CASH BALANCE .....	\$ 4,239.70	\$ 4,289.49	\$ 6,349.58

For the 240 acres in the unit, the return per acre for each year was \$17.67 in 1948-49, \$17.87 in 1949-50, and \$26.46 in 1950-51; or a return of \$23.30, \$23.57, and \$34.89 per acre, respectively, for the 182 acres in pasture and forage crops. The return from steers, excluding miscellaneous sales, on 182 acres in pasture and forage amounted to \$13.58 per acre the first year, \$19.12 the second, and \$28.89 the third. It is pointed out, however, that 159 of the 182 acres in forage and pasture were used at various times throughout the first year, 1948-49, whereas a 23-acre pasture was used only 38 days for grazing steers of the unit. During that short period, the steers made a total gain of 983 pounds. For about 8 months, the 23-acre pasture was rented for \$386.52. Beef production on the 159 acres averaged 186.4 pounds per acre during the first year that the unit was in operation. All of the 182 acres in forage and pasture has been used throughout the year for the past two years.

The first year, 1948-49, the unit was stocked with 128 steers, 20 of which were purchased during the summer of 1948 and 108 during the fall and winter. Sixteen of the summer-bought steers were grazed 108 days; 4 head were held over and sold in June 1949. They grazed a total of 355 days. The 16 head gained an average of 1.96 pounds per head daily, and the 4 head made an average daily gain of 1.35 pounds per head. Five of the fall- and winter-bought steers died from shipping fever and bloat. The remaining 103 head made an average daily gain per head of 1.28 pounds during the 193 days grazed. All of the 123 steers made a total gain of 30,615 pounds. The 20 head of summer-bought steers were purchased for \$23.59 per hundred-weight, and the

fall- and winter-bought steers cost \$21.45 per hundred-weight. Sixteen of the summer-bought steers sold in the fall for an average of \$22.30 per hundred-weight, and the four held over brought \$21.12 per hundred-weight the following June. The 103 head of fall- and winter-bought steers brought an average of \$20.99 per hundred-weight, or about 45 cents per hundred-weight less than the purchase price.

During the second year, 1949-50, the 182 acres of forage and pasture crops were stocked with 133 head of steers of which 62 were purchased in the summer and 71 in the fall and winter. Of the summer-bought steers, 32 head were grazed an average of about 137 days for an average daily gain per head of 1.34 pounds; 28 head grazed 334 days averaging about 0.9 pound daily gain per head; and two steers died. Two of the fall- and winter-bought steers also died. The remaining 69 head gained an average of 1 pound daily per head for the 222 days grazed. The 129 head sold gained a total of 29,895 pounds. The average selling price per hundred-weight was \$17.87 for the 32 head of summer-bought steers that were sold in the fall. This is almost \$5 per hundred-weight less than was paid for these steers. The remaining 28 head of summer-bought steers sold in the spring for \$23.80 per hundred-weight or about \$1 per hundred-weight more than was paid for them. The fall- and winter-bought steers sold for about \$3.50 per hundred-weight more than they cost.

In 1950-51, the third year of this experiment, the 182 acres of forage and pasture crops were stocked with 190 head of steers. Eight steers died during the year; this left 182 steers that were grazed on the area, but not all at one time. Of the 190 head, 69 head were summer-bought, and 121 head were bought in the fall and winter. Sixty-five head of the summer-bought steers were grazed 107.5 days and made an average daily gain per head of 1.36 pounds. The sale price per hundred-weight was approximately the same as the purchase price. The remaining four summer-bought steers were held over and grazed an average of 397 days before they were sold in the spring. The average daily gain per head was about 0.9 pound. They sold for almost \$1 per hundred-weight more than their purchase price. Eight of the 121 head of fall- and winter-bought steers died; the remaining 113 head produced an average daily gain per head of slightly more than a pound during the 223 days grazed. They sold for approximately the same price per hundred-weight as the purchase price. The 182 head gained 39,250 pounds.

Over the three-year period, the unit has produced 99,760 pounds of beef, and \$3,285.25 worth of seed.

When to buy steers for fattening on grasses and clovers, and when to sell.

Although conclusions cannot be made this early in the experiment as to when to buy or sell steers, the following preliminary results might give some indication:

(1) Summer-bought steers sold in the fall brought less per hundred-weight than the purchase price for all 3 years. The greatest decrease was approximately \$5 per hundred-weight in the fall of 1949.

