NORTH CAROLINA STATE COLLEGE

SCHOOL OF AGRICULTURE • RALEIGH, N. C.

OFFICE OF THE DEAN AND DIRECTORS

17 October 1958

Mr. Herbert M. Kieckhefer
Windrow Farms
Moorestown, New Jersey

COPY

Dear Mr. Kieckhefer:

It is my understanding that your office has communicated with Dr. Barrick advising of a slight change in transportation plans for their contemplated visit with you on October 22. This is entirely satisfactory and I believe they are proceeding in accordance with the amended schedule.

Unfortunately I will not be able to accompany them. However, Dr. Barrick and Professor Hyatt, who succeeded Dr. J. W. Pou as head of our Department of Animal Industry, will be in position to discuss the matter fully in behalf of the college. I called Mr. George Geoghegan with the hope that he might be able to accompany Messrs Hyatt and Barrick. He indicated that his schedule would not permit him to do so but that he would be very glad for Mr. Edmund Aycock, who is the agricultural representative of the bank and who is also a very active leader in the livestock industry of the state, to make the trip. Our staff is very happy to have Mr. Aycock with them. Therefore, it appears that the three men will be on hand according to your schedule on October 22. They will leave here on the 21st.

Again, let me express our gratitude to you for your generous thoughts in this regard.

Sincerely yours,

D. W. Colvard

D. W. Colvard
Dean of Agriculture

MDS
cc: George Hyatt, Jr.
E. R. Barrick
George Geoghegan

NORTH CAROLINA STATE COLLEGE
SCHOOL OF AGRICULTURE
RALEIGH

Department of Animal Industry

October 23, 1958

Dr. D. W. Colvard
Dean, School of Agriculture
115 Patterson Hall
Campus

Dear Dr. Colvard:

Professor Hyatt and I visited Mr. Kleckhefer on October 22 and inspected the Hereford cattle which he has offered to State College. The offering consists of 12 yearling heifers, a yearling bull and he also offered to let us have 4 - 6 mature cows of a line of breeding we are very much interested in.

These cattle are good representatives of the breed and will contribute materially to our teaching and research programs at State College. They will permit more rigid culling in our college herd than we have been able to practice. The pedigrees indicate that these animals should all be free from dwarfism. The cattle will be appraised for income tax purposes by Dr. G. W. Vander Noot of the New Jersey State College of Agriculture and we will be notified when the cattle are ready to be picked up.

Mr. Kleckhefer showed us every possible courtesy including a personally conducted tour through the paper processing plant and lunch in his home with him and his wife, as well as taking us to the airport for our return trip and having us picked up by a company plane in Raleigh.

Very truly yours,

E. R. Barrick, Head
Animal Husbandry Section

ERB:en

cc: Professor George Hyatt

NOVEMBER 5, 1958

MR. H. M. KIECKHEFER
WINDROW FARM
NORTH STANWICK ROAD
MOORESTOWN, NEW JERSEY

DEAR MR. KIECKHEFER:

WE ARE ENCLOSING A BRIEF STORY RELATIVE TO YOUR MOST GENEROUS GIFT TO NORTH CAROLINA STATE COLLEGE. WE WOULD LIKE TO SAY CONSIDERABLY MORE, BUT AS YOU KNOW, IF WE GET TOO LENGTHY THE NEWSPAPERS WILL NOT PRINT ANYTHING, SO WE HAVE, OF NECESSITY, MADE IT QUITE CONCISE.

I WOULD APPRECIATE IT GREATLY IF YOU WOULD CHECK THIS STORY AND LET US KNOW WHEN YOU RETURN IT TO US IF YOU APPROVE. PLEASE FEEL FREE TO ADD OR DELETE FROM IT IN ANY WAY YOU SEE FIT.

WE ARE LOOKING FORWARD TO THE TIME WHEN WE CAN PICK UP THE HEREFORDS AND ADD THEM TO OUR COLLEGE HERD. WE WISH TO THANK YOU OCE AGAIN FOR YOU VERY GENEROUS GIFT.

VERY TRULY YOURS,

GEORGE HYATT, JR., HEAD
DEPARTMENT OF ANIMAL INDUSTRY

GH:NR

P.S. DR. COLVARD--ANY SUGGESTIONS YOU HAVE RELATIVE TO THIS STORY WOULD BE GREATLY APPRECIATED.

cc: DR. D. W. COLVARD

NEWS RELEASE ON CATTLE GIVEN TO NORTH CAROLINA STATE COLLEGE BY MR. H. M. KIECKHEFER.

