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THE INFLUENCE OF HANDLING
SEED STOCK ON SHRINKAGE AND
PLANT PRODUCTION
OF THE TRIUMPH SWEETPOTATO

Thesis for the Degree of M. S.

William S. Anderson

1936

MICHIGAN STATE COLLEGE

C. D.

Sweet potatoes

74 *Forficulidae* - *Vegetables*

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V. R. Gardner

THESIS

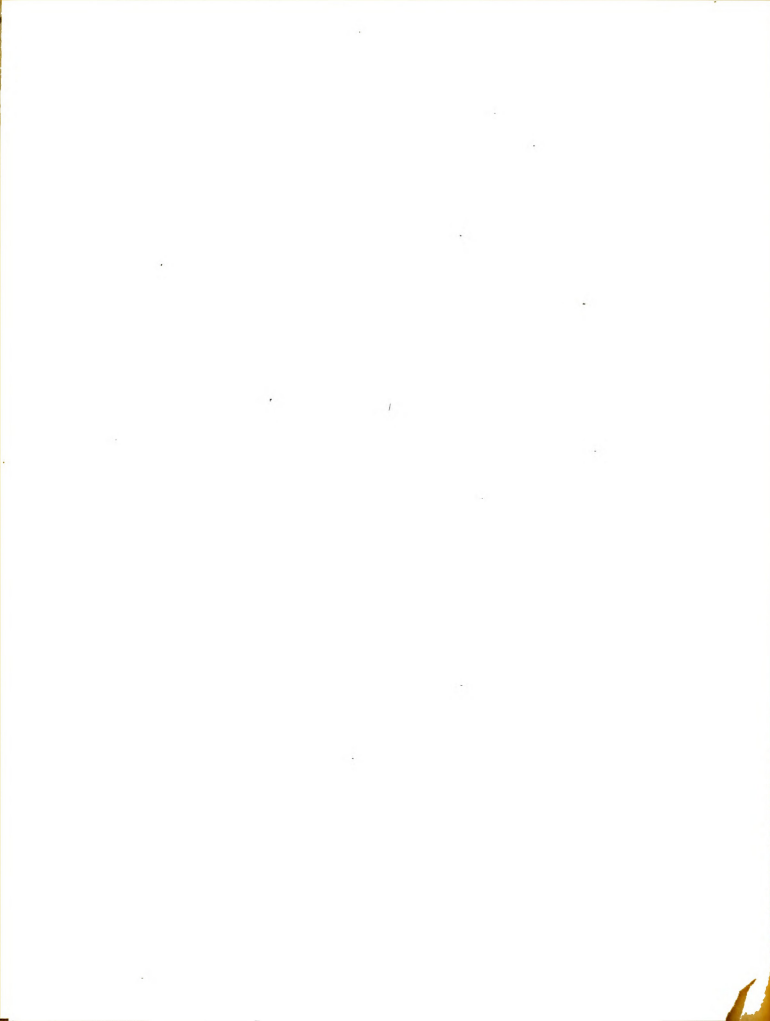
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I N T R O D U C T I O N

Although the sweetpotato is grown extensively in the southern portion of the United States and large quantities are placed in storage annually, little information is available on the effect of handling on losses of seed stock incurred from shrinkage and decay incident to storage, or the subsequent effect on plant production. Undoubtedly growers could well afford to handle their seed stock more carefully. The object of the investigations reported herein has been to study the effects of "careful" handling and "commercial" handling on the loss in weight of seed stock during storage and on subsequent plant production.

R E V I E W O F L I T E R A T U R E

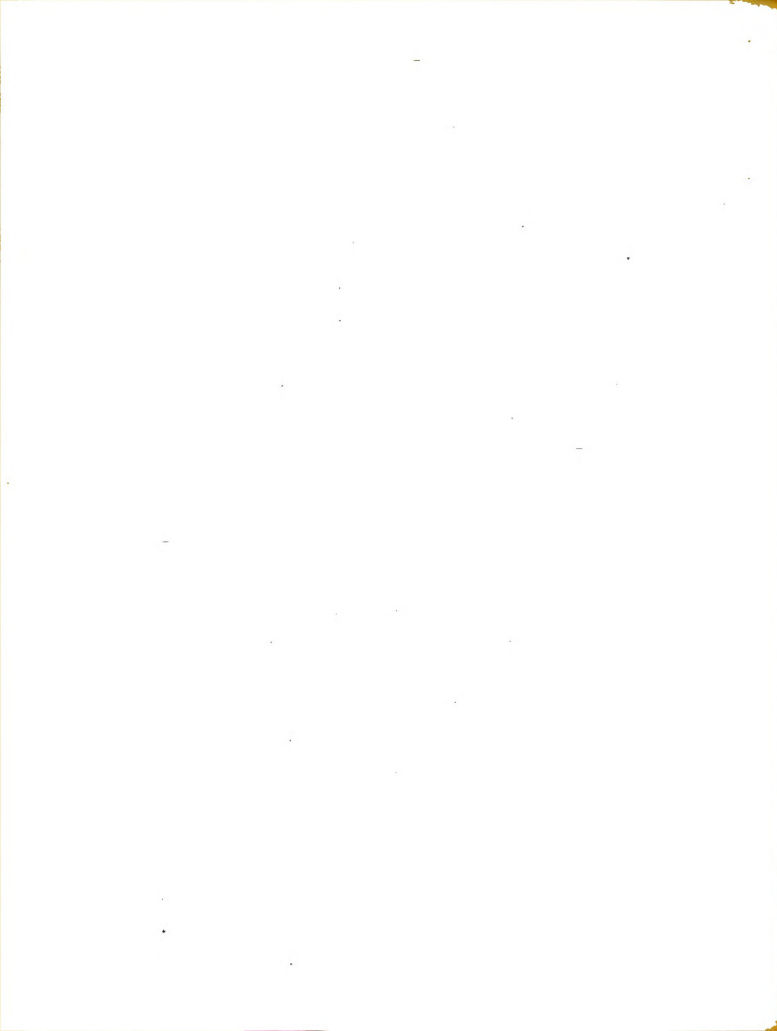
Thompson and Beattie (8) determined the shrinkage of "carefully" handled and "commercially" handled roots of the Nancy Hall and Dooley. The work was done in five storage houses during four seasons. The storage period of different seasons varied from 114 to 161 days. These investigators found marked differences in shrink-



age and per cent rots between the "carefully" and "commercially" handled lots. The average shrinkage of the "carefully" handled lot in all of the tests was 7.52 per cent, and of the "commercially" handled lot 10.00 per cent. The average loss due to decay in the "carefully" handled lot was 0.45 per cent and in the "commercially " handled lot 3.00 per cent.

