

FINAL REPORT, COMPLETED OR REVISED PROJECTS

North Carolina

Agricultural Experiment Station

1. Project title, number, and fund: **A Comparison of the Effects of Certain Management and Breeding Methods on Beef Cattle Production. P47-1110 - Funnell.**
2. Departments and cooperating agencies: **Animal Industry, Agronomy, and Bureau of Animal Industry, U.S.D.A.**
3. Major personnel: **H. W. Billard, J. E. Foster, T. N. Blumer, S. A. Stewart, E. L. Lovvorn, J. P. Ammerman, and E. H. Hostetler.**
4. Date begun: **Nov. 1945** Date revised/completed: **1951**
If discontinued without completion state reasons:
5. Estimated total cost by funds (salaries and maintenance): **\$35,000.00**
6. The problem (briefly restate its nature, importance, and economic significance):
The purposes of this study were (1) to study gains, costs and returns from feeding calves versus yearlings in preparation for the butcher market. (2) to study gains, costs, returns and quality of beef from grade steer calves sired by bulls of different breeds (Hereford, Brahman and Africander). The problem was of high economic importance because of the rapid expansion of beef production in the Southeast and the wide dissemination in the South of cattle possessing some Brahman breeding.
7. Major results and conclusions:
In three trials in which calves and yearlings were compared in feedlot the yearlings made more rapid gains and required a shorter period to reach a satisfactory finish but in each trial they were less efficient in feed utilization.
On the basis of information obtained here it is doubtful that it would be practical to carry weaned calves as stockers, to finish as yearlings, unless an abundance of pasture or roughage is available which could not be utilized as well by the younger animals.
Brahman sired steer calves were compared with Hereford sired calves in four trials. In three of the four years the Brahman sired calves gained more rapidly and used their feed more efficiently. Feeder, slaughter, and carcass grades were higher for the Hereford sired calves. Dressing percentage was slightly in favor of the Brahman group. Africander calves were about equal to Herefords in feedlot performance and in dressing percentage, but were inferior in conformation. Brahman and Africander sired calves were more nervous in disposition than Herefords. However this characteristic did not seem to influence their ability to utilize feed efficiently.
Brahman sired calves produce acceptable carcasses as efficiently as do the Hereford sired calves.

(over)

*Three copies to be sent to the Office of Experiment Stations.

8. Practical applications and public benefits achieved or in prospect:

Brahman sires are being used in increasing numbers throughout the Southeastern part of the United States. That the crossbred calves produced will perform well under feedlot conditions and produce acceptable carcass beef has great value for the producer. The fact that these crossbred animals are more nervous in temperament should cause additional care to be taken in providing facilities for handling and control of these cattle.

The ability of weaned calves to utilize feed more efficiently than yearlings will increase the number of pounds of beef which can be marketed per pound of feed used.

9. Publications:

- | | | |
|-----------------------------------|------|---|
| Billard, E. U. | 1948 | Finishing Steers of Different Ages and Breeding. Masters Thesis. |
| Billard, E. U. | 1949 | Finishing Steer Calves Sired by Bulls of Different Breeds. Proceedings of Association of Southern Agricultural Workers (an Abstract). |
| Stewart, H. A. and E. U. Billard. | 1950 | Summary of the Performance of Africander-Hereford, Brahman-Hereford and Grade Hereford Groups at North Carolina Experiment Station. N. C. Agr. Expt. Sta., A. H. Series 1, Progress Report 4. |

ANNUAL PROGRESS REPORT, FEDERAL-GRANT PROJECTS, 1950
(Three copies to be given to the CES examiner)

1. PROJECT: (Fund, number, and title): PURNELL An.Ind. P47-A110, A COMPARISON OF THE EFFECT OF CERTAIN MANAGEMENT AND BREEDING METHODS ON BEEF CATTLE PRODUCTION.
2. DEPARTMENTS AND COOPERATING AGENCIES: Animal Industry, Agronomy, and Bureau of Animal Industry.
3. PERSONNEL: E. U. Dillard, W. E. Tyler, H. A. Stewart, and E. H. Hestotler
4. NATURE OF WORK AND PRINCIPAL RESULTS OF THE YEAR (Confidential information should be so marked):

The grazing management phase of this project was discontinued in 1948, but the fourth trial to study the finishing of beef steer calves sired by bulls of different breeds was begun Nov. 22, 1949 at the Central Experiment Station, Raleigh, N. C.

Lot I is composed of steers sired by purebred Hereford bulls. Lot II of steer calves sired by a Brahman bull as well as a few Brahman x Hereford F_2 steer calves. Lot III is composed of Africander x Hereford F_2 steer calves.

