5037

S-197

ANNUAL PROGRESS REPORT

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION PROJECTS

1. PROJECT: (Fund, number, and title) State, S-197, A STUDY OF CERTAIN CULTURAL PRACTICES AFFECTING SWEET POTATO QUALITY AND PRODUCTION.

2. DEPARTMENTS AND COOPERATING AGENCIES: Horticulture and Field Crops.

3. PERSONNEL: Daniel T. Pope and Glenn C. Klingman.

4. NATURE OF RESEARCH AND PRINCIPAL RESULTS OF THE YEAR (Confidential information should be so marked):

-Sprout Production Differences Between Whole, Sliced and Cut Roots. Sprout production of cut, sliced and whole bedded roots of the Porto Rico variety were compared. Semesan Bel and Dowicide A were used for treatments to reduce rots and compared with untreated roots. The sliced roots treated with Dowicide A gave the highest sprout protection. The sliced roots produced the highest number of sprouts and the whole roots the lowest. The Semesan Bel treatments delayed sprouting and reduced the number of sprouts for the three pullings.

-Time of Planting and Time of Harvest as Effecting Yields. Two dates of planting and two harvest dates for each planting were made for Nugget, Porto Rico and three selections. Nugget produced highest yields of both No. 1's and marketable grades for the four tests. The earlier planting and later harvest

(cont'd on back)

5. APPLICATION OF FINDINGS (expressed in terms of measurable public benefits if and when justified):
   (a) Increase of sprout production through means of handling seed can reduce production costs for growers.
   (b) Yields can be increased by determining most effective planting and harvesting dates for a variety.
   (c) Spacings are helpful in determining grades which are important for the processors or for the fresh markets.

6. WORK PLANNED FOR NEXT YEAR:
   (a) Chemical weed control testing.
   (b) Sprout production studies using cut, sliced and whole roots.
   (c) Spacing tests with several new varieties.
   (d) Dates of planting and harvest tests with new varieties.

7. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

Pope, Daniel T. Fertilizing Sweet Potato Plant Beds. Research and Farming Vol. XVII: No. 4. 1960.

8. Prepared by Daniel T. Pope Approved _____
(Director)

Date March 23, 1961

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Cont'd)

gave the highest yield in all cases. The yields of both harvests of the second planting were much lower than the harvests of the earlier planting.

-Effect of Spacing, Time of Planting and Time of Harvest on the Porto Rico Variety. Plants were spaced 6, 8, 10 and 12 inches apart for two planting dates. There were two harvest dates for each planting date. The closer spacings for the earlier planting produced the higher yields of No. 1's, canners, and marketable grades. The yields of both harvests of the late planting were lower than the harvests of the earlier planting for all spacings.

-Use of Seed Pieces Vs. Sprouts. 35 gm. seedpieces treated with Semesan Bel and Dowicide A and untreated seedpieces were compared with sprouts in yield. Stem, middle and distal sections of the roots were compared. The stem section treated with the Dowicide A was the only treatment that significantly exceeded the sprouts in yield of No. 1's. No treatment exceeded the sprouts in marketable yield. Sprouting was extremely poor and slow with all middle sections.

-Chemical Weed Control. Four chemicals used. None gave effective control of all weeds and grasses in 1960.

U. S. DEPARTMENT OF AGRICULTURE
COOPERATIVE STATE EXPERIMENT STATION SERVICE

ANNUAL PROGRESS REPORT OF RESEARCH PROJECTS

INSTRUCTIONS: Three copies are to be retained by CSESS Examiner and the Experiment Station. See CSESS OD-1006, Suggestions for preparing annual progress reports.

1. NAME OF AGRICULTURAL EXPERIMENT STATION: North Carolina

2. PROJECT SUPPORTED BY: ☐ FEDERAL GRANT ☒ NON-FEDERAL ☐ AMA-TITLE II

3. YEARLY REPORT: 1963

4. PROJECT (*Number and title*)
S-197 - A Study of Certain Cultural Practices Affecting Sweet Potato Quality and Production.

5. DEPARTMENTS AND COOPERATING AGENCIES
Horticultural Science and Crop Science

6. PERSONNEL (*Indicate leader*)
Daniel T. Pope and Glenn C. Klingman

7. PROGRESS OF PRINCIPAL RESEARCH ACCOMPLISHMENTS OF THE YEAR, AND USEFULNESS OF SUCH FINDINGS TO AGRICULTURE AND THE GENERAL PUBLIC (*Confidential information should be so marked.*)

Effect of Length of Growing Season on Advanced Selections. Selections were divided into early and late sizing groups. Each group had a short and long growing period. Early types were given shorter growing periods than the late types. First harvest of both groups produced lower yields except for canners. Later harvests gave larger yields in commercials and oversizes. These tests gave a better classification of early and late types both of which have their place in the industry.