In a supplementary study, Thompson and Beattie (8) harvested roots of the Big Stem Jersey, Nancy Hall and Southern Queen. They placed bruised roots in one lot and non-bruised roots in another. Both lots were then cured at 80 to 90° F. for 15 days and stored for 164 days at a temperature varying from 50° to 55° F. Here again Thompson and Beattie obtained marked differences in shrinkage between the bruised and non-bruised lots. The bruised lot lost 28.13 per cent of its original weight and the non-bruised lot lost only 13.83 per cent. The bruised lot also had a greater per cent of decay. These authors concluded that growers could well afford to handle their sweetpotatoes more carefully, both in the field and in the storage house.

Smith (7) compared the effect of "careful" and "normal" handling on the keeping ability of Irish potatoes. He found that mechanical injuries to tubers incurred during harvesting and handling have a marked influence on the loss in weight and decay during subsequent storage. In two experiments the "carefully" handled lots lost

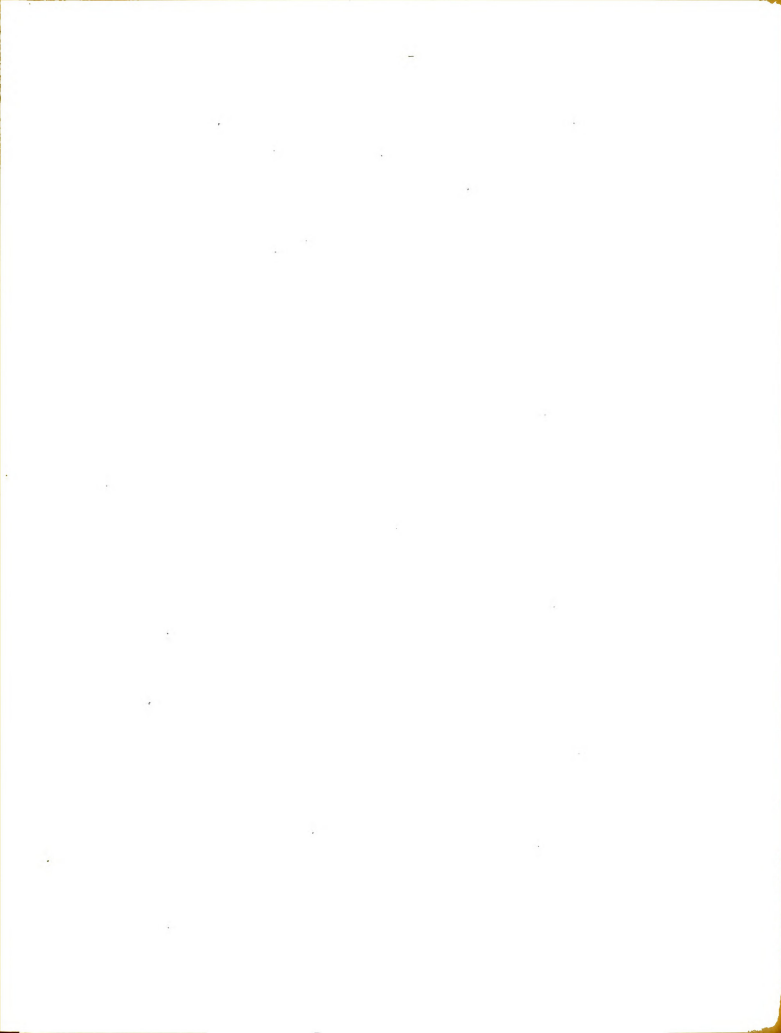


4.46 and 5.49 per cent of their original weight, and the "normally" handled lots lost 7.08 and 8.45 per cent. In the second experiment, the amount of loss due to decay was determined. The "carefully" handled lot had 1.16 per cent and the "normally" handled lot 2.29 per cent decay.

Lauritzen (4) stored small cured lots of the Little Stem Jersey in a laboratory for a period of 17 days. He found that, though black rot may infect unbruised roots, as a rule the pathogene gains entrance only through bruised tissue.

