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NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

Project Statement

January 3, 1928.

Section: Animal Husbandry.
Number of Project: 13
Name of Project: Vitamin A Studies with Beef Cattle.
Class: Animal Nutrition.
Leaders: J. O. Halverson and Earl H. Hostetler.
Cooperators:
Assistants: F. W. Sherwood, J. E. Foster and R. E. Nance.
Location: Central Station Farm, Raleigh.
Date Begun: Fall, 1928.

Object: To show definitely that Vitamin A in the heavy feeding of cotton seed meal is lacking in the livers of such animals; also to ascertain and show how this can be supplied and stored in the livers of these animals.

by examination of

This work so far has not been conclusively done with cottonseed meal. No work has been done to show the shortage of Vitamin A in the livers of stock heavily fed on cottonseed meal. Previous Project II did not cover this point.

Importance: To the Cotton Belt, where cottonseed meal is extensively fed to stock.

Method of Procedure:

6 calves, 10 to 12 months old, are to be individually fed cottonseed meal with hulls and beet pulp with mineral (as in C.S. Study II). This is to be continued until there appear definite symptoms of Vitamin A deficiency as shown by the affected eyes and fits when enough of them are to be killed for confirmation of this deficiency by small animal feeding of their livers for the presence or absence of Vitamin A.

The remaining animals as they show symptoms of deficiency are to be fed cod liver oil until alleviated and they are again in good condition.

When the symptoms of these deficiencies have been alleviated, the animals are to be slaughtered to ascertain whether Vitamin A has been utilized and stored in the body as shown by small animal tests on their livers compared to livers of similar animals on the usual stock rations.

Organization and
Cooperation:

N. C. Agr. Exp. Sta

Apportionment for
Project:

Purnell

<i>Maintenue</i>	<i>1000</i>
<i>Hortelley</i>	<i>300</i>
<i>Foster</i>	<i>200</i>
<i>Page</i>	<i>200</i>

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date Sept. 22, 1925.

Section: ANIMAL INDUSTRY

Number of Project: 12

Name of Project: Studies in Rations: As affecting sterility reproduction and lactation in the rearing of young.

Class: Animal Nutrition.

Leaders: J. O. Halverson and F. W. Sherwood.

Co-operators:

Assistants:

Location: State Department of Agriculture, Raleigh, N.C.,
State College after January 1, 1926.

Date begun: 1924.

Object: To determine what factors are of importance in influencing reproduction; in some cases resulting in sterility, in others resulting in good reproduction but inability to furnish sufficient milk or milk of good quality to nourish the young. The factors concerned are minerals, an unknown organic substance or substances, or possibly a reproductive vitamin. This work is conducted with peanuts and with the ordinary cereals. We have never successfully fed peanuts with good reproduction and rearing of young. Why? This is the larger phase of the problems into which the mineral and unknown deficiencies of the peanut studies were merged.

~~Importance~~

~~Method of Procedure~~

Importance: Of fundamental importance to the livestock industry and possibly the human as well as for the human as far as effect of diet is concerned. Our work has brought forth this thought, does stock (human and animal) "run out"? If so, what part does diet play? Our work indicates it plays a considerable part.

Method of Procedure:*

The following three methods of attack are in progress, using the albino rat as the experimental animal.

A. Studies on Peanuts (Reproduction and Rearing of Young)

1. Oil extracted peanuts and the deficiencies supplied in Ration 167 fed:

Result: Subnormal reproduction and no young weaned

* Divide and report on the various phases of the project according to sub-divisions, i. e., Sub-Division I, Sub-Division II, etc.