Effect of Spacings, Planting and Harvest Dates on Three Varieties. 6, 8 and 10 in. spacings of Centennial, Nugget and Goldrush were used for two planting dates and for two harvest dates for each planting date. Variety-wise, yields were in the order listed. The earlier plantings with the closer spacings and the longer growing periods generally gave the higher yields. Spacings did not have as much effect on yield or grade in the later plantings. Information valuable to the grower for determining spacings, planting times and length of growing season for important varieties.

Methods of Planting. Three different methods of planting produced significantly high yields than the standard method, thus increased yields may be obtained by new planting methods.

Chemical Weed Control. Eleven different chemicals were tested using various rates. Yields from plots treated with several chemicals were significantly higher than yields from the checks.

8. WORK PLANNED FOR NEXT YEAR
1. A study of the effect of sprout weights on yields of Centennial, Nugget & Goldrush. 2. A study of the effect of plastic on sprout production. 3. A continuation of the study of the effects of spacings, planting and harvest dates on Cent., Nug. & Goldrush. 4. A continuation of the study of length of growing season on early and late sizing selections. 5. Continued cooperation in chemical weed control testing.

9. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR

Mimeographed Summary Report - Sweet Potato Breeding and Investigations - January 1962. Daniel T. Pope and David G. Hoggard.

10. PREPARED BY	10A. DATE PREPARED
Daniel T. Pope	January 11, 1963
11. DIRECTOR'S SIGNATURE OF APPROVAL	11A. DATE APPROVED

CSESS Form 8
Nov. 1961

U. S. DEPARTMENT OF AGRICULTURE
COOPERATIVE STATE EXPERIMENT STATION SERVICE

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INSTRUCTIONS: Three copies are to be retained by CSESS Examiner and the Experiment Station. See CSESS OD-1006, Suggestions for preparing annual progress reports.

1. NAME OF AGRICULTURAL EXPERIMENT STATION: North Carolina

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5. DEPARTMENTS AND COOPERATING AGENCIES
Horticultural Science and Crop Science

6. PERSONNEL (*Indicate leader*)
Daniel T. Pope and Glenn C. Klingman

7. PROGRESS OF PRINCIPAL RESEARCH ACCOMPLISHMENTS OF THE YEAR, AND USEFULNESS OF SUCH FINDINGS TO AGRICULTURE AND THE GENERAL PUBLIC (*Confidential information should be so marked.*)

Effect of Length of Growing Season on Advanced Selections. Selections were divided into early and late sizing groups. Each group had a short and long growing period. Early types were given shorter growing periods than the late types. First harvest of both groups produced lower yields except for canners. Later harvests gave larger yields in commercials and oversizes. These tests gave a better classification of early and late types both of which have their place in the industry.

Effect of Spacings, Planting and Harvest Dates on Three Varieties. 6, 8 and 10 in. spacings of Centennial, Nugget and Goldrush were used for two planting dates and for two harvest dates for each planting date. Variety-wise, yields were in the order listed. The earlier plantings with the closer spacings and the longer growing periods generally gave the higher yields. Spacings did not have as much effect on yield or grade in the later plantings. Information valuable to the grower for determining spacings, planting times and length of growing season for important varieties.

Methods of Planting. Three different methods of planting produced significantly high yields than the standard method, thus increased yields may be obtained by new planting methods.

Chemical Weed Control. Eleven different chemicals were tested using various rates. Yields from plots treated with several chemicals were significantly higher than yields from the checks.

8. WORK PLANNED FOR NEXT YEAR 1. A study of the effect of sprout weights on yields of Centennial, Nugget & Goldrush. 2. A study of the effect of plastic on sprout production. 3. A continuation of the study of the effects of spacings, planting and harvest dates on Cent., Nug. & Goldrush. 4. A continuation of the study of length of growing season on early and late sizing selections. 5. Continued cooperation in chemical weed control testing.

9. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR

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CSESS Form 8
Nov. 1961

SES—Form 8
(June 12, 1957)

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

ANNUAL PROGRESS REPORT, ~~FEDERAL~~ STATE-GRANT PROJECTS, 1961

(Three copies to be given to the SES examiner)

1. PROJECT (Fund, number, and title): S-197, A STUDY OF CERTAIN CULTURAL PRACTICES AFFECTING SWEET POTATO QUALITY AND PRODUCTION.

2. DEPARTMENTS AND COOPERATING AGENCIES: Horticulture and Field Crops.

3. PERSONNEL: Daniel T. Pope and Glenn C. Klingman.

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Confidential information should be so marked):

Sprout Production Differences Between Whole, Sliced and Cut Roots. Sprout production of cut, sliced and whole bedded roots of the Porto Rico variety were compared. Semesan Bel and Dowicide A were used for treatments to reduce rots and compared with untreated roots. The sliced roots treated with Dowicide A gave the highest sprout protection. The sliced roots produced the highest number of sprouts and the whole roots the lowest. The Semesan Bel treatments delayed sprouting and reduced the number of sprouts for the three pullings.