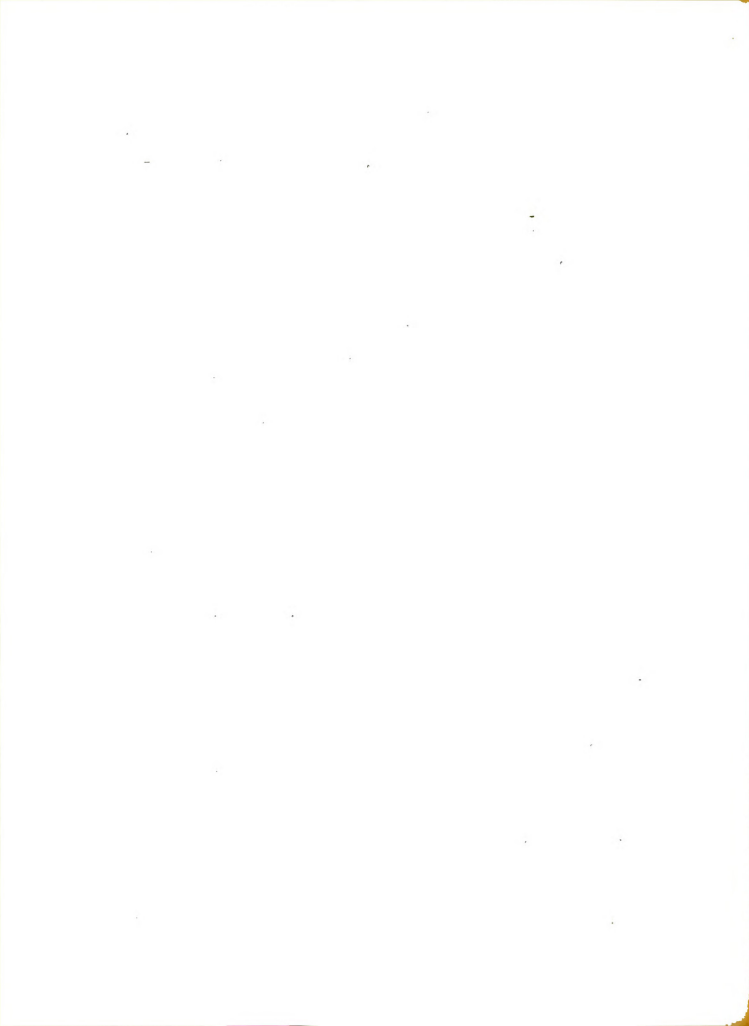
Lauritzen and Harter (5) found that *Rhizopus* rarely infects sweetpotatoes except through fresh wounds. On this basis success in keeping sound sweetpotatoes in storage, even at high humidities and in the presence of the organism, can be satisfactorily explained. These investigators concluded that any resistance developed by the roots was located in the surface layers and has a possible relation to cork formation. In later studies, Lauritzen and Harter (6) found that the time required for infection of sweetpotatoes by *Rhizopus* varied with the amount of wounding.

Artschwager and Starrett (1), working with roots of the Yellow Jersey variety, determined that sweetpotatoes heal their wounds by a suberization process of the cut surface and subsequent development of wound periderm. They found that the course of both processes was greatly influenced by the temperature and the relative humidity of



the surrounding air. If these conditions are favorable, both processes proceed rapidly, but under adverse conditions they may be delayed, or even inhibited. Wound periderm formed readily at temperatures between 71° F. and 94° F., provided the relative humidity was sufficiently high. At 73.5 per cent humidity and 85° F. it appeared after the fifth day; at 82.7 per cent humidity and 85° F. it appeared after the fourth day, and at 90 per cent humidity and above it appeared after the second and third days at temperatures from 85° F. to 94° F.

Hasselbring and Hawkins (2) studied the respiration of the Big Stem Jersey stored under commercial conditions. They found that wounding markedly increased the rate of respiration. They measured the rate of respiration of whole and of split roots. They found the output of carbon dioxide at 30° C. ranged from 29.8 to 42.7 milligrams per kilogram per hour with whole roots and from 52.5 to 60.0 milligrams per kilogram per hour with split roots. The ultimate effects of wounding upon loss in weight during storage, and on the production of sprouts were not determined. In the same study the authors obtained a positive correlation between reducing sugars and respiration rate. However, they state: "seasonal changes in temperature and other environmental conditions to which the sweetpotatoes had been subjected tended to obscure any such correlation in different lots."



MATERIALS AND METHODS

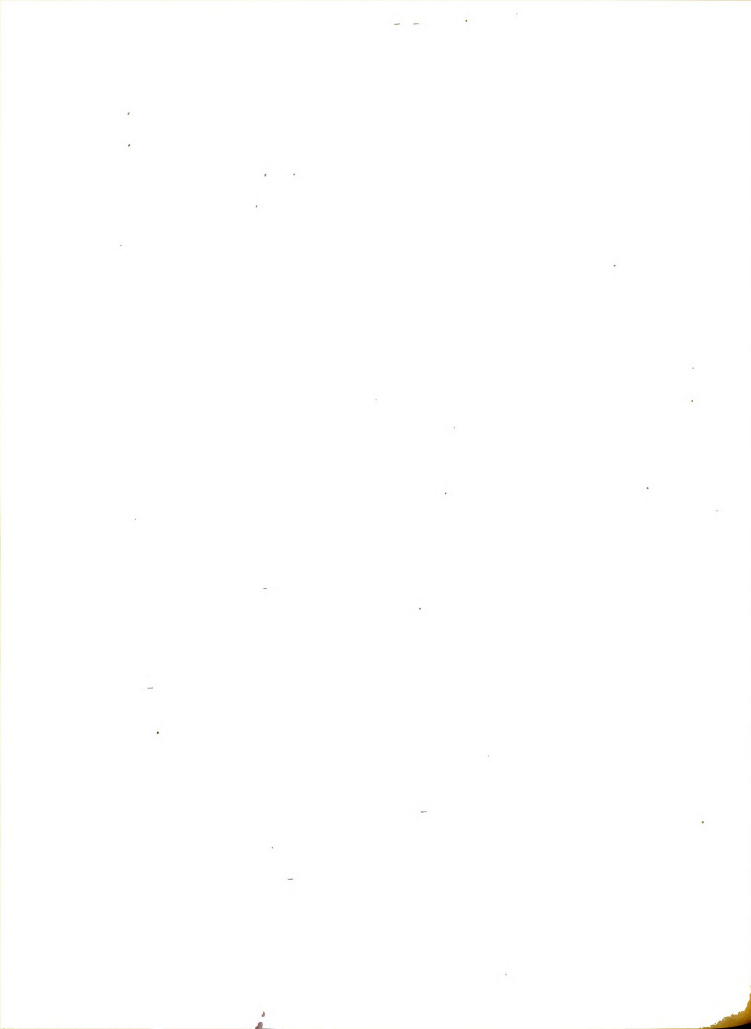
The sweetpotatoes used in this study were grown on uniformly fertilized and cultivated Iuston fine sandy loam soil. Harvesting was accomplished by plowing out the roots with an ordinary moldboard plow. The 1934 lots were harvested on December 5, and the 1935 lots on November 12. Only roots of the size of U. S. No. 1 and U. S. No. 2 grades were taken. Seven bushels were handled "carefully" and seven bushels were handled "commercially." "Careful" handling consisted of placing the roots directly from the row into crates lined with cotton outing cloth. "Commercial" handling consisted of throwing the roots of five adjacent rows into the center row and placing them into non-lined crates. This is the usual way in which sweetpotatoes are handled in Mississippi. Within each lot the crates were numbered from one to seven, and immediately transported to the sweetpotato storage house at the Laurel Starch Plant for curing and storing.