2. Same Ration 167 plus 5% dried alfalfa leaf fed.
Result: Young reared to 2nd and 3rd generation.
No 4th generation reared. Why?
3. Same Ration as in (2) except 1/10 as much wheat embryo added (0.5%) as in 3 above, now in progress.
4. Same Ration 167 as in (2), that is 5% alfalfa leaf plus 5% wheat embryo. Now in progress.
Result: 1 rat died. Young of 4 litters dead.
5. Same Ration as in (2) except the alfalfa ash is supplied equivalent to the 5% alfalfa leaf, with no wheat embryo. Done on 3rd generation under (2)
Result: All 4 rats dead.
6. Same Ration as in (2) substituting 5.0% wheat embryo in place of 5% alfalfa leaf. Now in progress on 3rd generation under (2).

B. Studies in Stock Cereal Ration 10-C with 5% dried alfalfa leaf added.

1. On cereals, chiefly corn, wheat, oats and several supplements without daily whole milk and cabbage tri-weekly, plus 5% dried alfalfa leaf.
Result: Reared litters to 3rd generation only.
Why?
2. Ration (10-B plus 5% alfalfa leaf) plus 2% cod liver oil plus 5% wheat embryo (Ration 10-E) now used for colony ration with apparent success as to reproduction, lactation and rearing of young.
3. Next to determine whether the factors in alfalfa leaf is organic or mineral.

Ration 124 cereal with no alfalfa leaf same as Ration 10-B above without fresh milk daily and cabbage tri-weekly, only one litter of 2nd generation was reared to weaning age. All but 2 of these died. These 2 rats were saved by changing to a better ration.

4. Same Ration as (3) above with 2% wheat embryo, Ration 124-A. Without daily fresh milk and cabbage tri weekly is now being fed and under way.
5. Same Ration as (4) above except 5% dehydrated soup vegetables are also added. Ration 124-B without daily milk or cabbage tri weekly, now under way.

C. Studies on Stock Cereal Ration 10-C (includes 5% alfalfa leaf) to determine whether the factors in fresh whole milk or cabbage is organic or mineral.

1. Ration 1-C plus equivalent milk ash and fresh cabbage tri weekly now under way.
2. Ration 10-C plus daily whole milk plus equivalent ash of cabbage tri weekly) now under way.

Result to Date: 2 females have 8 young (3 dead) which are being reared. One litter of 1 young died.

3. Ration 10-C plus equivalent milk, ash and equivalent cabbage ash now under way.

Result to Date: 1 female has 3 young left which are being reared (1 died) 2 other litters of 11 young have died.

Organization and Co-operation: N. C. Agricultural Experiment Station and
State Department of Agriculture Cooperating.
Apportionment for Project: State Department of Agriculture. Incidentals
for feed, etc.

Approved:

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President.

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Head of Department.

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Director.

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Head of Department.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date.....192.....

Section: Animal Industry

Number of Project:

Name of Project: Cottonseed Meal Studies IV - Effect of deficiencies of cottonseed meal on reproduction and lactation of dairy cattle when fed as 50% of concentrates along with good roughage thruout a full gestation and lactation period.

Class: Animal Nutrition.

Leaders: C. D. Grinnells, R. S. Curtis and J. O. Halverson,

Co-operators:

Assistants: G. S. Carter.

Location: Central Experiment Station, Raleigh, N. C.

Date begun: 1925

Object: To determine whether 50% of cottonseed meal in the concentrate ration will have any detrimental effect on reproduction and lactation of dairy cattle when these cattle are receiving freshly cut soilage crops.

~~Importance:~~ Some of the completed cottonseed meal studies indicate the possibility of feeding comparatively large quantities of cottonseed meal when certain nutritive supplements are added. The efficiency of these supplements and the quantities of them to accomplish the desired result must now be worked out

~~Method of Procedure:~~ Importance: Of great importance to the dairy industry of the South.

Method of Procedure:

(1) Subjects - Six cows in the herd will be selected so that they are comparable to the remainder of the herd in type, age, and productive capacity.

(2) Feed -

Roughage:

The roughage is to consist of green soilage crops such as rye, vetches etc and cottonseed hulls.

