

THESIS

Consisting of an Outline of a Study of
Potatoes as a Feature of Plant
Production Course.

Submitted

for

Master of Science Degree

in

AGRICULTURAL EDUCATION

by

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July 13, 1923.

A POTATO CROP

-By Clarence Jennings.

In this study no attempt has been made to cover the field of growing potatoes in the whole State of Virginia, but rather that phase of the work so far as found in the counties of Tidewater Virginia, and more particularly the conditions found in James City County, though it is hoped that the work as outlined can be, with some changes, adapted to the work of agricultural instructors in other parts of the state.

A study has been made of the leading crops in this county and on a basis of this study a time allotment of twenty days of the school year in which "Plant Production" is taught has been made to the subject of potatoes.

In some of the other counties, notably the Eastern Shore counties, Nansemond, Norfolk, and Princess Anne, it may be advisable to devote much more time to this crop, while in other counties so much time will not be needed.

The subject has been divided and treated under the following topics or factors:

- I. Soil
- II. Climate
- III. Seed
- IV. Fertilizers
- V. Insect enemies
- VI. Diseases
- VII. Cultivation
- VIII. Harvesting
- IX. Marketing

	References	Recommendations
I.	:	:
SOIL.	: 14th U.S.Census	: Have boys learn the
a.Sandy loam	: for Virginia	: first eight or ten early
b.Gravelley	:	: potato producing counties,
loam	: Farmers Bul.# 1205,	: from 14th census. Have
c.Shaley loam	: page 6	: them color map of Virginia
:	:	: showing the counties, put
:	: F.B.Bul.# 1190, p.4	: out by State and City
:	:	: Bank & Trust Co., Richmond,
:	: Va.B. # 217, p.6	: Va., using blue for the
:	:	: three leading counties,
:	: Va.Exp.Sta.Bul.#60,	: red for next three, and
:	: p.11	: yellow for the next.
:	:	:
:	: F.B. # 407, p.8	: Have boys describe the
:	:	: soil on the home farm, and
:	: U.S.Dept.Bul.# 784,	: any boys in class having
:	: p.15	: come from other potato
:	:	: producing counties describe
:	: Mich.Exp.Sta.Bul.	: the soil in these counties.
:	: # 117, p.11	:
:	:	: Use a soil map.
:	: The Potato, by Stuart,	:
A.Mechanical	: p. 14 & 23	: Find out from boys how
condition.	:	: soil on home farm has been
a.Loose and	: Va.Truck.Exp.Sta.	: treated for previous crops.
pliable	: Bul. # 7, p.132	:
b.Well	:	: Some boy in class will
supplied	: Gilbert, p. 86-107	: most likely be from a farm
with	:	: on which potato land is
organic	:	: in good condition. Let
matter	:	: him go into details of how
c.Deep, well	:	: the land was gotten in this
drained, &	:	: condition.
sufficient:	:	:
ly	:	: Cite some piece of land
moist.	:	: you know has not been well
d.Naturally	:	: prepared, or if some boy
cool.	:	: can do this it is better.
:	:	: Compare the yields so far
:	:	: as it is possible to compare
:	:	: them on the basis of soil
:	:	: condition only
B.Preparation.	:	:
a.Previous	:	:
crops.	:	:
Alfalfa,	:	:
Clover	:	:
Soy beans	:	:
Cow peas	:	:
Hay	:	:
Sod	:	:
Rye	:	:

References

Recommendations

b. Plowing.
 1. Time-
 Fall
 Spring

2. Depth.

3. Kind of
 plow.

4. Condition
 of soil
 at time
 of plow-
 ing.

c. Disking.
 1. Before
 plowing.

2. After
 plowing.

3. Harrowing.

4. Rolling.

: F.B. # 1190, p. 5
 : Va. Truck Exp. Sta.
 : Bul. # 7, p. 132.
 :
 : Plow in fall if possible
 : but if cover crop is used
 : or land washes badly delay
 : till winter or early spring.
 : Plow eight or ten inches
 : deep. Have boys find out
 : the practices of the people
 : in the community and compare
 : results. The plow that does
 : the best work should be used
 : --in some cases it will be
 : a turn plow and in others it
 : will be a disk.
 :
 : Sufficiently moist and
 : in late fall or winter may
 : be much wetter than in early
 : fall or spring.
 :
 : Disking before plowing
 : is generally recommended, and
 : if sod land disk after plow-
 : ing but do not drag. In
 : spring disking after plowing
 : should be done if land is
 : rough but not if smooth, only
 : use the harrow and this should
 : be done immediately after
 : plowing.
 :
 : In my section rolling is
 : not usually necessary, but is
 : used some times when sod has
 : been broken and finely disked,
 : in order to get a firm seed
 : bed.
 :
 : The above operations are
 : to be shown by field trips
 : and individual work with
 : boys on home farms in ad-
 : dition to class room dis-
 : cussions.