Figure 1 is a sketch of the floor plan of the house. The experimental stacks were placed adjacent to the inside aisles near the rear of the room-- the "carefully" handled lot at A and the "commercially" handled lot at B. in Room 2. To permit the use of the "Student" method of analysis of the experimental data the crates of

each lot were placed in adjacent stacks and each crate was placed in comparable positions in each stack. Thus, for each lot, crate No. 1 was placed on the false floor, crate No. 2 above it and crates Nos. 3, 4, 5, 6 and 7 in the order named with crate No. 7 on top.

In 1934, the roots were cured from December 6 to 24, and in 1935 from November 12 to 24. During the curing period of each year the temperature remained fairly constant but the humidity varied considerably. In 1934, the curing period temperature ranged from 82° to 92° F. and averaged 88.4° F. In 1935, it ranged from 78° to 93° F. and averaged 90.0° F. The humidity during this period in 1934 ranged from 25 to 70 per cent and averaged 45.1 per cent. In 1935, it ranged from 36 to 82 per cent and averaged 66 per cent.

The storage season in the 1934-35 work extended from December 24 to March 13. In the 1935-36 work it extended from November 22 to February 17. During the storage period of both years the temperature within the storage room varied considerably. The average temperature of the stacks was determined by readings three times per day on thermometers placed at the bottom, middle and top of the stacks. This mean temperature varied during the storage season of 1934-35 from 48° to 71° F. and averaged 56° F. It varied from 50° to 72° F. and averaged 55° F. during the storage season of 1935-36. Humidity, determined by a sling psychrometer in the aisle opposite the experimental stacks at the same time temperature readings were made, varied from 62 to 95 per cent and



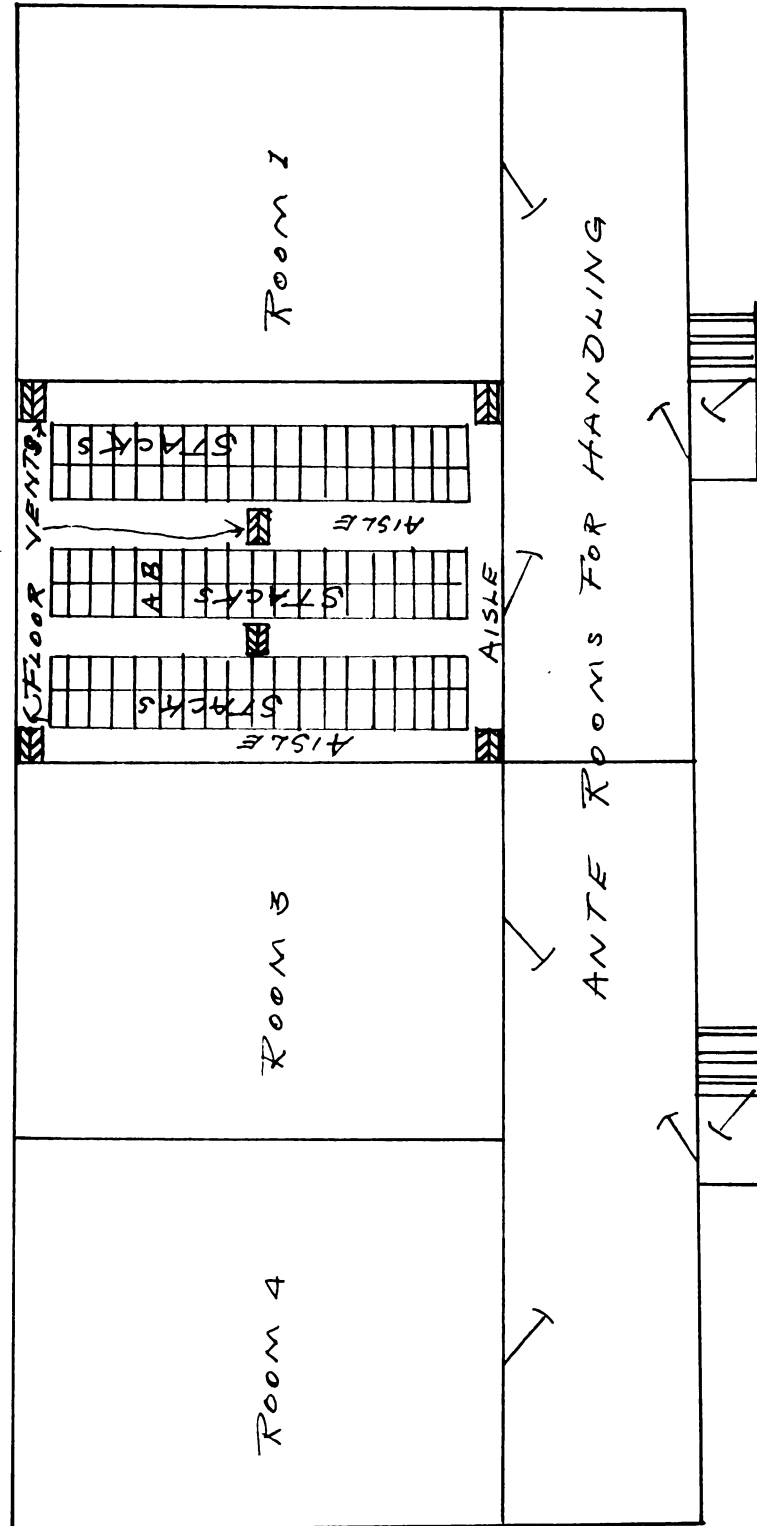


Figure 1. Sketch of Floor Plan of Sweetpotato Storage House, with details of Room 2 (handling studies room), showing arrangement of aisles, floor vents and location of experimental lots at A and B.