At the present time the groups are in the following order with respect to rate of gains: Hereford, Brahman crossbred, and Africander crossbred.

5. BENEFITS realized by farmers or the public through application of findings, stated in dollars, bushels, or other values, where possible:

Cattle of Brahman breeding are still on the increase in the Coastal and Piedmont areas of North Carolina. Many farmers are interested in the performance and adaptability of Brahman and Brahman crossbred cattle as beef producers in North Carolina. Information relative to the above questions may have considerable bearing upon the expansion of beef production in the State.

6. WORK PLANNED FOR NEXT YEAR:

The groups now under comparison will be slaughtered early in July and carcass comparisons made. The project will be discontinued with this trial and data for the four trials will be analyzed and a report prepared for publication.

7. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

will be closed during 51-50-51 fiscal year.

8. APPROVED: _____

Project Leader.

Director.

*file
with projects*

April 21, 1950

Mr. E. W. McComas
Animal Husbandman
Beef Cattle Investigations
Beltsville, Md.

Dear Mr. McComas:

Reply to your request of the 17th, I am enclosing
brief reports of our cooperative beef cattle work. These reports
have been prepared by Messrs. Dillard and Shepherd.

Very truly yours,

✓
E. H. Hostetler
Professor and Head
Animal Husbandry Section

Enc.

Cc: Dr. D.W. Colvard
Campus

Dr. Adams

Work Project Report

Project - A Comparison of the Effects of Certain Management and Breeding Methods on Beef Production (Purnell P47-a10)

A fourth trial to study the effect of breed of sire upon rate and efficiency of gain of beef steers is underway. Brahman x Hereford F₁ and F₂ steer calves are being compared with Grade Herefords and Africander x Hereford F₂ steer calves.

At the present time (after 20 weeks on feed) the Grade Herefords have an average daily gain of 2.32 pounds, the Brahman x Hereford 2.03 pounds and the Africander x Hereford F₂ 1.90 pounds. The difference in efficiency of gain between groups at this point is negligible.

Project - Utilization of reeds in Forest Grazing (Purnell P14-a13).

New subproject No. 11. Forage Species and Construction Methods Useful for Establishing Pasture Firebreaks in the Pond Pine Forest Type.

The experimental pasture firebreaks established at the Tidewater Experiment Station were grazed rather heavily from approximately April 1st to Nov. 7, 1949. These lanes are showing promise as fire barriers, access roads, and sources of supplemental feed in the Coastal Plain forest grazing areas.

On the basis of firmness of turf and resistance to trampling redtop and ryegrass plots were rated best of the grasses and ladino clover best of the legumes. Recent fuel ratings gave the ladino clover plots the best rating of the legumes for fire protection. Fescue and ryegrass were rated best of the grasses. Stand was an important factor in these ratings, particularly of the legumes, where poor stands were reflected in low fire protection values.

Additional firebreak seedings were made at the Frying Pan Experimental Range in 1949. Although good seedling establishment was obtained an unusually rainy season in 1949 resulted in poor survival.

Further grazing and additional appraisals of the persistence and productivity of the established stands are necessary before final evaluations can be made.

New Subproject No. 12 - Grazing capacity by Seasons in Relation to Density and Height of Switch Cane.

The second trial in this study has been completed. As in the previous year two year old bred heifers were used most of the year. Cattle gains again were low since an attempt was made to graze each paddock as long as the animals could get a full feed of the forage. Results to date are showing that the carrying capacity of switch cane ranges can be calculated with reasonable accuracy from such criteria as cane height and estimated foliage density or stem counts. An additional year or two will be needed to determine the effect of season of grazing on the productivity of the forage stand.

Progress made at Frying Pan Experimental Range

During 1949 a total of twenty (20) experimental ranges were laid out at the Frying Pan Experimental Range. To date fourteen (14) of these ranges have been fenced. The others are expected to be completed in 1950. Check plots have been fenced within each range completed. Forage surveys have been made and other preliminary information has been taken over the area. A range herd of some 75 cows has been moved to this area but only breeding work has been conducted thus far, pending completion of installation of range pastures.

