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CATTLE FEEDING TESTS

Wintering Feeding Trials (Cows 1950-51)

	Lot 1 Hay	Lot II Hay & corn silage	Lot III Corn Sil. & soybean meal	Lot IV Corn Sil. Sb. meal (outside)	Lot V Corncobs & Supplement
No. animals in lot	8	8	8	9	8
Ave. initial weight	1021.87	1008.12	1022.50	1013.90	1008.12
Ave. final wt.	978.75	893.37	983.75	1033.88	829.37
Ave. total gain per head	- 43.12	- 114.75	-38.75	+19.98	-178.75
Ave. daily gain per head	- .29	- .78	- .26	+ .14	- 1.22
Total feed per cow (Dec. 11 to May 7 = 147 days)					
Hay (first cutting alfalfa)	3583	1750	-	-	-
Corn silage	-	3685	7235	7235	-
Soybean oil meal	-	-	147	147	-
Corn cobs	-	-	-	-	1870
Supplement	-	-	-	-	735

Winter feeding Trials (Calves 1950-51)

	Lot 1 Hay	Lot 2 Corn silage & Soybean meal
No. Animals in lot	10	10
Ave. initial weight	387.00	386.50
Ave. final weight	487.00	598.50
Ave. total gain per head	100.00	212.00
Ave. daily gain per head	.68	1.44
Total feed per head (Dec. 11 to May 7 = 147 days)		
Hay (first cutting alfalfa)	1962	-
Corn silage	-	4715
Soybean oil meal	34.0	220

FINAL REPORT, COMPLETED OR REVISED PROJECTS

North Carolina Agricultural Experiment Station

1. Project title, number, and fund: State 543-a115, Comparison of Meadow Hay Cut at Different Stages of Maturity for Wintering Beef Cattle.

2. Departments and cooperating agencies: Animal Industry, Agronomy and N. C. Department of Agriculture.

3. Major personnel: Lemuel Goode, R. L. Lovvorn, W. W. Woodhouse and J. A. Graham

4. Date begun: June 1943 Date revised/completed: May 1949
If discontinued without completion state reasons:

5. Estimated total cost by funds (salaries and maintenance): $3000

6. The problem (briefly restate its nature, importance, and economic significance):
Wintering cattle is a critical problem in the mountain area of North Carolina. Meadows in permanent grass are the chief source of winter feed. Due to season and labor conditions, only a small percentage of the meadows are cut before late in the season after the grass has matured. This mature hay is low in protein, and protein feeds are very scarce in the mountain area. It is a common practice in this area to graze meadow aftermath at the close of the regular grazing season.

This project was devised to, a. compare the feeding value of early and late cut hay, b. to study the differences in yield per acre and chemical analyses, and c. to determine the difference in amount of fall grazing available from meadows cut at different stages of maturity.

7. Major results and conclusions:

Cattle fed early cut hay consistently came through the winter in better condition than cattle fed late cut hay. In the first feeding test, conducted during the winter of 1945-46, cows fed early cut hay lost less weight than cows wintered on late cut hay. During the 1946-47, 1947-48 and 1948-49 tests cattle receiving early cut hay either maintained their weight or made slight gains. Cattle receiving late cut hay usually lost considerable weight.

Hay yields from the early cut meadows were about 25 percent lower than from the late cut meadows. A chemical analyses of the hay fed during the winter of 1947-48 shows 8.63 percent crude protein in the early cut hay and 7.31 percent in the late cut hay. The early cut meadows always provided more fall grazing than the late cut meadows.

(over)

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

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

This project has demonstrated the higher feeding value of grass hay cut during an immature stage. However, it should be emphasized that the higher yield per acre obtained by late cutting along with more favorable weather conditions, makes a general recommendation for early cutting questionable.

9. Publications:

None

Director

PROJECT STATUS REPORTS

1. Title: Comparison of Meadow Hay Cut at Different Stages of Maturity for Wintering Beef Cattle.

2. Major Objectives:

   (a) To compare the feeding value of meadow grass cut and cured for hay when in the early bloom stage, with similar grass cut and cured for hay after the plants had matured.

   (b) To study the difference in yields per acre and chemical analyses of hay cut at different stages of maturity.

   (c) To determine the difference in amount of fall grazing available from meadows cut when in the early bloom stage or when the grass was mature.

3. Reasons for Undertaking Investigations:

   (a) According to agricultural statistics there are over 182,000 acres of tame hay in the Mountain district.

   (b) On most of the Mountain farms more cattle can be grazed through the growing season than can be wintered. The meadows which are in permanent grass are the chief source of winter feed. Only a small percentage of the meadows, due to season and labor conditions, are cut before late in the season after the grass has matured.