**THREE-YEAR SUMMARY of CASH EXPENSES, SALES, and NET RETURNS from a STEER-PATTENING EXPERIMENT  
TENNESSEE VALLEY SUBSTATION, July 1, 1948 - June 30, 1951**

Item	1948-49	:	1949-50	:	1950-51
<b><u>CASH EXPENSES</u></b>					
<b><u>Cost of summer-bought steers*</u></b>					
Number head	20		62		69
Average weight per head, lb.	483.25		541.13		547.10
Total weight, lb.	9,665		33,550		37,750
Price paid, cwt.	\$ 23.59		\$ 22.69		\$ 22.65
Total Cost	2,280.25		7,611.08		8,551.59
*Steers died			2 head - 1020 lb.		
<b><u>Cost of fall- and winter-bought steers*</u></b>					
Number head	108		71		121
Average weight per head, lb.	514.31		449.23		409.96
Total weight, lb.	55,546		31,895		49,605
Average price paid per cwt.	21.45		19.62		25.84
Total cost	11,913.82		6,258.03		12,817.33
*Steers died .....	(5 head - 2,170 lb.)		(2 head - 715 lb.)		(8 head - 3,250 lb.)
<b><u>Total cost of all steers</u></b>	<b>\$ 14,194.07</b>		<b>\$ 13,869.11</b>		<b>\$ 21,368.92</b>
<b><u>Seed</u></b> .....	740.84		777.84		870.34
<b><u>Fertilizer</u></b> .....	506.00		654.00		1,096.50
<b><u>Machinery Hire</u></b> .....	1,097.00		956.16		1,497.61
<b><u>Labor</u></b> .....	374.70		362.10		377.10
<b><u>Sales Commission, insurance and hauling</u></b> .....	326.33		350.00		488.00
<b><u>Miscellaneous, salt, vaccine, vet. services</u></b> ..	97.27		51.15		182.60
<b>Total all other expenses</b> .....	<b>3,142.14</b>		<b>3,151.25</b>		<b>4,512.15</b>
<b>TOTAL ALL CASH EXPENSES</b> .....	<b>17,336.21</b>		<b>17,020.36</b>		<b>25,881.07</b>

THREE-YEAR SUMMARY of CASH EXPENSES, SALES, and NET RETURNS from a STEER-FATTENING EXPERIMENT  
TENNESSEE VALLEY SUBSTATION, July 1, 1948 - June 30, 1951 (Cont'd)

Item	1948-49	1949-50	1950-51
<b>CASH SALES:</b>			
Number of summer-bought steers sold in fall .....	16	32	65
Average sale weight per head, lb. ....	680.00	771.88	699.38
Total sale weight, lb. ....	10,880	24,700	45,460
Average sale price per cwt., dol. ....	\$22.30	\$17.87	\$22.54
Total sales value, dol. ....	\$2,426.37	\$4,412.97	\$10,248.46
Average days grazed .....	108.0	137.3	107.5
Average daily gain, lb. ....	1.96	1.34	1.36
Number of summer-bought steers held over, sold May and June ...	4	28	4
Average sale weight per head, lb. ....	1,022.50	800.36	821.25
Total sale weight, lb. ....	4,090	22,410	3,285
Average sale price per cwt., dol. ....	\$21.12	\$23.80	\$23.48
Total sales value, dol. ....	863.74	5,334.18	771.47
Average days grazed .....	355.0	334.3	397.0
Average daily gain, lb. ....	1.35	.93	.92
Total sales of all summer-bought steers, dol. ....	3,290.11	9,747.15	11,019.93
Number of fall- and winter-bought steers, sold May and June ...	103	69	113
Average sale weight per head, lb. ....	763.94	673.84	660.26
Total sale weight, lb. ....	78,686	46,495	74,610
Average sale price per cwt., dol. ....	\$20.99	\$23.13	\$26.96
Total sales value, dol. ....	\$16,516.28	\$10,752.95	\$20,118.22
Average days grazed .....	191.5	221.7	222.8
Average daily gain, lb. ....	1.28	1.00	1.12
Total sales of all steers .....	\$19,761.65	\$20,500.10	\$31,138.15
Miscellaneous sales, seed and pasture rent .....	\$ 1,769.52*	\$ 809.75	\$ 1,092.50
Total all sales .....	\$21,575.91	\$21,309.85	\$32,230.65
Total all cash expenses (includes steers that died) .....	\$17,336.21	\$17,020.36	\$25,881.07
<b>CASH BALANCE - Income to capital and management .....</b>	<b>\$ 4,239.70</b>	<b>\$ 4,289.49</b>	<b>\$ 6,349.58</b>
Return per acre from all acres in unit (240 acres) .....	\$ 17.67	\$ 17.87	\$ 26.46
Return per acre from 182 acres in pasture and forage .....	\$ 23.30	\$ 23.57	\$ 34.89
Return from steers only on 182 acres of pasture and forage*** ..	\$ 13.58	\$ 19.12	\$ 28.89
Total weight gain of all steers, lb. ....	30,615	29,895	39,250
Gain per acre on 182 acres, lb. *** .....	186.36	164.26	215.66