Time of Planting and Time of Harvest as Effecting Yields. Two dates of planting and two harvest dates for each planting were made for Nugget, Porto Rico and three selections. Nugget produced highest yields of both No. 1's and marketable grades for the four tests. The earlier planting and later harvest gave the highest yield in all cases. The yields of both harvests of the second planting were much lower than the harvests of the earlier planting.

(cont'd)

5. USEFULNESS OF FINDINGS (Benefits to agriculture and the general public and contributions to science): (a) Increase of sprout production through means of handling seed can reduce production costs for growers. (b) Yields can be increased by determining most effective planting and harvesting dates for a variety. (c) Spacings are helpful in determining grades which are important for the processors or for the fresh markets.

6. WORK PLANNED FOR NEXT YEAR:

(a) Chemical weed control testing.
(b) Sprout production studies using cut, sliced and whole roots.
(c) Spacing tests with several new varieties.
(d) Dates of planting and harvest tests with new varieties.

7. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

Pope, Daniel T. Fertilizing Sweet Potato Plant Beds. Research and Farming. Vol. XVII: No. 4. 1960.

8. Prepared by Daniel T. Pope Approved _____ (Director).

Date March 23, 1961 Date _____

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Confidential information should be so marked): Cont'd

Effect of Spacing, Time of Planting and Time of Harvest on the Porto Rico Variety. Plants were spaced 6, 8, 10 and 12 inches apart for two planting dates. There were two harvest dates for each planting date. The closer spacings for the earlier planting produced the higher yields of No. 1's, canners, and marketable grades. The yields of both harvests of the late planting were lower than the harvests of the earlier planting for all spacings.

Use of Seed Pieces Vs. Sprouts. 35 gm. seedpieces treated with Semesan Bel and Dowicide A and untreated seedpieces were compared with sprouts in yield. Stem, middle and distal sections of the roots were compared. The stem section treated with the Dowicide A was the only treatment that significantly exceeded the sprouts in yield of No. 1's. No treatment exceeded the sprouts in marketable yield. Sprouting was extremely poor and slow with all middle sections.

Chemical Weed Control. Four chemicals used. None gave effective control of all weeds and grasses in 1960.

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NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

ANNUAL PROGRESS REPORT, ~~FEDERAL~~ STATE-GRANT PROJECTS, 1961

(Three copies to be given to the SES examiner)

1. PROJECT (Fund, number, and title): **S-197, A STUDY OF CERTAIN CULTURAL PRACTICES AFFECTING SWEET POTATO QUALITY AND PRODUCTION.**

2. DEPARTMENTS AND COOPERATING AGENCIES: **Horticulture and Field Crops.**

3. PERSONNEL: **Daniel T. Pope and Glenn C. Klingman.**

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Confidential information should be so marked):

Sprout Production Differences Between Whole, Sliced and Cut Roots. Sprout production of cut, sliced and whole bedded roots of the Porto Rico variety were compared. Semesan Bel and Dowicide A were used for treatments to reduce rots and compared with untreated roots. The sliced roots treated with Dowicide A gave the highest sprout protection. The sliced roots produced the highest number of sprouts and the whole roots the lowest. The Semesan Bel treatments delayed sprouting and reduced the number of sprouts for the three pullings.

Time of Planting and Time of Harvest as Effecting Yields. Two dates of planting and two harvest dates for each planting were made for Nugget, Porto Rico and three selections. Nugget produced highest yields of both No. 1's and marketable grades for the four tests. The earlier planting and later harvest gave the highest yield in all cases. The yields of both harvests of the second planting were much lower than the harvests of the earlier planting.

(cont'd)

5. USEFULNESS OF FINDINGS (Benefits to agriculture and the general public and contributions to science): **(a) Increase of sprout production through means of handling seed can reduce production costs for growers. (b) Yields can be increased by determining most effective planting and harvesting dates for a variety. (c) Spacings are helpful in determining grades which are important for the processors or for the fresh markets.**

6. WORK PLANNED FOR NEXT YEAR:

(a) Chemical weed control testing.
(b) Sprout production studies using cut, sliced and whole roots.
(c) Spacing tests with several new varieties.
(d) Dates of planting and harvest tests with new varieties.

7. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

Pope, Daniel T. Fertilizing Sweet Potato Plant Beds. Research and Farming. Vol. XVII: No. 4. 1960.