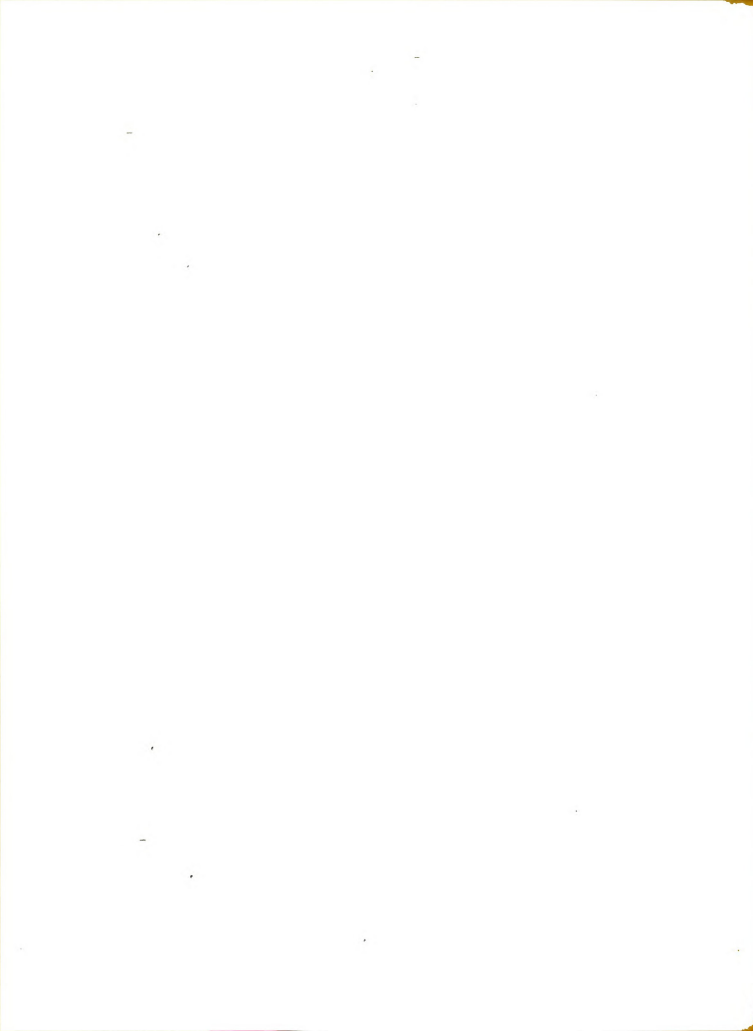


averaged 84 per cent during the storage season of 1934-35. It varied from 61 to 94 per cent and averaged 83 per cent during the storage season of 1935-36. Effort was made to maintain high humidity by manipulation of the vents, by operation of the electric fan in the heater unit, and by distributing shallow pans filled with water on the floor in the aisles throughout the room.

The evaporating power of the air was measured by means of Livingston spherical bulb atmometers. One atmometer was placed on top of crate No. 7 and one on the floor adjacent to crate No. 1. These atmometers were weighed at weekly intervals to determine the loss of water.

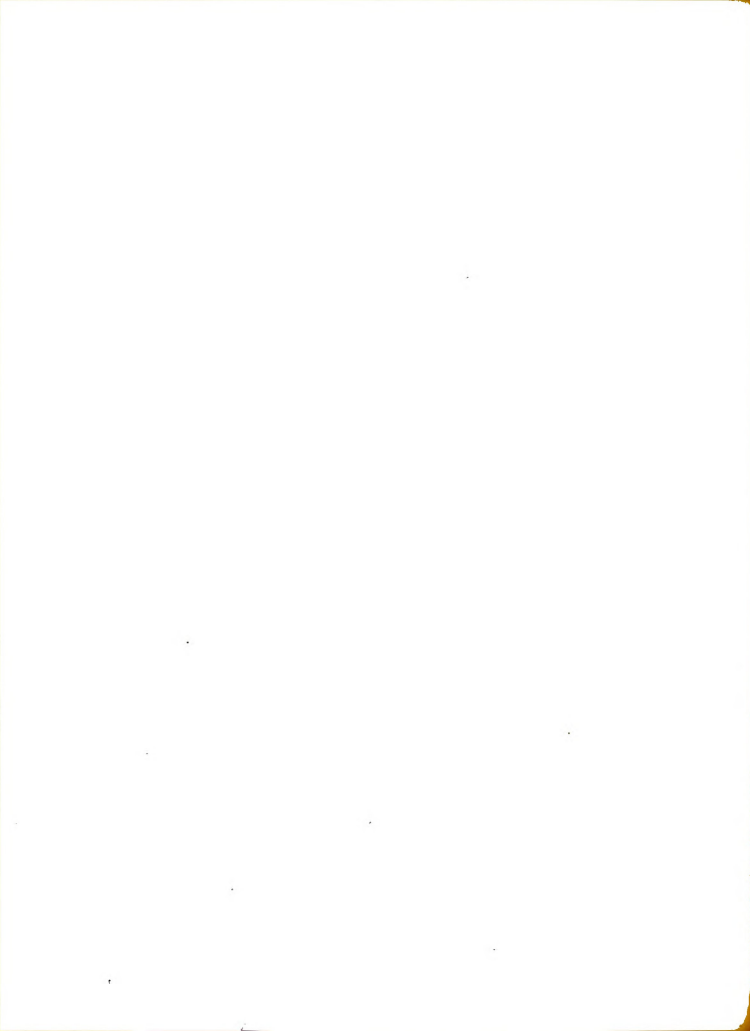
Data on shrinkage were secured by weighing each crate at intervals of two weeks throughout the storage period and on percentage of rots by weighing the decayed roots at the end of the storage period.