A GIFT OF TWENTY-THREE HEAD OF OUTSTANDING HEREFORD CATTLE HAS BEEN MADE TO THE DEPARTMENT OF ANIMAL INDUSTRY OF NORTH CAROLINA STATE COLLEGE BY MR. H. M. KIECKHEFER OF WINDROW FARM, MOORESTOWN, NEW JERSEY. THE GIFT CONSISTS OF ELEVEN HEAD OF YEARLING HEIFERS, SIX COWS, TWO OF WHICH HAVE HEIFER CALVES AT SIDE, AND TWO YOUNG BULLS. ALL OF THESE ANIMALS ARE OF POPULAR BLOOD LINES AND AS INDIVIDUALS ARE GOOD REPRESENTATIVES OF THE HEREFORD BREED.

MR. KIECKHEFER HAS DEVELOPED A HERD OF TOP QUALITY HEREFORD CATTLE AND AN EFFICIENT CATTLE OPERATION ON A FARM OF ONLY 90 ACRES NEAR MOORESTOWN, NEW JERSEY. BY MAKING USE OF IRRIGATION AND MODERN FEED HANDLING PRACTICES, WINDROW FARM HAS BEEN DEVELOPED TO THE POINT THAT IT HAS A CARRYING CAPACITY OF MORE THAN ONE COW PER ACRE. A REAL ACCOMPLISHMENT.

MR. KIECKHEFER IS SENIOR VICE-PRESIDENT OF THE KIECKHEFER-EDDY DIVISION OF WEYERHAUSER TIMBER COMPANY. THE NORTH CAROLINA PULP COMPANY AT PLYMOUTH, NORTH CAROLINA, WHICH PURCHASES AND PROCESSES LARGE QUANTITIES OF PULPWOOD IN NORTH CAROLINA, IS A SUBSIDIARY OF THIS COMPANY. IT WAS THROUGH THIS CONTACT THAT MR. KIECKHEFER BECAME INTERESTED IN NORTH CAROLINA AGRICULTURE AND THE CATTLE INDUSTRY.

THE KIECKHEFER CATTLE WILL BE USED IN THE PUREBRED HEREFORD HERD AT NORTH CAROLINA STATE COLLEGE AND IT IS EXPECTED THAT THEY WILL MAKE A REAL CONTRIBUTION TO THE TEACHING AND RESEARCH PROGRAMS.

NORTH CAROLINA STATE COLLEGE

SCHOOL OF AGRICULTURE • RALEIGH, N. C.

OFFICE OF THE DEAN AND DIRECTORS

31 October 1958

Mr. H. M. Kieckhefer
Windrow Farm
North Stanwick Road
Moorestown, New Jersey

COPY

Dear Mr. Kieckhefer:

In behalf of the School of Agriculture of North Carolina State College I am happy indeed to accept the splendid gift of twenty-three Hereford animals from your selected herd of breeding stock. You were most generous and it is our hope that the animals may be so incorporated into our breeding program that you will feel that your gift has served the agriculture of North Carolina and the livestock industry well.

Messrs Hyatt and Barrick have given a very fine report of their visit with you. They have a great deal of enthusiasm for the heifers, cows and the two bulls which have been selected for their use. This kind of support challenges our staff to exert every effort to provide information and leadership for the sound development of our state.

I hope you will give us the opportunity of returning your hospitality the next time you are in this part of the country. I should personally be very happy if you would visit us here at the college and have lunch or dinner with me and perhaps some of our staff and some of your other friends at your very first opportunity.

Again, let me emphasize our gratitude to you.

Sincerely yours,

D. W. Colvard
Dean of Agriculture

MDS
cc: C. H. Bostian
L. L. Ray
George Hyatt, Jr.
E. R. Barrick

NEWS RELEASE ON CATTLE GIVEN TO NORTH CAROLINA STATE COLLEGE BY MR. H. M. KIECKHEFER

A gift of twenty-three head of outstanding Hereford cattle has been made to the Animal Industry Department of North Carolina State College by Mr. H. M. Kieckhefer of Windrow Farm, Moorestown, New Jersey. The gift consists of eleven head of yearling heifers, six cows, two of which have heifer calves at side, and two young bulls, All of these animals are of popular blood lines and as individuals are good representatives of the Hereford breed.