8. Prepared by **Daniel T. Pope** Approved _____ (Director).

Date **March 23, 1961** Date _____

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Confidential information should be so marked): Cont'd

Effect of Spacing, Time of Planting and Time of Harvest on the Porto Rico Variety. Plants were spaced 6, 8, 10 and 12 inches apart for two planting dates. There were two harvest dates for each planting date. The closer spacings for the earlier planting produced the higher yields of No. 1's, canners, and marketable grades. The yields of both harvests of the late planting were lower than the harvests of the earlier planting for all spacings.

Use of Seed Pieces Vs. Sprouts. 35 gm. seedpieces treated with Semesan Bel and Dowicide A and untreated seedpieces were compared with sprouts in yield. Stem, middle and distal sections of the roots were compared. The stem section treated with the Dowicide A was the only treatment that significantly exceeded the sprouts in yield of No. 1's. No treatment exceeded the sprouts in marketable yield. Sprouting was extremely poor and slow with all middle sections.

Chemical Weed Control. Four chemicals used. None gave effective control of all weeds and grasses in 1960.

SES—Form 8
(June 12, 1957)

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

STATE

ANNUAL PROGRESS REPORT, [redacted] PROJECTS, 19 60

(Three copies to be given to the SES examiner)

1. PROJECT (Fund, number, and title): STATE, S-197, A STUDY OF CERTAIN CULTURAL PRACTICES AFFECTING SWEET POTATO QUALITY AND PRODUCTION

2. DEPARTMENTS AND COOPERATING AGENCIES: Horticulture and Field Crops

3. PERSONNEL: Daniel T. Pope, C. L. McCombs, and C. C. Klingman

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Confidential information should be so marked): Effect of Dalapon on Sprout Production: - Roots of two varieties were dipped in .001, .01, .1, and 1% solutions of dalapon and in tap water (check) for 10 sec., 10 min. and 30 min. periods. The concentrations of dalapon used had no apparent effect on increasing sprout production. An inhibiting effect with injury at the higher conc. occurred on one variety.

Spacing and Time of Harvest as Affecting Grades: - Studies with four spacings - 6, 8, 10 and 12 in. - and two harvest dates for each spacing, showed that the closer spacings produced larger yields of both No. 1's and canners for both harvest dates. The production of canners was greater for the second harvest period due probably to the wet season.

Chemical Weed Control: - Four chemicals - Simazin, Alanap 2, EPTC and Trietazine - and two rates were compared with hoed treatments. Plots treated with the first three chemicals gave the highest yields but there was no significant difference in any treatments.

Plant Bed Fertility Studies: - Plant beds fertilized with a 8-8-8 or 4-9-3 at the rates of 6 or 12 oz. per sq. yd. gave non-significant differences between analysis and rates but significant differences over the unfertilized check in number of sprouts produced. No effect of bed fertility is carried over to the field as indicated by yield and stand.

5. USEFULNESS OF FINDINGS (Benefits to agriculture and the general public and contributions to science):

a. Control of grasses and weeds through chemical means will cut production cost.
b. With more emphasis on processing, spacing tests will help the grower determine what part can be sold on the fresh market.
c. Increasing sprout production through fertilizing or by chemical means aid the grower in reducing production cost by using less seed.

6. WORK PLANNED FOR NEXT YEAR:

a. Continuation of spacing studies possibly including a second variety.
b. Plant bed fertility studies will be carried on.
c. Chemical weed control tests to be continued.
d. Dates of harvest tests comparing several breeding selections with Porto Rico.

7. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

Results of the plant bed fertility test used in preparation of Ext. Circular 353 - Grow Quality Sweet Potatoes - 1959.

8. Prepared by D. T. Pope Approved (Director).

Date March 18, 1960 Date

ANNUAL PROGRESS REPORT FOR STATE SUPPORTED PROJECTS
OF THE
NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
(Three copies to be submitted to Director's Office)

1. PROJECT: (Fund, number, and title): S-197. A Study of Certain Cultural Practices Affecting Sweet Potato Quality and Production.

2. DEPARTMENTS AND COOPERATING AGENCIES: Horticulture.

3. PERSONNEL: Daniel T. Pope, C. L. McCombs and G. C. Klingman

4. RESEARCH ACCOMPLISHMENTS OF THE YEAR (Confidential information should be so marked): Gibberellic Acid - Immersing roots of two varieties of sweet potatoes in 100, 300, 500 P.P.M. gibberellic acid and tap water (check) for 1/2 hour had no effect on increasing sprout production. A slight delaying effect was observed on one variety.

Chemical Weed Control - Seven chemicals and 23 different treatments were compared with hoed and non-hoed check treatments for the control of weeds. EPTC, Simazin, and Alanap 2 appeared to be the most effective chemicals.