   (c) This mature hay is lower in protein than hay cut in the immature stage and protein feeds are very scarce in the Mountain area. Only a small amount of legume hay is produced and practically no protein concentrates.

   (d) It is the customary practice in this area to graze the aftermath in the meadows after the permanent pasture grazing season is over. This regrowth following mowing the hay frequently furnishes an additional month's grazing and thereby reduces the long wintering period. Information on the amounts of grazing provided after cutting hay at different stages of maturity is badly needed.

4. Results to date:

Over an 84 day feeding period in 1946-1947 dry cows wintered on early cut hay gained 15 pounds per head while cows on late cut hay lost an average of 10 pounds. Weaned calves fed for the same length period, but receiving in addition two pounds of grain per head daily, gained 22 pounds each on early cut hay as compared to an average gain of 12 pounds for those fed late cut hay.

The wintering trial continued in 1947-1948 with yearling cattle showed the same trend as the previous year, in that the groups wintering on the early cut hay made an average daily gain of .20 pound while those on late cut hay lost an average of .25 pounds per day.

The early cut area yielded nearly 75 per cent of the hay tonnage of the late cut area in 1946 and 72 per cent in 1947. However, the early cut afforded about two weeks more fall pasture and produced hay of much higher feeding value as shown by the difference in cattle gains.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT OUTLINE

Project No. S43-A115
Date
Submitted September 5, 1945
Approved .....
Revised .....

1. Title Comparison of Meadow Hay Cut at Different Stages of Maturity for Wintering Beef Cattle

2. Objective(s)

(a) To compare the feeding value of meadow grass, cut and cured for hay when in the early bloom stage, with similar grass cut and cured for hay after the plants had matured.

(b) To study the difference in yields per acre and chemical analyses of hay cut at different stages of maturity.

(c) To determine the difference in amount of fall grazing available from meadows when cut at different stages of maturity.

3. Reasons for Undertaking Investigations*

(a) According to Agricultural Statistics there are over 182,000 acres of tame hay in the Mountain district.

(b) On most of the Mountain farms more cattle can be grazed through the growing season than can be wintered. The meadows which are in permanent grass are the chief source of winter feed. Only a small percentage of the meadows, due to season and labor conditions, are cut before late in the season after the grass has matured.

(c) This mature hay is lower in protein than hay cut in the immature stage and protein feeds are very scarce in the Mountain area. Only a small amount of legume hay is produced and practically no protein concentrates.

(d) It is the customary practice in this area to graze the aftermath in the meadows after the permanent pasture grazing season is over. This regrowth following mowing the hay frequently furnishes an additional month's grazing and thereby reduces the long wintering period. Information on the amounts of grazing provided after cutting hay at different stages of maturity is badly needed.

*Including economic justification

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

(a) F. B. Morrison of Cornell University states "Early cut hay is much richer in protein and also higher in total digestible nutrients than that which is cut at a late stage of maturity. Even a slight difference in time of cutting may make a considerable difference in the actual feeding value, especially in hay from the grasses." He found that timothy hay cut in early bloom contains an average of 7.6 per cent protein and 51.6 per cent total digestible nutrients. When cut in full bloom it contains 6.2 per cent protein and 48.0 per cent total digestible nutrients, and when cut from late bloom to early seed only 5.8 per cent protein and 44.4 per cent total digestible nutrients.

(b) Experiments by the New Hampshire, Ohio and Missouri stations show that when yield of hay, protein content, and amount of digestible nutrients are all considered, timothy should be cut not later than early to full bloom. In the New Hampshire tests timothy cut before bloom furnished 44 per cent more net energy with dairy cows than did that cut after the seed had formed. Only about one-third the protein in the latter hay was digestible but about 60 per cent of that in the early cut hay was digested. The late-cut hay barely furnished enough nutrients for maintenance, when supplied as the only feed, but the early cut hay supplied sufficient for maintenance and the production of 8 to 10 lbs. of milk a day.

(c) Ohio trials with pregnant and nursing ewes showed that early-cut timothy hay is much better than late-cut hay for sheep. When cut in early bloom and fed with corn silage and properly supplemented with a protein concentrate and limestone satisfactory results were secured. In fact the results were almost as good as those with alfalfa hay and corn silage for roughage. In the group receiving late-cut timothy hay in place of the early-cut hay the ewes lost weight and produced lambs lacking in vigor, milked poorly, and showed a tendency to shed the fleece because of weakened wool fibers.

All previous work here reported has been with timothy hay but it is the predominant grass in the meadows at the Mountain Station and it is thought that hay from other meadow grasses would be affected in a similar way.