Mr. Kieckhefer has developed a herd of top quality Hereford cattle and an efficient cattle operation on a farm of only 90 acres near Moorestown, New Jersey. By making use of irrigation and modern feed handling practices, Windrow Farm has been developed to the point that it has a carrying capacity of more than one cow per acre. A real accomplishment.

Mr. Kieckhefer is senior Vice-President of the Kieckhefer-Eddy Division of Weyerhaeuser Timber Company. The North Carolina Pulp Company at Plymouth, North Carolina which purchases and processes large quantities of pulpwood in North Carolina ia a subsidiary of this company. It was through this contact that Mr. Kieckhefer became interested in North Carolina agriculture and the cattle industry.

The Kieckhefer cattle will be used in the purebred Hereford herd at North Carolina State College and it is expected that they will make a real contribution to the teaching and research programs.

Moorestown, N. J. November 4, 1958

WINDROW FARM CATTLE
North Carolina State College

HEIFERS

Ear Tattoo	Born	Name	Sire	Dam	Bred To
I 2	4/2/57	WF Zato Heiress 28 Reg. #10021569	TR Zato Heir 207 Reg. #7065488	WF Zato Heiress 9 (twin) Reg. #8863878	Circle H Zato 83d Reg. #9532773
I 7	5/21/57	WF Zato Heiress 29 Reg. #10021571	WF Zato Heir 7 Reg. #8884440	HP Miss Regent 90 Reg. #5316996	"
I 10	6/13/57	WF Zato Heiress 30 Reg. #10021572	"	Miss Mill Iron 517B Reg. #8671844	Open
I 11	6/15/57	WF Zato Heiress 31 Reg. #10021573	TR Zato Heir 207 Reg. #7065488	HP Miss Regent 85 Reg. #5315115	Open
I 12	7/2/57	WF Zato Heiress 32 Reg. 10021574	WF Zato Heir 7 Reg. #8884440	WF Zato Heiress 12 Reg. #9090436	Open
I 16	7/24/57	WF Zzto Heiress 34 Reg. #10021576	"	Miss MillIron N684 Reg. #7190655	Open
I 18	8/1/57	WF Zato Heiress 35 Reg. #10021577	"	HP Miss Regent 124 Reg. #6100986	Open
I 19	8/15/57	WF Zato Heiress 36 Reg. #10021578	"	HP Miss Regent 145 Reg. #6981984	Open
I 22	8/20/57	WF Zato Heiress 37 Reg. #10021579	"	WF Zato Heiress 13 Reg. #9189303	Open
I 29	10/28/57	WF Zato Heiress 38 Reg. #10201761	"	Miss Mill Iron J301 Reg. #6481974	Open
I 31	11/1/57	WF Princess Zato Reg. #10201762	LM Prince A Zato 65 Reg. 8899061	Miss Mill Iron L554 Reg. #6587990	Open

Moorestown, N. J. November 4, 1958

WINDROW FARM CATTLE
North Carolina State College

HEIFERS - Cont.

Ear Tattoo	Born	Name	Sire	Dam	Bred To
I 35	12/9/57	WF Zato Heiress 39 Reg. #10201764	WFZato Heir 7 Reg. #8884440	HP Miss Royal 89 Reg. #4964560	Open

Moorestown, N. J. November 4, 1958

WINDROW FARM CATTLE

North Carolina State College

COWS

Ear Tattoo	Brand	Born	Name	Sire	Dam	Bred To	Calf at Side
R. E. J301	577	11/1/50	Miss MillIron J301 Reg. #6481974	Colo. Domino M 39 Reg. #3938570	Miss Mill Iron 1 Reg. #3812022	Open	B32 Heifer 10/14/58
R. E. K289	640	7/18/51	Miss Mill Iron K289 Reg. #6797387	Mill Iron Dom 420 Reg. #3758605	Miss Mill Iron 241 Reg. #4141790	"	B28 Heifer 9/23/58
R. E. E864	426	2/17/49	Miss Mill Iron E864 Reg. #5707383	Mill Iron A 4 Reg. #4656597	Miss Mill Iron A349 Reg. #4681127	"	B34 Heifer 10/28/58
R. E. N684	684 741	3/7/52	Miss Mill Iron N684 Reg. #7190655	Colo. Domino M 39 Reg. #3938570	Mill Iron Queen 203 Reg. #3774025	LMPZ65 *	To Calve 4/25/59
R&L 852	356	4/18/49	HP Miss Regent 115 Reg. #5978733	TT Regent Reg. #4158727	Emma May 15 Reg. #3343483	CHZ 83d **	2/20/59
All	All	7/13/55	WF Zato Heiress 14 Reg. #9189304	TR Zato Heir 207 Reg. #7065488	Miss LM Zato D81 Reg. #6690099		