Spacing and Time of Harvest as Affecting Grades - Four spacings - 6, 8, 10 and 12 in. - and two harvest dates for each spacing indicated that the closer spacing gave the greater production of canning sizes. Also, for the fresh market yields the 6" and 8" spacings were as productive for the early harvest and significantly higher for the late harvest than the 10 and 12 in.

Plant Bed Fertility - A comparison of an 8-8-8 and 4-9-3 fertilizer analysis at the rate of 6 and 12 oz. per sq. yd. applied to the plant bed indicated higher but non-significant sprout production for the 4-9-3 at the 6 oz. rate. Addition of N after the first pulling gave a slight but non-significant increase in sprout production for the second pulling. Yields at harvest indicated that there is no effect of fertility carried from the plant bed to the field.

Chemical Dips as Affecting Sprout Production - Dips of Dowcide A (1% and Semesan Bel, 1 # to 7 gal. water) using the Porto Rico variety showed no effect on sprouting by the Dowcide treatments and a delay and reduction in number of sprouts with Semesan Bel.

5. USEFULNESS OF FINDINGS (Benefits to Agriculture and the general public and contributions to science:

(1) Methods of increasing sweet potato plant production either through fertilizing the plant bed or through chemical treatment of the roots will aid growers in reducing the cost of production by using less seed. (2) Control of weeds and grasses through chemical means will also materially reduce production costs. (3) Results of spacing tests will aid the grower in determining what proportion of his crop he can expect to be sold to the processor and what part will be best suited to the fresh market.

6. WORK PLANNED FOR NEXT YEAR: The chemical weed control tests and the spacing studies will be continued. The plant bed fertility studies will be repeated. New chemicals will be tested on roots to determine their effect on sprouting. Dates of harvest tests comparing several breeding lines with Porto Rico will be added.

7. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

None

8. Prepared by D. T. Pope Approved _____

Date February 27, 1959 Date _____

NORTH CAROLINA STATE COLLEGE

SCHOOL OF AGRICULTURE • RALEIGH, N. C.

OFFICE OF THE DEAN AND DIRECTORS

March 24, 1958

MEMORANDUM TO: F. D. Cochran

FROM: R. L. Lovvorn

We have approved the State project, "A Study of Certain Cultural Practices Affecting Sweet Potato Quality and Production", and assigned it No. S-197.

We note in your memorandum of March 17 to Dr. Stewart that you suggest that this project be given the number St H-86 or another number. It could not be given the number St H-86 as we already have a Hatch project with the number H-86 with different title and different objectives. The "St" in front of the H only means that the Hatch project not only has Hatch money but also State money supporting it. The St in front of a H number indicates that warrants written against a Hatch project are to be charged against the State funds assigned to the project. It cannot apply to a separate project with separate objectives.

CC: H. A. Stewart

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
PROJECT OUTLINE

Project No. S - 199
Date Submitted March 2, 1958
Approved March 24, 1958
Revised .....

1. Title

A STUDY OF CERTAIN CULTURAL PRACTICES AFFECTING SWEET POTATO QUALITY AND PRODUCTION.

2. Objective(s)

1. To study the effects of planting and harvesting dates on yield and certain quality factors of new varieties and advanced breeding lines.

2. To study the effect of plant bed fertilization as related to sprout production and survival in the field.

3. To study the effects of variety, storage and chemical treatments on sprout production.

3. Reasons for undertaking Investigations*

The commercial sweet potato crop in North Carolina is planted and harvested over a relatively long period of time. Plantings begin in early April and continue until early July. The harvesting period extends from the middle of August into early November. Plantings and harvestings are carried on over a wide range of temperature and moisture conditions. Preliminary results indicate that varieties and lines vary markedly in growth characteristics and earliness. As new lines are developed by breeding and new varieties are released, it is necessary to determine their optimum growing period for commercial production.

Sprout production is important to the growers as the sweet potato is propagated commercially by asexual means. Greater sprout production lowers seed requirements and costs of production. While many factors have been shown to affect sprout production in the sweet potato, one of the most important and most neglected problems is the fertilization of plant beds. There is very little factual information on which to base recommendations for the commercial growers. It has been indicated elsewhere that sprout production may be increased fifty percent by proper bed fertilization.

In addition to the fertility problem there appears to be an inherent difference in the sprout production of some advanced seedling selections and newly released varieties. Many selections that have desirable commercial qualities combined with disease resistance are unsuitable as varieties because of their poor sprouting ability. Pre-bedding treatments have been encouraging in producing an increased number of sprouts under certain conditions. These treatments have included

*Including economic justification

(continued next page)

A Study of Certain Cultural Practices Affecting Sweet Potato Quality and Production.