PROJECT STATEMENT

Group I

Group II

Group III

75 % green material
25% cottonseed hulls

50 % green material
50 % cottonseed hulls

25% green material
75% cottonseed hulls

3- CONCENTRATES:

Group I

Group II

Group III

50% Cottonseed meal
50% Corn (ground)

50% Cottonseed meal
50% Corn (ground)

50% Cottonseed meal
50% Corn (ground)

4- CARE:

These animals will be confined in stanchions during feeding and milking and such times as weather will not permit their being turned out *to yards.*

5- EXPERIMENTAL PERIODS:

The rations will be continued until each experimental animal has completed at least two full gestation periods and subsequent lactation periods.

6- WEIGHTS:

Subjects will be weighed on the fifteenth day of each month.

7- PHOTOGRAPHS:

Subjects will be photographed when conditions justify it as the best procedure.

8- Milk will be weighed every day and tested once in a month/

9-

All feed, production, breeding calving and condition records will be preserved and kept summarized as the experiment progresses.

Organization and Co-operation: N. C. Agricultural Experiment Station,
~~Appropriation for Project~~ Interstate Cottonseed Crushers Association.

Apportionment of Project: \$125000

Approved:

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President.

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Head of Department.

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Director.

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Head of Department.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date _____ 1925.

SECTION: Animal Industry

NUMBER OF PROJECT:

NAME OF PROJECT: A gross study of the effect of practical correctives when fed with C.S.M. to beef cattle.

CLASS: Animal Nutrition.

LEADERS: R. S. Curtis and L. H. McKay.

COOPERATORS: J. O. Halverson

ASSISTANTS:

LOCATION: To be decided.

DATE BEGUN: October 15, 1925.

OBJECT: To work out a safe and feasible plan to use cottonseed meal in such a way as to make possible a higher finish and more satisfactory and profitable marketing.

IMPORTANCE: This is of great importance to all beef cattle producers and finishers in the State.

METHOD OF PROCEDURE: Accurate records, weights and photographs will be kept on all animals in the various groups.

ORGANIZATION AND COOPERATION: North Carolina Agricultural Experiment Station.

APPORTIONMENT OF FUNDS: State: To pay incoming freight and wages of man to do feeding work. Cattle to be fed on marginal basis and feeds to be paid for when cattle are sold.

APPROVED: _____

Director. Head of Department.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date _____ 1925.

SECTION: Animal Industry

NUMBER OF PROJECT:

NAME OF PROJECT: A study of the effect of various correctives when
fed with C.S.M. to beef cattle.

CLASS: Animal Nutrition

LEADER: R. S. Curtis and L. H. McKay.

COOPERATORS: J. O. Halverson.

ASSISTANT:

LOCATION: College Farm

DATE TO BEGIN: October 15, 1925.

OBJECT: To further determine whether C.S.M. injury is due
to toxicity, deficiency or both.

IMPORTANCE: A parallel study with what is commonly known as
Cottonseed Meal Studies, in fact a part of this
study.

METHOD OF PROCEDURE: Weights, photographs and accurate records will be
kept of each animal which will be fed individually.
A daily record will also be kept showing any pe-
culiar developments which may arise from the use of
any one or more of the feed combinations.

ORGANIZATION AND
COOPERATION: North Carolina Agricultural Experiment Station.

APPORTIONMENT OF
FUNDS: State and College - \$500.00
Proceeds will be available within fiscal year.

APPROVED:

Head of Department.

Director.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT.

Sept. 29, 1925.

SECTION: Animal Industry

NUMBER OF PROJECT:

NAME OF PROJECT: The Influence of Sex and of Cottonseed Meal Versus Corn on the Quality of Meat.

This covers two phases of the general subject entailing the study of factors which influence the quality of meat.

CLASS: Animal Nutrition

LEADERS: R. S. Curtis, J. O. Halverson, L. H. McKay.

COOPERATORS: U. S. Department of Agriculture.

ASSISTANTS:

LOCATION: Central Experiment Station Farm, Raleigh, N.C.