5. Outline of Procedure:

(a) Cutting and storing hay:

The meadows will be surveyed and staked off into three replications of the experiment giving the two treatments. In treatment I the grass will be cut in the early bloom stage, and in treatment II it will be cut after it is fully mature, which is the stage that most of the Mountain meadows are cut for hay. Replication 1 covers roughly the area in the large meadow on the west side of the creek that is newly seeded. It runs from the highway 600 feet up the creek, and 600 feet up the new road to the parkway. It consists of three strips 100 feet wide for the early cut, and three for the late cut. Replication 2 is made of the remainder of the large meadow and consists of 8 parallel strips, 4 early and 4 late cuts. Replication 3 consists of the four acres across the creek from Replication 2, and two additional acres in the bottom, just up the creek

from this area and still on the east side of the creek. The four acre field is to be cut up into approximately 100 feet strips and the two acres into two strips, one-half of which will be cut early and one-half late.

All hay from any particular cut in any one replication will be kept together and may be stacked in one or more stacks, depending on which is the most practical, and then baled together. This will result in a total of six lots that are to be kept separately; early and late cuttings from replications 1, 2, and 3. See attached maps.

(b) Selection of Animals

Twenty-nine bred grade Hereford heifers of known breeding and previous treatment will be divided into six as uniform groups as possible at the close of the grazing season in 1945 (about December 15). In future years it is planned to use yearling steers for these tests.

(c) Methods of feeding:

(1) Regular experimental procedure as regards weighing, grading, recording, and reporting of data, etc. will be followed in all details of the work.

(2) The six groups of cattle, which include two comparisons replicated three times, will be full fed meadow hay and enough cottonseed meal to winter them in a thrifty condition. The same amount of cottonseed meal will be fed per head in each group. When the heifers calve a small amount of ground corn may be added to the ration of each group if necessary to keep them in the desired condition.

(3) Three of the groups (Ia, Ib, and Ic) will be fed the hay cut in the mature stage and the other three groups(IIa, IIb, and IIc) that cut in the immature stage. The feeding will continue until the permanent pastures are ready to graze about May 1.

(d) Data on Meadow "aftermath" or regrowth:

(1) Wire cages may be used to measure the difference in available grazing on the early and late-cut meadow strips.

(2) In future years the grazing on the early and late-cut meadow land will also be measured by grazing cattle on them. In this case days grazing and weight changes will be recorded.

(e) Records:

(1) Hay - The yield of hay produced in each replicate will be weighed and graded.

(2) Cattle - Individual weights of each animal will be recorded at regular 28-day intervals. However, the initial and final weight of each animal will be an average of three weights taken on successive days. Following the wintering period, pasture gains for the season will be recorded to see the "carry-over" effect of the previous winter treatment.

(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 crop yields.

6. Probable Duration of Project: Three to five years

7. Date of Initiation: June 1945

8. Personnel:

Name	Department	Relation to Project
J. E. Foster	Animal Industry (An. Husb.)	Leader
R. L. Lovvorn	Agronomy (Management)	Co-leader
W. W. Woodhouse	Agronomy (Nutritional)	Co-leader
E. H. Hostetler	Animal Industry (An. Husb.)	Adviser
D. W. Colvard	N. C. Dept. of Agriculture	Cooperator

9. Coöperation:

a. Interdepartmental Animal Industry (Animal Husbandry) and Agronomy

b. Other Agencies N. C. 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						
2. Labor						
3. Travel				50.00		
4. Equipment & Supplies						
5. All Other						
Total				$50.00		

b. Proposed Future Budgets:

Year	Salaries	Total Expenditures	Estimated Income
1946-47		100.00	None
1947-48		150.00	"
1948-49		200.00	"
1949-50		200.00	"

11. General Remarks: Project financed by North Carolina State Department of Agriculture except for travel of Experiment Station workers.

SIGNATURES OF APPROVAL

1. Approval of Project Leaders

Date Sept. 5, 1945 ..... J. E. Foster .....

Title In Charge Beef Cattle & Sheep Research

Date Sept. 5, 1945 ..... R. L. Lovvorn .....

Title Associate agronomist

Date Sept 5 1945 ..... W. W. Woodhouse .....

Title Assoc. agronomist

2. Approval of Heads of Departments or Cooperating Agencies

Date 9-6-45 ..... Earl N. Hostetler .....

Head, A. H. Section

Date 9-26-45 ..... J. H. Hilton .....

Head, Department of Animal Industry

Date 9/27/45 ..... Ralph W. Cummings .....

Head, Dept. of Agronomy

3. Approval of Committee on Experiment Station Projects

Date 9/27/45 ..... R. W. Cummings .....

Chairman of Committee

4. Approval of Director

Date 10/16/45 ..... L. D. Baver .....

Director, North Carolina Agricultural Experiment Station

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

Date .....

Chief, Office of Experiment Stations