New studies including cattle and forage management are being planned for this Experimental Range.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
PROJECT OUTLINE

| | |
|-------------|----------|
| Project No. | P49-A110 |
| Date | |
| Submitted | |
| Approved | |
| Revised | |

1. Title - A comparison of the effects of certain management and breeding methods on beef cattle production.

2. Objective(s)

- (a) To study gains, costs and returns from feeding calves versus yearlings in preparation for the butcher market.
- (b) To study wintering and summering production costs on steers from weaning (8 months) to fattening (20 months) through the use of annual grazing crops and permanent pasture.
- (c) To study the effect of age of animal (calves versus yearlings) on quality of beef.
- (d) To study gains, costs, returns and quality of beef from grade steer calves sired by bulls of different breeds (Hereford, Brahman and Africauder).

3. Reasons for Undertaking Investigations*

Many farms throughout North Carolina are badly eroded and of low fertility because of the continued use of a row crop system of farming. Crop control of cotton and tobacco, labor shortage, and a growing consciousness of the need for soil conservation have caused an increase in the acreage of small grains, hays, and winter and summer pastures. Forage crops are usually more profitable when fed to livestock. Beef cattle are efficient users of these crops as well as permanent pastures.

There has been a marked increase in beef herds in the Piedmont area and it has had a good source of feeder cattle from the Mountains for years. Now with the great increase in beef cattle in the Coastal Plain another source of feeders is becoming available. The question of the most profitable age to finish cattle has long been an important one.

*Including economic justification

4. Previous work and present status of investigations in the field of this project:

(a) A summary of numerous experiments by Dr. R. E. Snapp of the University of Illinois, in which calves were compared with yearlings, brought out the following facts: Calves gained faster than yearlings when fed from birth so as to grow and fatten at the same time, but the reverse was true during the finishing period if they were grown as stockers and then fattened. Calves made more economical gains in the feed lot, needed a longer period to finish, required slightly more increase in weight to attain the same degree of finish, and needed higher quality feeds than yearlings. There was very little difference in the amount of concentrates necessary to fatten the cattle of different ages, but the yearlings consumed more roughage and more pork was produced behind them. Similar results were obtained by Professor F. B. Morrison of Cornell University in a summary of seventeen experiments in which the finishing of different age cattle was compared.

(b) Previous results from this Station have shown that beef can be produced efficiently when a barley-lespedeza rotation system is used to provide grain, hay and pasture.

(c) Information from Professor E. A. Trowbridge of the University of Missouri shows that in a rotation grazing system, in which bluegrass was supplemented with Korean lespedeza and winter rye or barley, greater gains per acre were produced than where bluegrass was grazed alone.

(d) Previous results from this Station have shown the relationship between rate of gains in the feed lot and condition, grade, and dressing per cent.

5. Outline of Procedure:

(a) Recent tests reported by H. E. Guilbert et al. of the California Station (Bul. 688 - 1944) show the relation between continuous growth and fattening and rate of gain, efficiency of food utilization and changes in body size and proportions.

5. Outline of Procedure:

(a) Selection of animals

Thirty or more grade steer calves will be moved, when weaned in November, from the Hofmann Forest, Jacksonville, North Carolina, to the Animal Husbandry Farm, Raleigh, North Carolina. The majority of these steers will be out of grade Hereford cows but will be sired by Hereford, Brahman and Africander bulls.

(b) Methods of feeding

All of the steers used in this experiment will be born on the Hofmann Forest, grazed with their dams on forest grazing (principally reeds) until weaned. They will be finished at the Animal Husbandry Farm on a fattening ration, consisting of a full feed of coarsely ground barley and lespedeza hay plus two pounds of cottonseed meal per steer daily.

Group I - Calves

On arrival at the Animal Husbandry Farm after weaning, one half of the Hereford calves, all of the Brahman calves and all of the Africander calves will be placed on the fattening ration. However, they will be divided into three groups and each breed will be fed in a separate group. (When facilities become available at the Hofmann Forest and the size of the cow herd is increased sufficiently, a certain number of the calves will be creep fed and put into the fattening lot immediately after weaning to compare with those calves that have not been creep fed).

Group II - Yearlings

On arrival at the Animal Husbandry Farm after weaning these steers will be grazed for one year according to the following schedule: November to April, barley and crimson clover; April, May and June, either woods grazing or permanent pasture; July to November, lespedeza or permanent pasture.

If at any time during this period grazing is not available, these steers will be full fed lespedeza hay plus two pounds of coarsely ground barley per steer daily, in a dry lot. Beginning approximately one year after weaning, these yearling steers will be put into the feed lot and finished on the fattening ration.