DATE BEGUN: November 1st, 1925.

OBJECT: To determine: (1) whether sex is a real factor effecting the quality of meat as market quotations and prices paid in actuality seem to indicate. This particular phase of the problem will be studied by a number of the stations cooperating. (2) In connection with the above a study will also be made on the effect of cottonseed meal as effecting the quality of meat.

IMPORTANCE: This is a cooperative project in which 27 states have indicated their desire to study such phases as conditions will permit. Numerous committee and general meetings have been held under the leadership of Prof. F. B. Mumford of Columbia, Mo.

METHOD OF PROCEDURE:

This is really two projects carried on simultaneously. Four groups of animals will be involved embracing two groups of females and two groups of steers.

- a. There will be twelve animals used in each group. All animals will be of the same breeding in so far as possible and will be started on feed when approximately 2½ years old.
- b. One group of the females and one group of the steers will be fed cottonseed meal solely for the concentrated portion of the ration. The other group of females and the other group of steers will be fed corn solely as the concentrated portion of the ration.
- c. All of the four groups will be fed the same roughage which will consist of silage, cottonseed hulls and hay, thus making the comparison on a basis of the difference in the effect of the concentrates fed.
- d. The following is the grouping and the rations to be fed:

Group I. Females- C.S.M.
C.S. Hulls,
Corn Silage,
Hay.

Group II. Steers- C.S.M.
C.S. Hulls,
Corn Silage,
Hay.

Group III. Females Corn
C. S. Hulls,
Corn Silage,
Hay.

Group IV. Steers- Corn
C.S. Hulls,
Corn Silage,
Hay.

- e. All animals will be weighed individually at the beginning of the period and each 30 days thereafter until the work is closed.

- f. Photographs will be made at the beginning and end of the experiment. The approximate length of the feeding period will be about five months. This will depend somewhat on the gains made and the condition of the market at the close of the work.
- g. At the beginning of the Experiment one animal out of each group will be slaughtered to make a study of the condition of the carcass before the fattening process begins. All animals will be slaughtered at the close of the experiment and a study made of the differences in quality which exist. These will be determined largely by color, firmness, tenderness, amount of distribution of fat, texture, and flavor.

ORGANIZATION AND
COOPERATION:

North Carolina Experiment Station,
U. S. Department of Agriculture.
N. C. Department of Agriculture.

APPORTIONMENT FOR
PROJECT:

Purnell	\$1,000.00
State	1,000.00

Head of Department.

APPROVED:

Director.

3 copies made

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date March 30, 1926.

Section: Animal Industry

Number of Project: 3

Name of Project: Effect of Heavy Feeding of C. S. Meal to cattle on the Vitamin A content of butter.

Class: Animal Nutrition

Leaders: J. O. Halverson, F. W. Sherwood, and Dr. C. D. Grinnells.

Co-operators:

Assistants:

Location: State College, Raleigh, N.C.

Date begun: Summer, 1926.

Object: To ascertain whether butter from cows fed exclusively on C.S.M. or fed 50% each of cottonseed meal and corn concentrates with mineral and with good roughage supplied (alfalfa hay) contains the usual amount of Vitamin A.

Importance: Of importance in the feeding of Cottonseed meal to cows supplying milk for human consumption.

Method of Procedure:*

I. Three lots of 4 to 6 rapidly growing albino rats of 40 - 50 grams are to be fed an adequate purified ration except for Vitamin A; D will be supplied by irradiation, until they attain a condition of avitaminosis when the butter fat to be tested will be fed at 2.5, 5 and 7.5% to each lot.

Similar control lots will be fed at the same time on good creamery butter in like amounts. As many additional lots will be used as may be necessary to evaluate this factor.

II. Butter from cows being fed 50% each of corn and cottonseed meal will likewise be used in other lots of rats similarly used as above.

* Divide and report on the various phases of the project according to sub-divisions, i. e., Sub-Division I, Sub-Division II, etc.