\*Includes \$386.52 from rent of 28 acres of pasture for 8 months.

\*\*Excluded miscellaneous sales.

\*\*\*Gain per acre from 159 acres in 1948-49. Total gain less 983 pounds gain made while steers were on a 23-acre pasture for short period equals total gain from 159 acres.

(2) Summer-bought steers carried through the winter and sold in May and June brought slightly more than the purchase price 2 years out of 3.

(3) Fall- and winter-bought steers sold in May and June brought more than the purchase price 2 years out of 3, and about the same the other year. An increase of about \$3.50 per hundred-weight over the purchase price was received in the spring of 1950.

(4) For all 3 years, very little if any increase in value of sales over purchase prices could be attributed to price spread.

(5) The increase in sales value over cost was attributed primarily to economical gains of beef made on pasture and forage crops.

#### Pasture and Forage Crops

The areas in pasture and forage crops in 1951 are as follows:

Improved pasture .....	83 acres
Sericea-crimson clover-ryegrass .....	35 acres
Crimson clover-ryegrass .....	25 acres
Sudan grass followed by oats and crimson clover .....	20 acres
Experimental pasture plots of grasses and clovers .....	13 acres
Fescue (to be seeded) .....	6 acres
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	182 acres

Fertilizer treatment. The initial application of fertilizer in establishing these pastures was 1,000 pounds of basic slag and 200 pounds of muriate of potash per acre. All pasture and forage crops on the experimental unit have received annual applications of 600 pounds of basic slag per acre, or 300 pounds of 20 per cent superphosphate, plus 100 pounds of muriate of potash per acre. In addition, the oats have been top-dressed each fall and each spring with 100 pounds of ammonium nitrate per acre per application. The fescue, orchard, and rescue grass-Ladino clover areas of the improved pasture received 100 pounds of ammonium nitrate per acre in the fall and again in the spring.

Improved pasture. The 83 acres of improved pasture are used for both summer and winter grazing. Forty-three acres had been seeded several years before the Substation acquired the land; but because of the lack of care and management, this area had become very weedy and as a result furnished little grazing. By annual applications of slag or superphosphate and potash, and by mowing for weed control, the area has been brought back to furnish good grazing. The remaining 40 acres are in fescue, orchard, and rescue grass-Ladino clover combinations.

Sericea-crimson clover-ryegrass. Thirty-five acres are seeded to lespedeza sericea-reseeding crimson clover-ryegrass combination. This area was planted in July 1947 on fallowed land. The seeding rate per acre was 40 pounds of sericea and 30 pounds of reseeding crimson clover. After the sericea and crimson clover were well established the second year, the area was also seeded to ryegrass at the rate of 20 pounds per acre. Prior to planting the sericea-crimson clover mixture, the area was fertilized with 600 pounds of basic slag and 200 pounds of muriate of potash per acre. Since then the area has been given a standard treat-