BULLS

I 3		5/7/57	WF Zato Heir 19 Reg. #10021570	WF Zato Heir 7 Reg. #8884440	HP Miss Royal A20 Reg. #8568495		
B 11		4/30/58	WF Prince Zato 2 (Reg. applied for)	LM Prince A Zato 65 Reg. #8899061	Miss LM Larry 48 Reg. #6690101		

* LM Prince AZato 65
** Circle H Zato 83d

October 27, 1958

Mr. H. M. Kieckhefer

Windrow Farm
North Stanwick Road
Moorestown, New Jersey

Dear Mr. Kieckhefer:

We had a successful but rather long return trip from Philadelphia, since weather conditions made delays for us in both Washington and Richmond. However, Dr. Barrick and I had much food for thought after our fine day with you and your wife.

We are certainly grateful to you for being so generous with your cattle, and I am sure they will make a real addition and contribution to our herd of Herefords. Moreover, we greatly appreciated your generosity with your time in showing us through the two plants in Camden. We also want to express our gratitude to you and your wife for the lovely visit we had in your home and for the opportunity to talke with both of you and eat together at noon.

2 We want to prepare a little news story regarding your gift to North Carolina State College, but you may be assured that we will check it with you prior to release. We will be writing you soon about this story. I have relayed the events of our visit with you to our Dean of Agriculture and I am sure that you will be hearing from Dr. Colvard in the next few days.

I want to emphasize once more that we would enjoy your stopping in at State College any time so that you can see the operation we have here, and I am sure you will be happy to see how your cattle are handled and cared for and how well they will fit in with our overall program for the improvement of beef cattle.

Be sure and give our best regards to your pilot who was most congenial and who piloted us so well on the trip north.

Very truly yours,

George Hyatt, Jr., Head
Department of Animal Industry

cc: Chancellor C. H. Bostian
Dean D. W. Colvard
Director R. L. Lovvorn

SCHOOL OF AGRICULTURE

North Carolina State College

Office of the Dean and Directors

MEMORANDUM

_____Note and pass to next person.
_____Note and return.
_____Note and do not return.
_____Please handle.
_____Please answer.
_____For your approval.
_____Needs your signature.
_____Note opinion and return.
_____For your information.
_____Note for further discussion.

TO: CHANCELLOR C. H. BOSTIAN

WE WILL FIND ENCLOSED A ROUGH DRAFT OF THE PROPOSED LETTER FOR YOU TO WRITE TO MR. HERBERT M. KIECKHEFER THANKING HIM FOR HIS RECENT CONTRIBUTION OF A FINE HEREFORD BULL. ORIGINAL CONTACT WITH MR. KIECKHEFER WAS MADE BY MR. HERVEY EVANS OF LAURINBURG. MR. GEORGE GEOGHEGAN HAS FOLLOWED THROUGH IN A VERY FINE MANNER AND ACTUALLY VISITED WINDROW FARMS WITH DR. POU WHEN THE BULL WAS APPRAISED AND WHEN ARRANGEMENTS FOR HIS SHIPMENT WERE MADE. FOR YOUR INFORMATION, MR. KIECKHEFER'S COMPANY HAS A LARGE PLANT IN PLYMOUTH. IT IS A PULP PAPER PLANT.

cc: J. W. POU

Date MARCH 29, 1957 (Sign) D. W. Colvard

Department of Animal Industry
NORTH CAROLINA STATE COLLEGE

MEMORANDUM

To ~~Dr Barwick~~ Thanks. E.R.B.