Soon after the end of the storage period (on March 30 for the 1935 work and on February 24 for the 1936 work) the roots of each lot were weighed singly, dipped for 10 minutes in a 1-1000 corrosive sublimate solution, and beaded four inches deep in a six-inch layer of river bed sand contained in an outdoor propagating bed. To secure a series of uniform pairs, roots of identical crates were placed in adjacent plots in the bed. For the bed used in 1935, bottom heat was provided by applying steam (alternately) through both ends of three-inch tile lines placed 18 inches apart and laid 22 inches deep at one end of the propagating bed and 18 inches



deep at the other end. Because of the heating effect of sunshine and the cooling effect of rains during the early part of the propagating period and despite the application of warm water during cool weather and cool water during warm weather, the temperature in the bed fluctuated between 65° and 102° F. The daily mean maximum and minimum temperatures of the bed were 90° and 73° F., respectively. For propagation in the 1936 work a bed was constructed like that described by Isbell and Kimbrough (3) for which heat was provided by conducting the smoke from a pit furnace through a six-inch air space underneath the floor of the bed. A compact clay covering four inches thick at the furnace end and two inches thick at the stack end of the bed was placed on the floor. The medium (six inches of river bed sand) was placed on this layer of clay. A covering of light muslin (which could be raised or lowered) was provided for the bed. A continuous record of the temperature of the bed was secured by placing the bulb of a soil-air thermograph within the medium among the roots of each lot. Despite the protection furnished by the covering and firing at regular intervals during cool weather, the temperature of the bed fluctuated between 68° and 102° F. The daily mean maximum and minimum temperatures of the bed were 85° and 75° F., respectively.

In 1935, pulling of the plants began on April 29 and continued at intervals of 3 to 5 days until August 2,



when plant production had practically ceased. In 1936 it began March 26 and continued until July 13, when plant production had practically ceased. The plants were pulled singly, counted and weighed collectively for each crate.

PRESENTATION OF RESULTS

Shrinkage. The data on shrinkage and on percentage of rots of individual crates and on the average shrinkage and percentage of rots of all crates for the work of 1934-35 are presented in Table 1, and for the work of 1935-36 in Table 2. Differences in the shrinkage between the "carefully" and the "commercially" handled lots were very striking in both years. In the 1934-35 experiments, for the period of December 24 to January 21, the "carefully" handled lots lost less weight than the "commercially" handled lots in 6 cases out of 7, for the period of January 22 to February 18 in 5 cases out of 7, and for the period of February 19 to March 15 in 6 cases out of 7. Thus, in 17 cases out of 21 the "carefully" handled lots lost less weight than the "commercially" handled lots. The differences were significant for the second storage period (January 22 to February 18), the third storage period (February 19 to March 15), and for the entire storage period (December 24 to March 15). They were not significant for the first

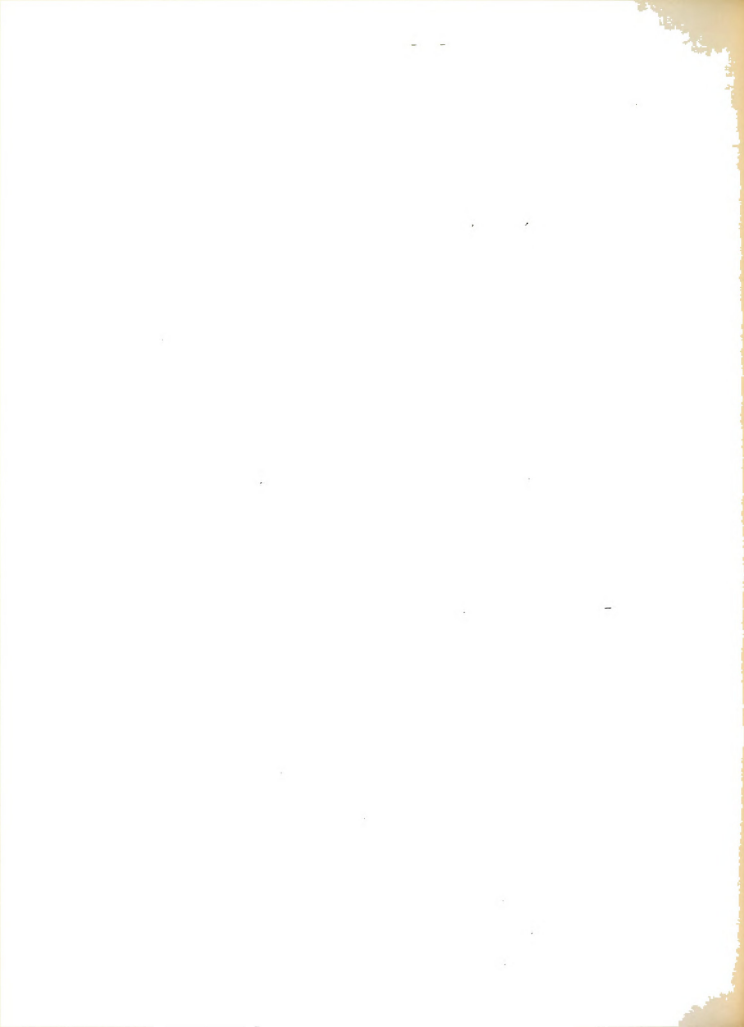


Table 1. Influence of Handling Seed Stock on Loss in Weight in Storage of the Triumph Sweetpotato, 1934-35.

Pair	Treat- ment	Initial Weight (pounds)	Per cent loss in weight				per cent rots by weight
			Dec. 24 to	Jan. 22 to	Feb. 19 to	Dec. 24 to	
			Jan. 21	Feb. 18	Mar. 15	Mar. 15	
INDIVIDUAL PAIRS							
7	A ¹	55.5	0.7	2.7	1.8	5.2	1.80
	B ²	49.0	3.2	2.3	4.5	16.0	7.20
6	A	55.0	0.9	2.5	1.6	5.0	0.90
	B	57.0	2.5	0.8	3.5	6.8	1.60
5	A	51.0	2.8	1.9	1.1	5.8	1.00
	B	54.5	2.4	2.7	1.8	6.9	3.20
4	A	52.5	1.9	1.9	1.3	5.6	1.70
	B	54.0	2.5	3.5	2.0	7.9	3.30
3	A	57.0	1.6	1.7	0.0	3.3	0.00
	B	51.0	2.3	2.0	1.3	6.6	1.50
2	A	50.5	0.9	2.1	0.0	3.0	0.00
	B	49.0	3.0	0.9	2.0	5.9	0.00
1	A	52.5	0.9	1.7	0.0	2.6	1.90
	B	51.0	1.9	1.9	0.0	3.8	0.03
MEAN ALL PAIRS							
1-7	A	52.43	1.29	2.07	0.90	4.26	1.04
(incl.)B		52.21	3.33	2.16	2.23	7.72	2.26
Difference (A minus B)			1.94**	0.09*	1.33*	3.36*	1.22**

1. "Carefully" handled

2. "Commercially handled.