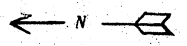
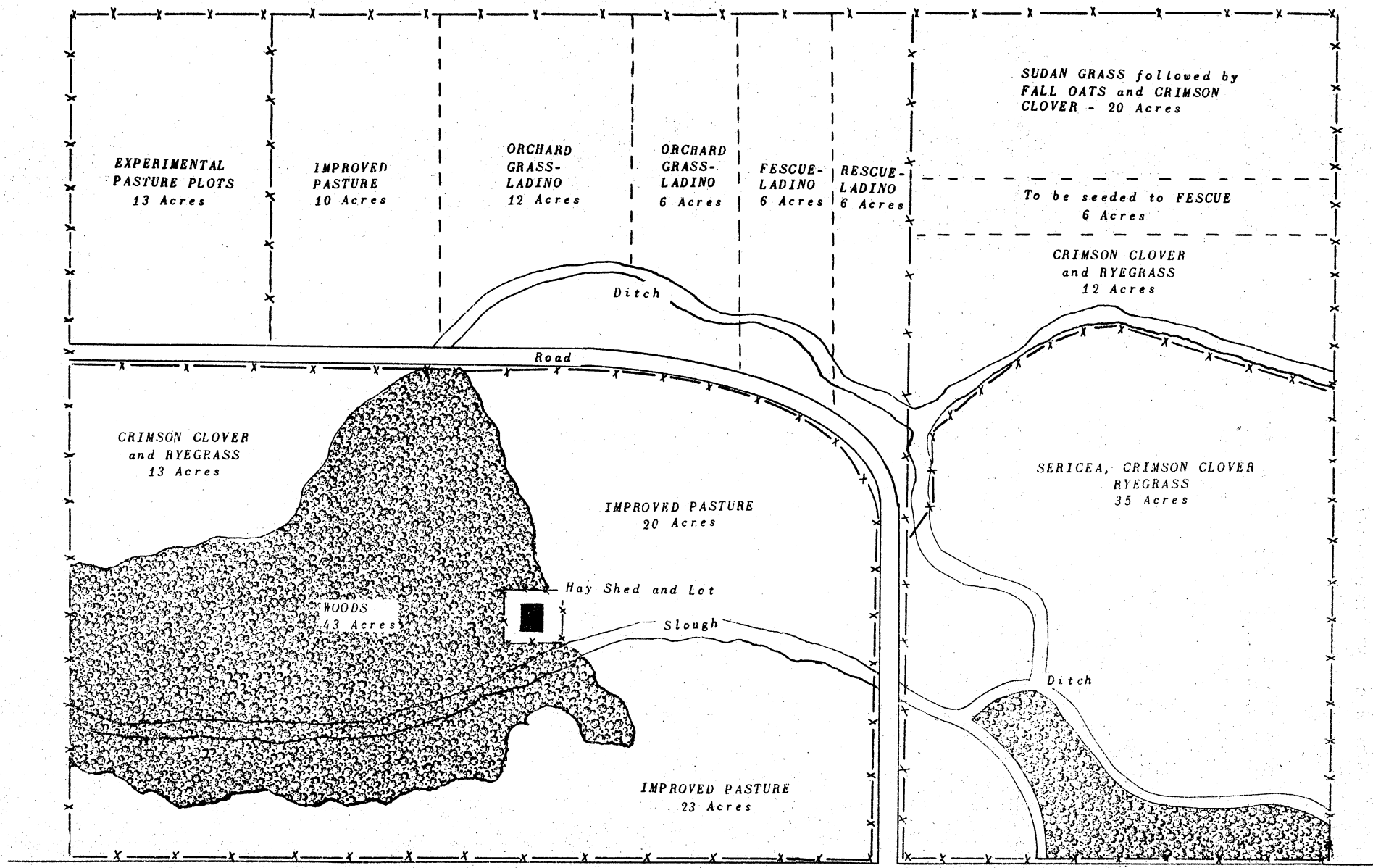
ment of phosphate and potash each year, which is based on research results of the Substation. This area is used for summer, late fall, winter, and spring grazing.

Crimson clover-ryegrass. There are 25 acres of crimson clover planted in combination with ryegrass that furnish early fall and winter grazing. On this area, seed are allowed to mature and are combined. The area is then prepared for planting again to crimson clover and ryegrass.

Sudan grass followed by fall oats and crimson clover. Twenty acres are planted to sweet Sudan grass about the middle of June. The Sudan is grazed or cut for hay; in either case, the land is prepared in September and fall oats and crimson clover are seeded for winter grazing. The oats are either grazed during the spring or cut for hay, whichever is needed most.

Experimental plots. There are 13 acres in experimental pasture plots. These include well-known grasses and clovers that are grown separately and in various combinations to determine possibilities of better combinations. Because of the very low fertility of the area, 1,000 pounds of basic slag and 200 pounds of muriate of potash per acre were used to establish good stands.

**FORAGE CROP and PASTURE AREAS of GRADE STEER-FATTENING EXPERIMENT**  
**TENNESSEE VALLEY SUBSTATION, Belle Mina, Alabama**



Fencing X—X—X