3. Reasons for Undertaking Investigations - Continued.

variations of storage temperatures and the applications of chemicals. Preliminary work at this station with extremely low concentrations (.01 PPM) of a number of growth regulating chemicals have given promising results in breaking the apical dominance and increasing sprout production. The effectiveness of new chemicals, such as the gibberellins, and other pre-bedding treatments that have given indications of increasing sprout production should be tested. At the present time, no specific chemical or storage treatment is generally recommended or used. An effective treatment which would overcome the problem of low sprout production would greatly aid the sweet potato breeding program and be of unlimited value to the entire industry.

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

Considerable experimental work has been done in various southeastern states on time of planting and spacing of sweet potatoes. Most of the work conducted is in agreement with the findings of Miller and Kimbrough (17) and Edmond (5). In general, these investigations indicate that sprouts planted early produce rounder, chunkier, and less elongated roots than those planted late. Also, Cochran (3) and Beattie and Boswell (2) state that highest yields of No. 1 roots come from the earliest plantings and as the time is delayed in setting plants in the field, there is a proportional reduction in yield. In general, investigations by Zimmerly (20), Woodard (19), Beattie and Boswell (2), Anderson (1), Miller (17) have shown that closer spacings (10-12 in.) of the Porto Rico variety give the highest yields of marketable and total grades, and that closer spacings in early plantings are preferable to late plantings in reducing the proportion of jumbos. There is little information on the performance of new varieties at different dates of planting and harvesting. Observations indicate that certain new varieties size up more rapidly than Porto Rico, while others size up more slowly. Contrary to the results of many investigations, growers in southeastern North Carolina who plant their crop in late June or early July from vine cuttings usually obtain yields and quality as high as those who plant earlier from sprouts.

A number of factors have been studied in connection with sprout production of sweet potatoes. "Crowded" bedding (8), bedding media used as soil, sand, and sawdust (9), types of bed covers (9), exposure to low temperatures (6), size of seed stock (7), (19), (11), (13), storage temperatures (4), bed temperatures (9), and more recently chemical treatments to break dominance (10), (14), have been considered. Although present publications make varied recommendation for plant

(Con't. page 2-a)

5. Outline of Procedure:

I. Dates of planting and harvesting.
   1. Only new varieties that show outstanding commercial possibilities for North Carolina and advanced selections that show promise of being released as varieties will be tested. The Porto Rico variety will be used as a check and four to six varieties and/or selections will be entered into the tests.
   2. Two or three planting dates and two or three harvest dates for each planting will be made. The first planting date will correspond to the early planted crop, the second date to the normal planting time, and other dates may be added as seem advisable. The harvest dates will be spaced about two weeks apart to determine optimum times for the harvest of the different entries. A split plot design will be used with varieties as whole plots and subplots as planting and harvesting dates.
   3. Records will be taken on grades and yields for each harvest period.
   4. Moisture, sugars, carotene, and ascorbic acid will be run on samples from each harvest.
   5. Curing and storage losses will be determined for each harvest date.

II. Effect of bed fertilization on the production of sprouts.
   1. Roots of the Porto Rico variety that have been stored under the same conditions will be selected for the tests.
   2. Equal numbers of roots of a uniform size and enclosed in a wooden frame.
   3. Each plot will be of uniform size and enclosed in a wooden frame.
   4. Two standard fertilizer grades will be used. Top dressing of nitrogen will be applied to parts of the test at the rate of 3 ounces per square yard.
   5. Two applications of each grade of fertilizer will be used.
   6. Methods of fertilizer placement will be as follows:
      a. All fertilizer will be placed on the bottom of the bed and worked lightly into the soil.

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

bed fertilization, there appears to be very little specific experimental work on which to base these recommendations. Nusbaum (19) indicated a split application of complete fertilizers to the beds gave the best performance of sprout production. Fertilizers were applied before bedding and as a top dressing after the second pulling of the plants. Some growers in North Carolina apply their fertilizer to the top of the bed after the roots are covered and water it in or let the rain dissolve it. The quantity and methods of application vary and there is little consistency in, or basis for, many of the practices used.

Storage temperatures and chemical treatments appear to have an effect on sprout production. Cooley et al (4) reported differences in plant production among four varieties of sweet potatoes when stored at 50° F. The Porto Rico sprouted satisfactorily, whereas, the other three varieties sprouted poorly. Earlier Edmond (6) found that by exposing seed stock of Porto Rico sweet potatoes to 40° F. for 7 and 14 days caused a decreased yield of plants per bushel of roots. Kushman et al (15) in 1957 found that roots of three varieties, Porto Rico, Allgold and Goldrush, when stored at 70° F. gave a significantly greater number of plants per bushel, although they did not keep as well as those stored at 50° and 60° F.