Organization and Co-operation: Animal Nutrition and Dairy Investigation,
Animal Industry Section.
Apportionment for Project: Irradiation Outfit \$225.00
Balance on Nutrition Maintenance Fund.

Approved:

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President.

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Head of Department.

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Director.

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Head of Department.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date _____ 192__.

SECTION: Animal Industry

NUMBER OF PROJECT:

NAME OF PROJECT: A study to determine the most economical and effective rations for work stock under North Carolina conditions.

CLASS: Animal Nutrition

LEADERS: R. S. Curtis and Earl Hostetler

COOPERATORS: C. D. Grinnells.

ASSISTANTS:

LOCATION: College Farm

DATE TO BEGIN: ^{July} March 1, 1926.

OBJECT: Stated in name of project.

IMPORTANCE: The cost of feeding the farm work stock of North Carolina is equivalent to one-half the value of the cotton crop.

METHOD OF PROCEDURE: The six teams are to be fed rations as follows:

Team No. 1. Corn, Timothy Hay or corn stover.

Team No. 2. Corn 85 parts,
Cottonseed Meal 15 parts.
Timothy Hay or corn stover.

Team No. 3. Corn, Soybean or cowpea hay.

If additional teams are available from the Horticultural Department I would suggest the following:

Team No. 1. Corn 60 parts
Oats 40 parts
Timothy Hay.

Team No. 2. Corn 80 parts
Oats 20 parts
Legume hay, cowpeas or soy beans.

When the animals are not worked as teams it will, of course, be necessary to have them do similar work when hitched single in order that we may have comparable conditions.

Photographs are to be taken at the beginning of the test and weighings made monthly. A daily record of the feeds eaten and the amount refused is to be maintained.

During idle seasons the rations are to be reduced and supplemented with pasture. It will be necessary for this particular part of the work to be more or less elastic as the reduction of feed and the amount of pasture used to supplement it would depend on the amount and character of work being done during the idle periods.

During this work general supervision will be maintained over the animals in order that parallel conditions might be provided at all times.

If the necessary arrangements can be made so that the Animal Husbandry workers could have complete supervision over the work stock then I would suggest making comparison within the teams rather than making the teams the unit. This would be a mere matter of shifting, depending upon the plan that could be worked out.

**ORGANIZATION AND
COOPERATION:**

North Carolina Agricultural Experiment Station.

**APPORTIONMENT OF
FUNDS:**

State and College.

No material extra cost except for dependable feeder and record blanks.

Head of Department.

APPROVED:

Director.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date.....192.....

Section: **Animal Industry**

Number of Project:

Name of Project: **Cottonseed Meal and Soybean Meal Feeding Studies
with Beef Cattle.**

Class: **Animal Nutrition.**

Leaders: **R. S. Curtis**

Co-operators:

Assistants:

Location: **N. C. Experiment Station Farm.**

Date begun: **October 15, 1926.**

Object: **To determine the relative feeding value and efficiency
of cottonseed meal and soy bean meal and their effect
on the quality of meat.**

Importance: **The soy bean is becoming one of the important crops in
eastern North Carolina where the cattle production and
feeding industry will develop rapidly since the eradication
of the cattle tick. Very little is known relative to the value of soy bean meal either in the
production or finishing of beef cattle.**

Method of Procedure: **Two groups of animals will be used. These groups will
be divided on a basis of age, weight, quality and condition
as near equally as possible. Initial weights will be taken of individuals and of the groups after
the preliminary feeding period is completed.**

The two groups will be fed as follows:

Group I.	Cottonseed Meal	8 lbs.
	Cottonseed hulls	10 lbs.
	Alfalfa Hay	10 lbs.

Group II.	Soy bean meal	8 lbs.
	Cottonseed hulls	10 "
	Alfalfa Hay	10 "

* Divide and report on the various phases of the project according to sub-divisions, i. e., Sub-Division I, Sub-Division II, etc.