References

Recommendations

References	Recommendations
C. Drainage.	
a. Natural surface.	Not too steep so that water runs off instead of entering the ground but drained so that water does not stand. Cite instances of poor stands on account of water standing.
b. Natural underground.	
c. Ditches.	Refer back to study of soils, I; show how one holds water longer than another.
d. Tile.	Use laboratory experiments to show water holding capacity.
e. Use of beds.	Cite instances of the use of ditches or tile drains to take off water. Have boys in class from other counties describe drainage and use of beds for protection against water.
II. CLIMATE.	
1. Temperature	
a. Time of planting.	As early in spring as danger of freezing is past, use weather reports for your county for past several years. Around 40° or 50° F. is best for the growing season.
b. Growing season.	
c. Time of setting tubers.	Compare the growth of previous crops with temperature conditions as shown by weather report. Was this good or bad growth due to temperature or moisture?
d. After setting tubers.	Temperature should be a little higher at time of setting tubers and after than before. At time of digging cool weather is desirable, but can be controlled by digging late in the afternoon or early in the morning.
e. Time of digging.	This topic is to be considered again under the head of "digging".

Stuart, p. 15.

	References	Recommendations
2. Moisture.		
a. Time of planting.		This subject is very largely controlled by the preparation of soil and by drainage.
b. Growing season.		
c. Time of setting tubers.		Visit fields or homes of boys in which is shown the result of too much water after the fertilizer is sown.
d. After setting.		
e. Time of digging.		This can be shown by lab. experiment showing the solubility of fertilizer. At time of digging dry as cleaner brighter and tougher skin is produced.
III. Seed Selection.	F. B. Bul. # 794	Find out the varieties used in the community, time they are usually marketed both for spring and fall crops, and where they are usually shipped. Use government and census reports.
1. Purpose of crop.	" " " # 533	
a. Early or late market.	" " " # 407, p. 9-12	
b. Storage, or immediate market.	Exp. Sta. Bul. # 217, p. 8 F. B. Bul. # 1205, p. 9-13 " " " # 1190, p. 8. Va. Truck Exp. Sta. Bul. 24, p. 509-513. Stuart, The Potato. Gilbert, The Potato and How to Grow It.	
2. Market uses.		Learn how many people in community usually store potatoes and how many send to market immediately after digging and the results of each case financially.
a. Family use.		
b. Restaurant baking.		
c. Potato chips.		
3. Seed purpose.		The variety mostly raised in the community is generally the one to grow, but not always.
a. Section to be supplied.		
b. Judging seed.		
4. Sources of seed stock.		Learn what markets supply a, b, c., and what varieties are best suited to these markets.
a. Value of good seed.		
b. Certified seed.		Current text books usually give this and if not the state bulletins and government bulletins do.
c. Time of purchase.		
d. From whom to purchase.		Use seed of different varieties in class room, keeping the varieties separate until some judging has been done then mix and have pupils sort out & classify.
e. How to purchase.		
f. Local product.		

	References	Recommendations
f. Local product.		For no. 4 use reports and correspondence with State Crop Improvement Association.
g. Cheapness of good seed.		
h. Cost of poor seed.		Study results of work of Farm Bureau of Tidewater Virginia in purchasing seed in Maine, 1923.
5. Storage of seed.		
a. Cold storage.		Visit State Experiment Plats if possible.
b. Storage homes.		
c. Cellars.		Find out some farmers who have or have had seed in storage. Visit storage house near the school and visit storage houses, cellars, and pits on home farms. Study the different bulletins by State and Federal Gov., on "Potato Storage".
d. Pits or mounds.		
IV. Fertilizers.		
a. Needs of the crop.	F. B. Bul. # 1205, p. 7. Exp. Sta. Bul. # 217, p. 12. F. B. Bul. # 407, p. 15-16	The nature and the supply of fertilizing materials will have been gotten in the study of soil and soil formation, and only a review will be necessary here. The needs of the crop to be gotten from reference material and the sources of supply to be gotten from advertising samples and printed material sent out by Fertilizer companies. "d" is to be shown by solubility experiment in the laboratory.
b. Supply in the soil.	Va. Truck Exp. Sta. Bul. on Fertilizers.	
c. Sources of supply.	Verhees, on Fertilizers; Gilbert, The Potato	
d. Availability of fertilizing elements in the ingredients used.	Stuart, The Potato, p. 27.	
e. Purchasing the fertilizer.		
1. Com. prod.		Get prices from fertilizer companies on raw materials and mixed goods. Figure the cost of the ingredients and the cost of mixing. Get prices on small lots used on large lots; also get freight rates on these same quantities.
2. Home mix.		
3. Factory		
4. Individual buying in any of the above cases.		
5. Cooperative buying of the same.		