Dr. Poe

ATTACHED PAPERS

- Please note and return.
- Return with recommendations.
- For your records.
- Speak to me concerning.
- Please handle.
- Please answer.
- Needs your signature.
- For your approval.
- Please give me all data.
- Note and pass to next person.
- Please reply, sending me a copy.

Date

Signed: Jno Poe

BLOOD LINES
ZATO HEIR
REGENT
MILL IRON
LONG MEADOW

REGISTERED HERFORDS

PHONE
BELMONT 5-1124
BELMONT 5-4982

WINDROW FARM
NORTH STANWICK ROAD
MOORESTOWN
NEW JERSEY

November 7, 1957

Dr. J. W. Pou, Head
Department of Animal Industry
North Carolina State College
Raleigh, North Carolina

Dear Dr. Pou:

Thank you for your letter of October 29th.

I am pleased to know that you have bred WF Zato Heir 5 to five of your good cows, in addition to fifteen known dwarf carriers.

I will certainly make it a point to come down to see his calves in late February or early March, and will be very much disappointed if they do not compare with several of his calves which arrived this Summer. Should you happen to be in this area, I would be pleased to show them to you.

Sincerely yours,

H. M. Kieckhefer
WINDROW FARM

HMK:ML
cc: Dr. D. W. Colvard,
Dean of Agriculture

October 29, 1957

Mr. H. M. Kieckhefer
Windrow Farm
North Stanwick Road
Moorestown, New Jersey

Dear Mr. Kieckhefer:

We appreciate your letter and the information concerning the very good offspring of WF Zato Heir 5 you examined recently. We bred Zato Heir to five of the good cows in our College breeding herd at Raleigh and then we moved him to our Branch Station at Rocky Mount to breed a fifteen cow dwarf carrier herd. We have this herd established for checking on sires used in our College Breeding Program. Since this is the best check known to animal breeders at the present time, and because of our interest in taking full advantage of Zato Heir with our breeding herd, we felt this was a good opportunity to use him with the carrier herd as our breeding season at the College station was already pretty well over when he arrived at the College last spring.

We certainly hope that it will be possible for you to visit with us at N. C. State College either later this fall or early next spring. The Zato Heir calves should be dropped during the latter part of February or early March. We would be glad to have you see these calves and our other cattle and livestock used in our teaching and research program.

I appreciate very much your kind invitation to visit your farm again and see your new bull Circle H Zato 83d. I thoroughly enjoyed the visit last spring with Mr. Geoghegan, and we are looking forward to having the opportunity to return some of your wonderful hospitality when you visit Raleigh.

Sincerely yours,

J. W. Pou, Head
Department of Animal Industry

JWP:NR
cc: Dr. D. W. Colvard, Dean of Agriculture

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
PROJECT OUTLINE

Project No. S-191
Date Submitted May 2, 1957
Approved Jul 9, 1957
Revised .....

1. Title A Study of Performance Characteristics of Beef Cattle as Related to the Presence or Absence of the Genes for Recessive Dwarfism.

2. Objective(s)
   (1) To compare progeny performance of bulls as related to the gene-type for recessive dwarfism of the bull and of his progeny.

   (2) To develop and improve biochemical techniques for detecting phenotypically normal cattle which carry genes for dwarfism and to correlate results obtained with results from the genetic study.

   (3) To provide proof of freedom from recessive dwarfism for bulls to be used in the foundation herds at research stations.

3. Reasons for undertaking Investigations*

Dwarf cattle have been produced occasionally in breeding herds for many years. Within the last ten years the frequency of the occurrence of dwarfs has reached levels of economic importance in the beef cattle industry. Some breeders have become alarmed over the prospects of some day finding that many animals in their herds were heterozygous for dwarfism. A number of these animals which possess the gene for dwarfism have been identified in beef cattle herds in North Carolina.

Breeders are discriminating against many lines of breeding and favoring other lines according to whether or not dwarfism has been reported for some individual in the pedigree. This is causing economic loss for certain lines even though a high percentage of the animals in those lines may not be dwarf carriers.