Weighings will be made every 30 days on the individuals and groups. The final weighings will be made when the cattle are finished for market and slaughter data taken from a representative animal from each group in the beginning.

Organization and Co-operation: N. C. Experiment Station.

Apportionment for Project: State.

Approved:

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President.

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Head of Department.

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Director.

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Head of Department.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date. September 29, 1925

Section: Animal Industry

Number of Project: #20

Name of Project: The Influence of Sex and of Cottonseed Meal
Vs. Corn on the Quality of Meat.
This covers two phases of the general subject entailing the study of factors which influence the quality of meat.

Class: Animal Nutrition.

Leaders: R. S. Curtis, J. O. Halverson, L. H. McKay.

Co-operators: U. S. Department of Agriculture.

Assistants:

Location: Central Experiment Station Farm, Raleigh, N.C.

Date begun: November 1st, 1925.

Object: To determine: (1) Whether sex is a real factor effecting the quality of meat as market quotations and prices paid in actuality seem to indicate. This particular phase of the problem will be studied by a number of the Stations cooperating. (2) In connection with the above, a study will also be made on the effect of cottonseed meal as effecting the quality of meat.

Importance: This is a cooperative project in which 27 states have indicated their desire to cooperate in the study of such

Method of Procedure:* phases as conditions will permit.

There exists a general prejudice among local butchers against female beef animals. The lower price received by farmers for females is hardly justified by a real difference between the meat of females and steers. Beef animals fattened in the South usually bring a smaller price than similar animals from the West. The feeding of cottonseed meal has been given as partly responsible, it being supposed that corn is superior feed when quality is considered.

Method of Procedure: This is really two projects carried on simultaneously. Four groups of animals will be involved, embracing two groups of females and two groups of steers.

* Divide and report on the various phases of the project according to sub-divisions, i. e., Sub-Division I, Sub-Division II, etc.

(a) There will be twelve animals used in each group. All animals will be of the same breeding in so far as possible, and will be started on feed when approximately 2½ years old.

(b) One group of the females and one group of the steers will be fed cottonseed meal solely for the concentrated portion of the ration. The other group of females and the other group of steers will be fed corn solely as the concentrated portion of the ration.

(c) All of the four groups will be fed the same roughage which will consist of silage, cottonseed hulls and hay, thus making the comparison on a basis of the difference in the effect of the concentrates fed.

(d) The following is the grouping and the rations to be fed:

Group I. Females - C.S.M.
C.S. Hulls,
Corn Silage,
Hay.

Group II. Steers - C.S.M.
C.S. Hulls,
Corn Silage,
Hay.

Group III. Females - Corn,
C.S. Hulls,
Corn Silage,
Hay.

Group IV. Steers - Corn
C.S. Hulls,
Corn Silage,
Hay.

(e) All animals will be weighed individually at the beginning of the period and each 30 days thereafter until the work is closed.

(f) Photographs will be made at the beginning and end of the experiment. The approximate length of the feeding period will be about five months. This will depend somewhat on the gains made and the condition of the market at the close of the work.

- (g) At the beginning of the Experiment one animal out of each group will be slaughtered to make a study of the condition of the carcass before the fattening process begins. All animals will be slaughtered at the close of the experiment and a study made of the differences in quality which exist. These will be determined largely by color, firmness, tenderness, amount of distribution of fat, texture, and flavor. A standard score card is being used.

Organization and Co-operation:

North Carolina Experiment Station,
U. S. Department of Agriculture,
N. C. Department of Agriculture.

Apportionment for Project:

Apportionment for Project:

Furnell	\$1,000.00
State	1,000.00

Approved:

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President.

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Head of Department.

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Director.

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Head of Department.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT.

April 10, 1927

~~September 29, 1925.~~

SECTION: Animal Industry

NUMBER OF PROJECT: ~~No. 2.~~ 2

NAME OF PROJECT: The Influence of Sex and of Cottonseed Meal
Vs. Corn on the Quality of Meat.