References

Recommendations

<p>V. Diseases.</p> <p>1. Parasitic fungous.</p> <p>A. Scab.</p> <p> a. Treatment.</p> <p> Formalin.</p> <p> Potassium Permanganate.</p> <p> Corrosive.</p> <p> Sublimate.</p> <p>B. Early blight.</p> <p> 1. Treatment.</p> <p>C. Late blight.</p> <p> 1. Treatment.</p>	<p>Stuart, p. 248</p>	<p>Get from Farm Bureau or county agent results of fertilizers purchased during the past year and have each boy give results of his own or father's purchase.</p> <p>Compare the difference in cash and time prices. Consider the borrowing of money from bank and paying cash.</p> <p>Advise the use of the fertilizer recommended by the Experiment Station, and if you cannot get this used as a whole try to get comparison plots run using this as one of the fertilizers in the test.</p> <p>Show samples of scabby potatoes. Discuss the conditions under which scab has been found on any of the home farms.</p> <p>Has anything ever been done about scab? Here is a good place to bring in a discussion of the results of applying lime and manures.</p> <p>Stress the use of scab free seed and scab free soil.</p> <p>If possible, show samples of the blights, though in the early potato section the late blight is not as important factor.</p> <p>Discuss the remedies. Make a Bordeaux solution which will take only a few minutes of laboratory work.</p>
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- 2. Non-parasitic : Stuart, p. 246.
- a. Spindling sprout.
- b. Curly dwarf.
- c. Tip burn.
- d. Arsenical injuries.

: Show samples of non-parasitic diseases if possible.

: Have class study chap. XV in Stuart. Arsenical remedies will be best studied under the use of sprays for chewing insects, the next topic to be taken up.

VI. Insects. : Stuart, chap. XVI.

- A. Leaf eating.
 - 1. Colorado beetle.
 - 2. Flea beetle.
 - 3. Three lined beetle.
 - 4. Tortoise-shell beetle.
 - 5. Blister beetle.

: Find out what insects have been giving trouble and how this has been met.

: Get prices on the different arsenical compounds. Figure the cost per acre in using each. Compare the effectiveness of each so far as possible.

: Have boys make observations at home and report to class. This can be used as a laboratory exercise if care is shown in getting infected plants in the laboratory. Use two compounds generally used in that section and compare the effectiveness of each. Show specimens of plants damaged by bugs or go to the field for this work.

- B. Stem and tuber eating:
 - 1. Stalk borer.
 - 2. Stalk weevil.
 - 3. Cut worm.
 - 4. Grub worm.
 - 5. Wire worm.
 - 6. Tuber moth.

: If much of "B" is present make a field trip to observe conditions and take materials for control measures, as poison bran.

	References	Recommendations
C. Sucking.	Va. Truck Exp. Sta.	Show specimens and
1. Potato aphid.	Bul. 29.	apply control measures.
2. Four lined leaf bug.	F.B. Bul. # 1225.	Study the different machines for dusting and spraying.
3. Leaf hopper.		Discuss the advantages of each.
VII. Cultivation.	F.B. Bul. # 1190, p. 5.	A and B have been covered under the heading of Soil # I.
1. Plowing.		Find out what was done on the home farms the previous year, and the results of same.
A. Fall.	Va. Truck Exp. Sta. Bul. # 7, page 132.	Talk to the leading potato raisers in your section before time of dealing with this subject. Be ready to give their views and your own.
1. Disking.	F.B. 407, p. 15-16.	Study in same way as did cultivation.
2. Plowing.		
B. Spring.		
1. Disking.	Stuart, p. 35.	
2. Plowing.		
3. Harrowing.		
4. Marking.		
2. Sowing		
fertilizer:	F.B. 407, p. 15.	
a. Some time in advance of planting.	Stuart, p. 35	
b. Immediately before planting.		
3. Planting.		Find out what kind of planters on the home farms or what kind used during the past few years. If different makes have been used, compare the results. This can be gotten better from the farmers but worth while to try to get it from the boys.
a. Kind of planting.		
(1) Pick.		
(2) Plate.		
(3) "Do It All"		
b. Depth to be planted, and covered.		
4. Running out middles.		Recommend the use of the plate or two man planters for same reasons as given by Stuart. This is the planter generally found in my section. The third type is not used there nor is it in general use in any of the leading potato counties.
a. With plow or cultivator.		
b. Before or after dragging.		