Several chemicals have been used in order to increase sprout production in sweet potato roots. Horsfall (12) in 1935 demonstrated that proximal dominance was lost from Porto Rico roots when they were immersed in a thiourea solution for one, two or three hours. Later weak solutions of 2,4D used as a dip were found to increase sprout production (14). Proximal dominance was broken in varying degrees, depending on the variety tested, by dipping the roots in a weak 2,4-D solution, immersing in thiourea for three hours, and exposing to the vapor of ethylene chlorohydrin for 72 hours (16). Hall et al (10) also found that ethylene chlorohydrin as an instant dip was effective in removing proximal dominance and that the growth inhibiting substance associated with this dominance dissipated earlier in the Jersey type than in the Porto Rico type indicating a greater need to treat Porto Rico type seed roots to remove proximal dominance.

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c. Applications of a top dressing of nitrogen to one-half of each plot after second pulling of plants.

7. A split plot design with the whole plots as fertilizer rates and grades, and subplots as N applications will be used. The whole plot treatments i will be arranged in randomized blocks.

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Concentrations of the chemicals, times of exposure (submergence of roots), and numbers of applications to the beds will be varied.

Initially the following chemicals will be employed:

(Cont'd. page 3-a)

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Five years

7. Date of Initiation:

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Name	Department	Relation to Project
Daniel T. Pope	Horticulture	Leader
C. L. McCombs	Horticulture	Co-leader
David D. Mason	Statistics	Advisor
David Hoggard	Horticulture	Assistant

9. Coöperation:

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5. Outline of Procedure: Continued.

(1) Mixture of the gibberellins
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The latter two chemicals have been effective in preliminary work. Other chemicals may be included.

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Literature Cited

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19. Woodard, O. 1932. Sweet potato culture in the Coastal Plain of Georgia. Ga. Coastal Plain Expt. Sta. Bul. 17.

20. Zimmerly, H. H. 1935. Effect of plant spacing on development of sweet potato storage roots. A.S.H.S. 32: 492-497.

10. Financial Support:

a. Proposed Budget ..... to .....

Items	ALLOCATION OF FUNDS				
	Hatch	Regional Research	State	Other	Total
1. Salaries			$ 9,456.		
2. Labor			242.		
3. Travel			250.		
4. Equipment & Supplies			495.		
5. All Other			90.		
Total			$10,533.		

b. Proposed Future Budgets:

Year	Salaries	Total Expenditures	Estimated Income

11. General Remarks:

Project No. .....

SIGNATURES OF APPROVAL

1. Approval of Project Leaders

Date Mar. 17, 1958 ... Daniel D. Pope .....

Title Res. Assoc. Prof. .....

Date Mar. 17, 1958 ... C. L. McCombs .....

Title Res. Asst. Prof .....

Date ....

Title .....

2. Approval of Heads of Departments or Coöperating Agencies

Date Mar. 17, 1958 ... Fred D. Cochran .....

Head, Dept. of Horticulture .....

Date ....

Head, ...

Date ....

Head, ...

3. Approval of Director

Date 3/22/58 ..... J. F. Lovvorn .....

Director, North Carolina Agricultural Experiment Station

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

Date ....

Chief, Office of Experiment Stations

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
PROJECT OUTLINE

Project No. S-197
Date Submitted March 2, 1958
Approved March 24, 1958
Revised .....

1. Title

A STUDY OF CERTAIN CULTURAL PRACTICES AFFECTING SWEET POTATO QUALITY AND PRODUCTION.

2. Objective(s)

1. To study the effects of planting and harvesting dates on yield and certain quality factors of new varieties and advanced breeding lines.

2. To study the effect of plant bed fertilization as related to sprout production and survival in the field.

3. To study the effects of variety, storage and chemical treatments on sprout production.

3. Reasons for undertaking Investigations*

The commercial sweet potato crop in North Carolina is planted and harvested over a relatively long period of time. Plantings begin in early April and continue until early July. The harvesting period extends from the middle of August into early November. Plantings and harvestings are carried on over a wide range of temperature and moisture conditions. Preliminary results indicate that varieties and lines vary markedly in growth characteristics and earliness. As new lines are developed by breeding and new varieties are released, it is necessary to determine their optimum growing period for commercial production.

Sprout production is important to the growers as the sweet potato is propagated commercially by asexual means. Greater sprout production lowers seed requirements and costs of production. While many factors have been shown to affect sprout production in the sweet potato, one of the most important and most neglected problems is the fertilization of plant beds. There is very little factual information on which to base recommendations for the commercial growers. It has been indicated elsewhere that sprout production may be increased fifty percent by proper bed fertilization.

In addition to the fertility problem there appears to be an inherent difference in the sprout production of some advanced seedling selections and newly released varieties. Many selections that have desirable commercial qualities combined with disease resistance are unsuitable as varieties because of their poor sprouting ability. Pre-bedding treatments have been encouraging in producing an increased number of sprouts under certain conditions. These treatments have included

*Including economic justification

(continued next page)

A Study of Certain Cultural Practices Affecting Sweet Potato Quality and Production.