This covers two phases of the general subject
entailing the study of factors which influence
the quality of meat.

CLASS: Animal Nutrition.

LEADERS: R. S. Curtis, ~~J. O. Halverson, L. H. McKay.~~

COOPERATORS: U. S. Department of Agriculture.

ASSISTANTS:

LOCATION: Central Experiment Station Farm, Raleigh, N.C.

DATE BEGUN: November 1st, 1925.

OBJECT: To determine: (1) Whether sex is a real factor
effecting the quality of meat as market quotations
and prices paid in actuality seem to indicate. This
particular phase of the problem will be studied by
a number of the stations cooperating. (2) In con-
nection with the above, a study will also be made on
the effect of cottonseed meal as effecting the quali-
ty of meat.

IMPORTANCE: This is a cooperative project in which 27 states
have indicated their desire to cooperate in the
study of such phases as conditions will permit.

There exists a general prejudice among local
butchers against female beef animals. The lower
price received by farmers for females is hardly
justified by a real difference between the meat of
females and steers. Beef animals fattened in the
South usually bring a smaller price than similar
animals from the West. The feeding of cottonseed
meal has been given as partly responsible, it being
supposed that corn is superior feed when quality is
considered.

METHOD OF PROCEDURE: This is really two projects carried on simultaneously. Four groups of animals will be involved embracing two groups of females and two groups of steers.

- a. There will be ¹⁰~~twelve~~ animals used in each group. All animals will be of the same breeding in so far as possible and will be started on feed when approximately 2¹/₂ years old.
- b. One group of the females and one group of the steers will be fed cottonseed meal solely for the concentrated portion of the ration. The other group of females and the other group of steers will be fed corn solely as the concentrated portion of the ration.
- c. All of the four groups will be fed the same roughage which will consist of ~~silage~~, ^{alfalfa} ~~what I saw~~ cottonseed hulls and hay, thus making the comparison on a basis of the difference in the effect of the concentrates fed.
- d. The following is the grouping and the rations to be fed:

Group I. Females - C.S.M.
C.S. Hulls,
~~Corn Silage~~, ^{alfalfa} ~~what I saw~~ Hay.

Group II. Steers - C.S.M.
C.S. Hulls,
~~Corn Silage~~, ^{alfalfa} ~~what I saw~~ Hay.

Group III. Females - Corn
C.S. Hulls,
~~Corn Silage~~, ^{alfalfa} ~~what I saw~~ Hay.

Group IV. Steers - Corn
C.S. Hulls,
~~Corn Silage~~, ^{alfalfa} ~~what I saw~~ Hay.

- e. All animals will be weighed individually at the beginning of the period and each 30 days thereafter until the work is closed.

- f. Photographs will be made at the beginning and end of the experiment. The approximate length of the feeding period will be about five months. This will depend somewhat on the gains made and the condition of the market at the close of the work.
- g. At the beginning of the Experiment one animal out of each group will be slaughtered to make a study of the condition of the carcass before the fattening process begins. All animals will be slaughtered at the close of the experiment and a study made of the differences in quality which exist. These will be determined largely by color, firmness, tenderness, amount of distribution of fat, texture, and flavor. A standard score card is being used.

ORGANIZATION AND
COOPERATION:

North Carolina Experiment Station,
U. S. Department of Agriculture,
~~N. C. Department of Agriculture.~~

APPORTIONMENT FOR
PROJECT:

Purnell	1800.00
State	1,000.00
	1,000.00
	2200.00

Head of Department.

APPROVED:

Director.

Revised Aug. 6/26.

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

PROJECT STATEMENT

Date Aug. 6, 1926.....