References

Recommendations

<p>5. Dragging down.:</p> <p> a. Direction of dragging.:</p> <p> b. No. of times.:</p> <p>6. Weeder.:</p> <p> a. Direction of running.:</p> <p> b. No. of times.:</p> <p>7. Cultivator.:</p> <p> a. Deep or shallow.:</p> <p> b. Size of shovels.:</p> <p> c. No. of times.:</p> <p> d. Laying by:</p> <p> (1) Plow.:</p> <p> (2) Cultivator.:</p> <p> e. Inter-planting of following crop.:</p> <p>VIII. Harvesting.:</p> <p> 1. Machinery.:</p> <p> a. Early.:</p> <p> b. Late.:</p> <p> 2. Containers.:</p> <p> 3. Time of day.:</p> <p> a. Morning.:</p> <p> b. Afternoon.:</p> <p> 4. Use plow or digger.:</p> <p> 5. Scratching.:</p> <p> 6. Grading.:</p>	<p>Exp. Sta. Bul. 217, p. 10</p> <p>Stuart, 74</p> <p>Va. Bul. 217, p. 11.</p> <p>F. B. Bul. 1205, p. 28.</p> <p>F. B. Bul. 1190, p. 23-24.</p> <p>F. B. Bul. 407, p. 22-23.</p> <p>F. B. Bul. 407, p. 20</p> <p>Stuart, 166-178.</p>	<p>Inspect the planting work and for 4, 5, & 6 follow the customs of the best farmers in the community.</p> <p>Find out the practices on the home farms and the practices on the different soils. Discuss the purposes of the cultivator, bringing out the type that will do the best work.</p> <p>In some cases the plow is used for stopping a very weedy or grassy growth, but usually a riding cultivator will complete the work.</p> <p>Consider the time of growth of the crop - whether corn, soy beans, or cow peas; the damage done to the crop at time of digging and the amount of drainage done in relation to the size of the crop at time of digging. Find out date of digging for last few years; also date of planting in each year.</p> <p>Compare the condition of crop of current year with that of previous years as of same date. Estimate the date of harvesting for current year.</p> <p>Find out what machinery is usually used; whether same on both crops or not, the kind of containers used on the different farms and reasons for difference if any; also time of day of digging and reason for this.</p>
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	References	Recommendations
7. Filling containers.		: Show the advantage of : late afternoon plowing and : scratching and early morning : barreling over the other : method.
8. Covering.		: Discuss good and poor : scratching, and see how good : scratching may be brought : about.
9. Loading.		: When is grading and : selection done? The most : advantageous time and why.
		: Show the necessity of : careful filling and well : filled containers.
		: Find out the facilities : on the different farms for : loading. Discuss high and : low wagons; also high and : low boxes on the wagons, the : method of placing in the car : and the kind of car to use : or the necessity of good : ventilation.
X. Marketing.	: Monthly Crop Reporter.	: Study market and crop
1. Early crop.	: Marketing Bulletins.	: reports of previous years.
a. Local markets.	: State Bulletins.	: Study current crop reports
b. Central market.	: F.B.Bul. 407 - 23	: for same time of year.
c. Holding for later market.	: F.B.Bul. 1205 - 23	: Get local market prices.
d. Individual marketing.	: Gilbert,	: Get near market prices.
e. Cooperative marketing.	: Stuart, 198.	: Get central market prices.
		: Get freight rates to each
		: of these places in small
		: lots and in car load lots.
		: Estimate the amount of
		: shrinkage in storage, rent on
		: storage space, cost of extra
		: handling, interest on money
		: at current price.

References

Recommendations

- 2. Late crop.
- a. Storage.
- b. Seed marketing.
- c. Local market.
- d. Central market.
- e. Individual marketing.
- f. Cooperative marketing.

Study the marketing methods in each of the potato growing counties. Compare with local conditions and see if these methods could be followed.