** Differences are considered significant.
* Differences are considered insignificant.

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Table 2. Influence of Handling Seed Stock on Loss in Weight in Storage of the Triumph Sweetpotato, 1935-36

Pair	Treat- ment	Initial weight (pounds)	Per cent loss in weight						Per cent rots by weight
			Dec. 24 to Jan. 21	Jan. 22 to Feb. 18	Feb. 19 to Mar. 15	Dec. 24 to Mar. 15			
			INDIVIDUAL PAIRS						
7	A ¹ B ²	42.5 48.0	1.9 3.8	1.7 4.7	2.6 3.6	6.2 12.1	0.8 1.6		
6	A B	44.5 50.0	1.3 3.2	0.9 3.3	1.6 3.7	4.3 10.2	0.0 1.2		
5	A B	44.5 51.0	1.7 3.5	0.4 3.3	2.2 2.0	4.3 8.8	1.4 0.0		
4	A B	44.0 44.5	0.4 4.1	2.3 3.6	1.1 3.4	3.8 11.1	0.0 0.0		
3	A B	46.0 49.0	1.0 2.7	1.7 0.8	2.3 2.3	5.0 6.8	0.0 0.0		
2	A B	48.5 51.5	2.9 3.2	1.1 2.1	0.7 2.4	4.7 10.8	0.6 0.0		
1	A B	44.0 52.0	3.0 4.7	1.7 4.1	2.7 2.6	7.4 11.4	0.9 0.0		
MEAN ALL PAIRS									
1-7	A (inc.) B	44.7 49.6	1.8 4.0	1.4 3.2	1.9 2.8	5.1 10.2	0.5 0.5		
Difference (A minus B)			-2.2*	-1.8*	-0.9*	-5.1*			

1 "Carefully" handled.

2 "Commercially" handled.

* Differences considered significant.

storage period (December 24 to January 21). In the 1935-36 experiment, for the first storage period (November 25 to December 23) the "carefully" handled lots lost less weight than the "commercially" handled lots in 7 cases out of 7; for the second storage period (December 24 to January 20) in 6 cases out of 7; for the third storage period (January 21 to February 17) in 4 cases out of 7, and for the entire storage period (November 25 to February 17) in 17 cases out of 21. The differences were significant for the first, second, third, and entire storage periods.

The results of both years' experiments also show that, regardless of the method of handling, the roots stored in crates 4, 6 and 7 (located in the upper level of the storage house) lost more weight than those stored in crates 1, 2 and 3 (located in the lower level of the storage house.) This difference was due, partially at least, to a somewhat higher evaporation in the upper level than in the lower level, since the evaporating power of the air was higher in the upper level than in the lower level. The temperature also remained slightly higher at the upper level than at the lower level. See Tables 3 and 4.

The data for both years also show that, with one exception for each year, the roots lost more weight during the first and during the second period of storage than during the third. The data in Tables 3 and 4 show

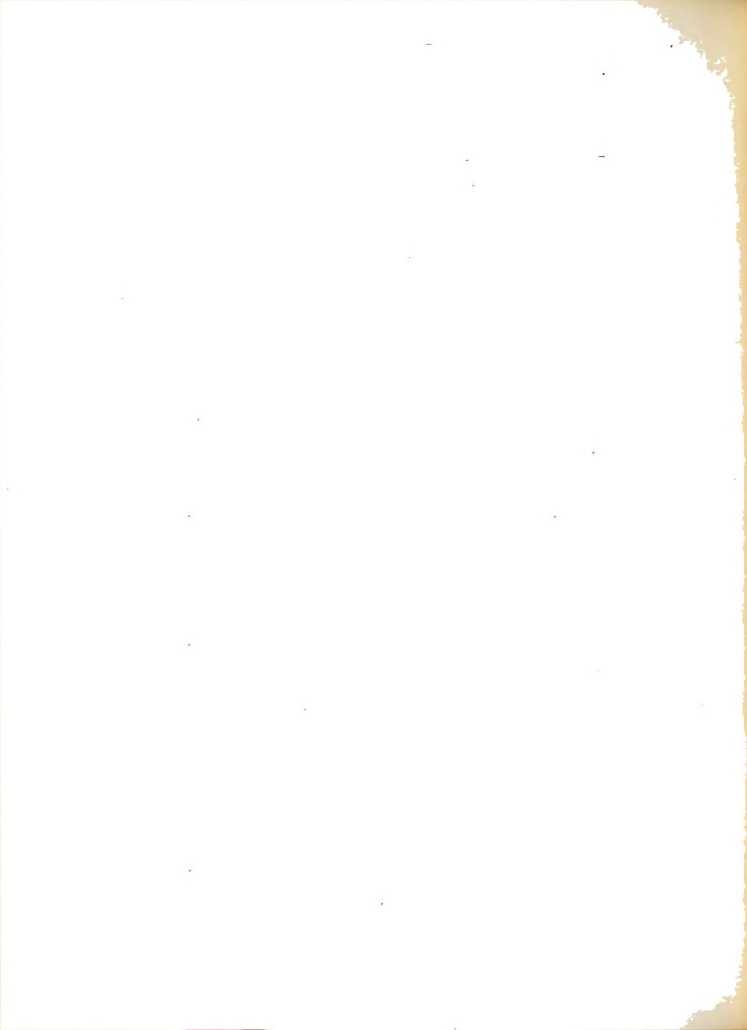
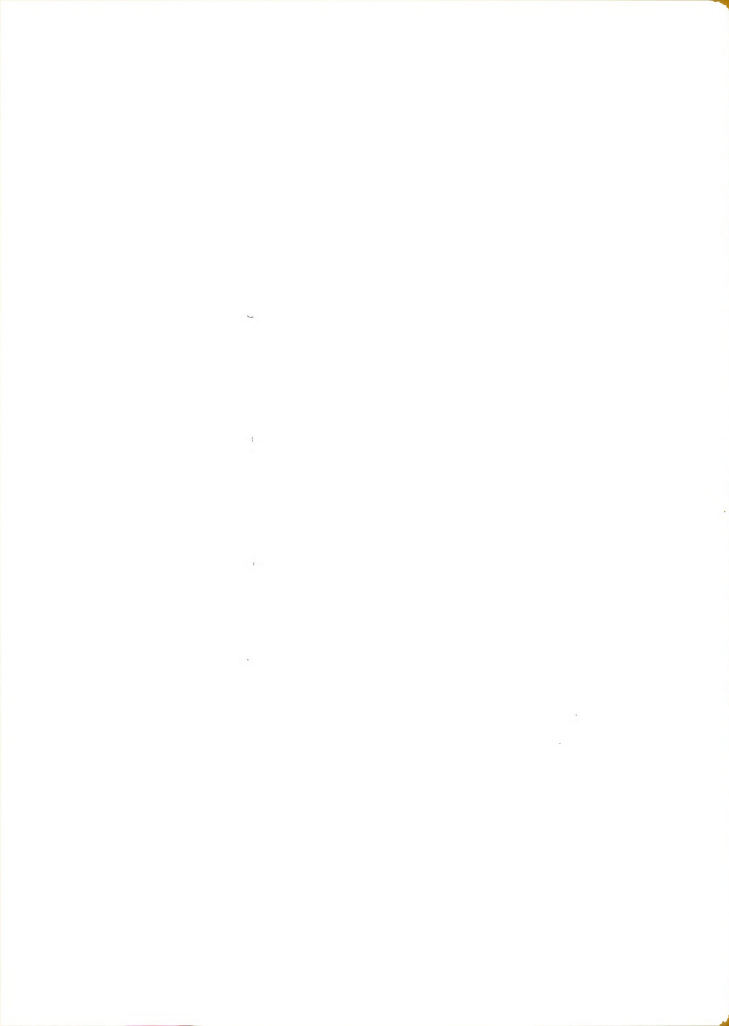