Section: Animal Industry

Number of Project: 2

Name of Project: Nutrition Properties of the Peanut:

I. Nutritive Factors in the diet Influencing Lactation and Rearing of Young.

II. A Biological Study of the Distribution of Vitamin B in the Peanut Kernel.
Animal Nutrition.

~~Class:~~

~~Leaders:~~

~~Class:~~

~~Cooperators:~~

Leaders:

Assistants:

J. O. Halverson and F. W. Sherwood.

Location: State College, Raleigh, N.C.

Date begun: Aug. 6, 1926.

Object: I. In studies on the nutritive value of the peanut using young growing rats, we have not been able to rear the young when the mother was chiefly fed on peanuts or peanut meal with the known deficiencies supplied.

Supplements have been used such as whole milk, soybean leaf, peanut leaf, or alfalfa leaf in various amounts with resulting good growth. Reproduction was fair but the rats were unable to rear the young. Milk or wheat embryo have been added to the ration. Wheat embryo in the ration together with alfalfa leaf alone made reproduction possible but not the rearing of young. Upon the addition of large amounts of wheat embryo, together with lettuce fed three times a week, one young has been successfully reared.

~~Importance:~~

~~Method of Procedure:~~*

In view of these results it is proposed to study further the lactation and rearing of young of mothers fed on the peanut ration in order to ascertain the reasons for lack of successful lactation or rearing of young.

II. Previous studies on the feeding or nutritive value of the peanut has given some indications that Vitamin B exists in only moderate or small amounts in this oil-bearing seed as measured by the albino rat to which peanuts were fed. Occasionally rats would be seized with violent convulsions along the spinal column whose symptoms resemble those caused by lack of Vitamin B.

* Divide and report on the various phases of the project according to sub-divisions, i. e., Sub-Division I, Sub-Division II, etc.

It is proposed to study the distribution of B in the Jumbo grade of the Virginia Runner bean in the sheath, germ and in the remaining part of the cotyledon.

Importance: Of importance in the feeding and use of peanuts for livestock or man.

Method of
Procedure:

Sub Division I. Two or three proved female rats having successfully reared one or two litters and one male will be used in each lot on each peanut ration and individually fed with records made of the feed intake.

The galactogogic substances to be used are:
Wheat embryo in large amounts fed separately or
lettuce in various definite amounts to each rat.

The ration of peanuts (Ration 192 modified)
will be: Per Cent

Peanuts, (whole or ether extracted)	40.34
Dried Brewer's Yeast	5.00
Osborne and Mendel Salt Mixture	4.00
Cod Liver Oil	5.00
Starch	45.66

100.00

To one lot will be fed wheat embryo and to
another lot lettuce.

All rats will be kept on 3/8" mesh wire screens.

Sub Division I
Note: Under the subject of lactation and rearing of young, the entire rat colony will continue to have its rations modified occasionally as conditions warrant in order to stimulate lactation and better growth of young by adding the necessary constituents lacking as soon as they become apparent.

It is desired, if possible, to establish a complete colony ration without the use of lettuce, cabbage or milk. Such a ration will have some experimental advantages.

The results obtained on the rat colony will be studied further in a statistical manner.

To date satisfactory results similar to those recently published by Osborne and Mendel have been obtained by modifications of our colony rations.

Sub Division II. In order to study the distribution of Vitamin B in the sheath, germ and rest of the cotyledon, young growing rats of 40-50 grams will be fed in groups of 4 or 5 to a weight of 150 - 200 grams.

Various amounts of sheath, germ and cotyledon will be separately fed to different rats. The highly purified ration will consist of:

Casein B-free	18 percent
Cod Liver Oil	5 "
O & M. Salts	4 "
Crisco	15 "
Starch B-free	<u>58</u> "
	100 "

Wheat embryo extract 6 drops to each rat daily.

Check rats will be used, feeding separately to each rat definite amounts of dried brewer's yeast daily in addition the ration given above.

All rats will be kept on 3/8" mesh wire screen.

Organization and Co-operation: None

Apportionment for Project: Run on Nutrition Maintenance Fund.

Approved:

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President.

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Head of Department.

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Director.

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Head of Department.