3. Reasons for Undertaking Investigations - Continued.

variations of storage temperatures and the applications of chemicals. Preliminary work at this station with extremely low concentrations (.01 PPM) of a number of growth regulating chemicals have given promising results in breaking the apical dominance and increasing sprout production. The effectiveness of new chemicals, such as the gibberellins, and other pre-bedding treatments that have given indications of increasing sprout production should be tested. At the present time, no specific chemical or storage treatment is generally recommended or used. An effective treatment which would overcome the problem of low sprout production would greatly aid the sweet potato breeding program and be of unlimited value to the entire industry.

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

Considerable experimental work has been done in various southeastern states on time of planting and spacing of sweet potatoes. Most of the work conducted is in agreement with the findings of Miller and Kimbrough (17) and Edmond (5). In general, these investigations indicate that sprouts planted early produce rounder, chunkier, and less elongated roots than those planted late. Also, Cochran (3) and Beattie and Boswell (2) state that highest yields of No. 1 roots come from the earliest plantings and as the time is delayed in setting plants in the field, there is a proportional reduction in yield. In general, investigations by Zimmerly (20), Woodard (19), Beattie and Boswell (2), Anderson (1), Miller (17) have shown that closer spacings (10-12 in.) of the Porto Rico variety give the highest yields of marketable and total grades, and that closer spacings in early plantings are preferable to late plantings in reducing the proportion of jumbos. There is little information on the performance of new varieties at different dates of planting and harvesting. Observations indicate that certain new varieties size up more rapidly than Porto Rico, while others size up more slowly. Contrary to the results of many investigations, growers in southeastern North Carolina who plant their crop in late June or early July from vine cuttings usually obtain yields and quality as high as those who plant earlier from sprouts.

A number of factors have been studied in connection with sprout production of sweet potatoes. "Crowded" bedding (8), bedding media used as soil, sand, and sawdust (9), types of bed covers (9), exposure to low temperatures (6), size of seed stock (7), (19), (11), (13), storage temperatures (4), bed temperatures (9), and more recently chemical treatments to break dominance (10), (14), have been considered. Although present publications make varied recommendation for plant

(Con't. page 2-a)

5. Outline of Procedure:

I. Dates of planting and harvesting.
   1. Only new varieties that show outstanding commercial possibilities for North Carolina and advanced selections that show promise of being released as varieties will be tested. The Porto Rico variety will be used as a check and four to six varieties and/or selections will be entered into the tests.
   2. Two or three planting dates and two or three harvest dates for each planting will be made. The first planting date will correspond to the early planted crop, the second date to the normal planting time, and other dates may be added as seem advisable. The harvest dates will be spaced about two weeks apart to determine optimum times for the harvest of the different entries. A split plot design will be used with varieties as whole plots and subplots as planting and harvesting dates.
   3. Records will be taken on grades and yields for each harvest period.
   4. Moisture, sugars, carotene, and ascorbic acid will be run on samples from each harvest.
   5. Curing and storage losses will be determined for each harvest date.

II. Effect of bed fertilization on the production of sprouts.
   1. Roots of the Porto Rico variety that have been stored under the same conditions will be selected for the tests.
   2. Equal numbers of roots of a uniform size and enclosed in a wooden frame.
   3. Each plot will be of uniform size and enclosed in a wooden frame.
   4. Two standard fertilizer grades will be used. Top dressing of nitrogen will be applied to parts of the test at the rate of 3 ounces per square yard.
   5. Two applications of each grade of fertilizer will be used.
   6. Methods of fertilizer placement will be as follows:
      a. All fertilizer will be placed on the bottom of the bed and worked lightly into the soil.

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

bed fertilization, there appears to be very little specific experimental work on which to base these recommendations. Nusbaum (19) indicated a split application of complete fertilizers to the beds gave the best performance of sprout production. Fertilizers were applied before bedding and as a top dressing after the second pulling of the plants. Some growers in North Carolina apply their fertilizer to the top of the bed after the roots are covered and water it in or let the rain dissolve it. The quantity and methods of application vary and there is little consistency in, or basis for, many of the practices used.

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Date Mar. 17, 1958 C. F. McCombs

Title Res. Asst. Prof.

Date.....

Title.....

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Date Mar. 17, 1958 Fred D. Cochran

Head, Dept. of Horticulture

Date.....

Head,.....

Date.....

Head,.....

3. Approval of Director

Date 3/22/58 R. L. Lovvorn

Director, North Carolina Agricultural Experiment Station

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

Date.....

Chief, Office of Experiment Stations