The major problem with respect to the control of recessive dwarfism in beef cattle is that up to the present time no satisfactory technique has been found for identifying the heterozygous or carrier animal. Several methods have been investigated and are being currently evaluated by research workers throughout the United States. Results to date indicate that certain of the techniques may be valuable in locating carrier animals, but at present progeny testing is the surest way to detect the carrier. Due to the low fecundity of the cow, it is practically impossible to prove a cow clean by breeding test. However, the use of progeny tested bulls will

*Including economic justification

reduce the frequency of the gene for dwarfism, and appears to be a sound approach from an economic point of view. In mating a bull to known carrier cows, the probability of his producing all normal calves are as follows:

Number matings	Probability
2	56.3
4	31.6
6	17.8
8	10.0
10	5.6
12	3.2
14	1.8
16	1.0

The availability of tested bulls is limited, but the use of "pedigree clean" bulls is receiving considerable attention. Continued effort should be made to discover criteria by which the carrier or heterozygous animals may be identified.

The North Carolina Agricultural Experiment Station through its purebred beef cattle herds at Raleigh supplies the herd bulls not only for the purebred herd but also for research herds at three other locations in the state. Approximately three hundred cows are bred annually. It can be seen that the introduction of the gene for dwarfism into the foundation herd through two or more bulls might result in introduction of the dwarf gene into all herds. It is believed that none of the older cows now in the herds carry the gene for dwarfism, but in view of the relatively large number of known heterozygous bulls that appear in the pedigrees of many of the lines of breeding there is a certain amount of risk of bringing in the dwarf gene each time a new bull not proven to be clean is brought into the herd. If the gene has a frequency as low as .10 (it is probably at least this frequent) about one bull in five for the breed as a whole would be expected to be heterozygous for the trait.

~~XX Previous work and present status of investigations in the field of this project:~~

4. Review of Literature:

Dwarfism in cattle has been reported since 1860 among many breeds of cattle in both Bos taurus and Bos indicus (Seligman, 1904). Craft and Orr (1924) described an undersized Hereford steer with dwarf-like appearance and suggested this condition might be due to an under-developed thyroid and pituitary gland. A dwarf form morphologically similar to the preceding one has been studied more recently by various workers, including Johnson, Harshfield and McCone (1950), and Gregory and co-workers (1951, 1953). This type of dwarf has a short broad head, an excessively bulging forehead, and marked prognathis. In addition to its small stature, it has a distended abdomen, a strong pre-disposition to bloat and breathes heavily.

Cornelius, Tyler and Gregory (1956) found no difference in phenotypically normal calves and dwarf calves under 14 months of age in serum proteins, calcium, magnesium and phosphorus. They also found serum cholesterol and protein-bound iodine within normal range on the short headed dwarfs as compared with the phenotypically normal calves. They did find the difference between normal and dwarf calves in neutrophils and lymphocytes to be highly significant at the .15 level.

Gregory, Rollins, Pattengale and Carrol (1951) used the profilometer to demonstrate that a specific type of dwarfism in the homozygous state in cattle causes a distinct bridging of the frontal bones in the region of the mid-forehead. Schoonover and Stratton (1956) found no clear cut evidence that gave an indication that rise, bulge or frontal bone irregu-

5. ~~Outline of Procedure:~~

larity was associated with only heterozygous cows. The most noticeable inclination in the separation of clean and heterozygous cows was the cephalic index, head length divided by head width. A low index was indicative of a carrier, but they found a large overlap between the groups and a rather high frequency of carriers with a high cephalic index.

Massey, Foley, Milicevic, Johnson, Mayer and Lasley (1956) showed by injection of insulin a continuing increase in lympnocytes in carrier cows two hours after the injection of insulin, whereas the pedigree-clean cows showed a decline in lymphocytes at two hours after the injection of insulin.

Hazel, Emmerson and Bovard (1956) examined radiographs of the thoracolumbar spinal region of 40 to 50 Snorter dwarfs and found severe longitudinal compression and irregular protrusion of the body below the usual epiphyseal-disphyseal union. Twelve normal calves having one dwarf parent had abnormal vertebrae varying from slight to extreme degrees of abnormality. Homozygous calves have been classified abnormal and heterozygous calves have been classified completely normal. They also found another dwarf gene, having a different syndrome of abnormalities and apparently at a different locus, having an obvious but less severe effect upon the vertebrae than the Snorter dwarf gene.