(c) Slaughter Data:

1. Grades (feeder, slaughter and carcass).
2. Live weights (just before leaving farm for slaughter and after having been off feed for 24 hours - missing P. M. feed of preceding day and A. M. feed of day of slaughter).
3. Warm dressed weight (for each side).
4. Cold dressed weight (for each quarter).
5. Rib eye measurements:
 - a. Length of "eye" (longissimus dorsi) muscle from outside edge of lumbar vertebra process to outside edge of "eye" muscle at division of fat and lean taken at the maximum length of muscle.
 - (1) Across anterior 1st lumbar vertebra.
 - b. Width of "eye" (longissimus dorsi) muscle from top of transverse spinal process to external edge of fat taken parallel to spine of lumbar vertebra at the anterior articular process.
 - (1) At anterior 1st lumbar vertebra.

- c. Thickness of fat over center of "eye" (longissimus dorsi) muscle of loin from external edge of fat to the lean flesh at

(1) An anterior 1st lumbar vertebra.

(d) Records:

(1) Crops - The yield of crops will be measured either by days grazing furnished, gains of animals grazed, tons of hay or straw or bushels of grain produced.

(2) Cattle - Individual weights of each animal will be recorded at regular 14-day intervals. However, the initial and final weight of each animal will be an average of three weights taken on successive days. Each calf and yearling will be graded as feeders, when ready for slaughter and in the carcass by a committee according to the U. S. Grading System. A record of the ancestry and previous treatment will be kept on each steer.

(3) Feeds - The amounts of concentrates and roughage that are fed will be weighed and recorded daily. Each kind of feed will be chemically analyzed and examined as to its commercial grade. A record will also be made of the kind and amount of pasture used, both the area and number of hours grazing.

(4) Weather records of rainfall and temperature will be coordinated with the crop yields.

(5) Bedding - The barley straw, after the grain is harvested will be stored and used as bedding for these cattle.

6. Probable Duration of Project: 3 to 5 years.

7. Date of Initiation: November 1945.

8. Personnel:

| Name | Department | Relation to Project |
|-------------------|-----------------------------|---------------------|
| John E. Foster | Animal Industry (An. Husb.) | Leader |
| T. H. Blumer | Animal Industry (An. Husb.) | Co-Leader |
| E. A. Stewart | Animal Industry (An. Husb.) | Co-Leader |
| E. L. Lovvorn | Agronomy | Co-Leader |
| J. P. Ammerman | Animal Industry (An. Husb.) | Assistant |
| Earl H. Hostetler | Animal Industry (An. Husb.) | Adviser |

9. Coöperation:

a. Interdepartmental

Agronomy Department

b. Other Agencies

Bureau of Animal Industry

United States Department of Agriculture.

10. Financial Support:

a. Proposed Budget **7-1-45** to **6-30-46**

| Items | ALLOCATION OF FUNDS | | | | | |
|-------------------------|---------------------|---------------|-------|-------|-------|-------|
| | Bankhead-Jones | Purnell | Adams | State | Other | Total |
| 1. Salaries | | \$3657 | | | | |
| 2. Labor | | 300 | | | | |
| 3. Travel | | --- | | | | |
| 4. Equipment & Supplies | | 1143 | | | | |
| 5. All Other | | 125 | | | | |
| Total | | \$5225 | | | | |

b. Proposed Future Budgets:

| Year | Salaries | Total Expenditures | Estimated Income |
|-------------|-------------|--------------------|------------------|
| 1947 | 3800 | 6000 | 2000 |
| 1948 | 3900 | 6000 | 2000 |
| 1949 | 4000 | 6000 | 2000 |
| 1950 | 4000 | 6000 | 2000 |

11. General Remarks:

SIGNATURES OF APPROVAL

1. Approval of Project Leaders

Date Jan. 12, 1946 *J. E. Foster*
 Title *in charge of Path & Sheep Research*

Date Jan. 14, 1946 *J. N. Blumer*
 Title *Research assistant professor*

Date Jan. 12, 1946 *H. A. Stewart*
 Title *Associate, Animal Genetics Research*

Jan. 16, 1946 *Blowman*
 Title *Prof. of anatomy*

2. Approval of Heads of Departments or Cooperating Agencies

Date Jan. 14, 1946 *Carl H. Hostetler*
 Head, *A. H. Section*

Date Jan. 15, 1946 *J. Stovetter*
 Head, *Dept. of animal industry*

Date
 Head,

3. Approval of Committee on Experiment Station Projects

Date Jan. 16, 1946 *R. W. Cummings*
 Chairman of Committee

4. Approval of Director

Date 3/7/46 *R. D. Brewer*
 Director, North Carolina Agricultural
 Experiment Station

5. Approval of U. S. D. A.

Date MAR 18 1946 *D. Dromme*
 Acting Chief, Office of Experiment Stations