5. Outline of Procedure:

A breeding herd of 20 cows known to be carriers, i.e., heterozygous for the recessive dwarf gene, will be purchased by the Division of Research Stations of the North Carolina Department of Agriculture and established at the Upper Coastal Plain Research Station. Each season one half of these cows will be bred to each of two bulls which are prospective herd sires for the foundation herds at Raleigh. Assuming an 80 per cent calf

crop, this would give 8 calves per bull on the average. The chances of a heterozygous bull producing no dwarf calves out of 8 when mated to known heterozygous cows are about one in ten. Thus two bulls could be proven at a satisfactory level of probability annually.

It is anticipated that most of the bulls to be progeny tested for dwarfism will be normal, however, some no doubt will be carriers, thus calves that are homozygous for normal growth and for recessive dwarfism as well as heterozygous calves will be present for research studies.

The growth pattern of all calves will be determined by weighing at regular intervals of 14 or 28 days from birth to removal from herd.

Body measurements as outlined in the Regional Beef Cattle Breeding Project S-10 will be taken.

That enzymatic and hormonal secretions of the animal organism are influenced and modified by its genetic material is a hypothesis that has received considerable attention in recent years. With respect to dwarfism in cattle, Lasley and his co-workers (1956) have shown that dwarf cattle differ from normal individuals in carbohydrate metabolism and in the response of white blood cell production to insulin injections. They present data which suggest that phenotypically normal cattle which carry genes for dwarfism are intermedicate in the latter response. As a starting point in this study, insulin will be injected intravenously with dosage levels based on body weight. Dosage levels will initially be set at 0.36 units of insulin per pound of body weight and variations from this level will be used if the need is indicated. Blood samples will be collected by jugular puncture immediately prior to insulin injection and at 0.5, 1.0, 2.0, 4.0 and 6.0 hours

con't 3a

6. Probable Duration of Project: Review of progress annually with termination probable at any time a satisfactory technique for distinguishing dwarf carrier animals becomes available.
7. Date of Initiation: Spring of 1957
8. Personnel:

Name	Department	Relation to Project
E. U. Dillard	Animal Industry	Leader
M. B. Wise	Animal Industry	Co-leader
J. H. Gregory	Animal Industry	Cooperator
E. R. Barrick	Animal Industry	Advisor
W. H. Bailey	Upper Coastal Plain Research Station	Cooperator

9. Coöperation:

a. Interdepartmental

b. Other Agencies

North Carolina Department of Agriculture

following injection. An anti-coagulant will be used in proper quantities. A total white blood cell count will be made immediately following blood sampling. A differential count including lymphocytes and neutrophils will subsequently be made after staining with Wright's stain. Other leads which develop as a result of the work outlined will be pursued.

10. Financial Support:

a. Proposed Budget July 1, 1957 to July 1, 1958

Items	ALLOCATION OF FUNDS				
	N. C. Agr. Exp. Sta.	Regional Research	State	Div. of Other Res. Sta.	Total
1. Salaries	2,000		~~1000~~ 1822	600	2,600
2. Labor					
3. Travel	250				250
4. Equipment & Supplies	880		500	660 1/	1,540
5. All Other 20 cows @$125.00				2,500	2,500 2/
Total	3,130		2322 1548	3,760	6,890

1/ Pastures are already established. Hay is a by-product of the present research program.
2/ Non-recurring expense.

b. Proposed Future Budgets:

N. C. Agricultural Experiment Station

Year	Salaries	Total Expenditures	Estimated Income
1958-59	2,000	3,130	
1959-60	2,000	3,130	
1960-61	2,000	3,130	

~~XXXXXXXXXXXXXXXX~~ Division of Research Station

1958-59	600	1,260	1,600
1959-60	600	1,260	1,600
1960-61	600	1,260	1,600

SIGNATURES OF APPROVAL

1. Approval of Project Leaders

Date June 12, 1957 ..... E. U. Dillard .....

Title Assistant Professor, Animal Husb. Section

Date June 13, 1957 ..... Milton B. Wise .....

Title Assistant Professor, Animal Husb. Section

Date ....

Title .....

2. Approval of Heads of Departments or Coöperating Agencies

Date 23 Sept 57 ..... J. W. Fox .....

Head, Animal Industry .....

Date ....

Head, ...

Date ....

Head, ...

3. Approval of Director

Date Oct. 9, 1957 ..... H. A. Stewart .....

asst. Director, North Carolina Agricultural Experiment Station

4. Approval of U. S. D. A.

Date ....

Chief, Office of Experiment Stations