Table 3. Humidity, Temperature, and Water Lost and Atmometers in Storage House, 1934-35.

Period of Storage	Per cent humidity		Temperature degrees F.		Water lost from atmometers, cubic centimeters	
	Range	Average	Top	Bottom	Top	Bottom
			Range	Average		
			Range	Average		
Lec. 24 to Jan. 21	62-90	79	50-71	59	50-69	57
Jan. 22 to Feb. 18	66-94	84	48-68	55	48-65	54
					125	130
Feb. 19 to Mar. 15	70-95	83	50-68	57	50-64	55
					152	127
Dec. 24 to Mar. 15	66-95	84	48-68	56	48-65	55
					288	257

Table 4. Humidity, Temperature, and Water Lost from Atmometers in Storage House, 1925-26.

Period of storage	Per cent Humidity		Temperature degrees F.		Water lost from atmometers cubic centimeters.			
	Range	Average	Range	Average	Top	Bottom		
Nov. 25 to Dec. 22	61-94	79	50-72	58	50-68	56	265	200
Dec. 24 to Jan. 20	69-92	84	50-62	55	50-62	55	136	128
Jan. 21 to Feb. 17	73-94	86	50-64	53	45-50	48	123	124



that a somewhat higher humidity was maintained during the third period than during the first and second periods. Since Artschwager and Starrett (1) have shown that the higher the per cent humidity the more rapid is the development of periderm in storage, this greater humidity of the third storage period undoubtedly induced a faster growth of periderm which in turn reduced the rate of shrinkage and the rate of water loss.

Storage rots. Differences in percentage of rots between the "carefully" and "commercially" handled lots, though not statistically significant in the 1934-35 results, are rather striking. In 5 out of 7 cases the "carefully" handled lots had a lower percentage of storage rots than the "commercially" handled lots. The data for 1935-36 show very low percentages of decay and that there was no difference in decay between the "carefully" and "commercially" handled lots. Obviously, bruising should be avoided in order to reduce to a minimum the chances of entrance of decay organisms.

In general these results agree with those of Thompson and Beattie (3) and of Smith (7). Thompson and Beattie found that "carefully" handled roots of the Dooley and Nancy Hall varieties of the sweetpotato lost less weight and had a lower percentage of storage rots than those "commercially" handled. Smith found that "carefully" handled tubers of the Rural Russet Irish Potato lost less weight and had a lower percentage of storage rots than those "normally" handled.



Plant Production. The data on plant production are presented in Tables 5 and 6. These data show that in all cases the "carefully" handled lots produced significantly more plants per root and per bushel than the "commercially" handled lots. There was practically no difference in the size of individual plants produced by the two lots. Apparently bruising the roots of seed stock does not affect the size of sprouts. In all cases the "carefully" handled lots required by far less weight of root to produce unit weight of plant. The "carefully" handled lots produced 2029 plants per bushel in 1935 and 2613 in 1936. The "commercially" handled lots produced 1166 plants per bushel in 1935 and 1748 in 1936. The differences of 963 plants per bushel in 1935 and 868 in 1936 are highly significant.

Figure 2 illustrates the effect of handling seed stock on the earliness of sprouting. Data presented in Table 7 show that no sprouts were pulled from the "commercially" handled lot at the time of the first pulling from the "carefully" handled lot. At the second pulling from the "carefully" handled lots the first plants were taken from the "commercially" handled lots. At all pullings the "carefully" handled lots produced more plants than the "commercially" handled lots. The differences between the two lots were greater at the early pullings than later in the season. These results are of considerable importance. They show that "carefully" handled seed stock can be expected to sprout

Table 5. Influence of Handling Seed Stock on Plant Production of the Triumph Sweetpotato, 1935.

Pair	Treat- ment	Mean Weight Roots (Grams)	No. Plants per root ¹	Mean Weight Plant (Grams)	Grams Root per Gram Plant ²	Plants per 60 -ound bushel ²
INDIVIDUAL PAIRS						
1	A ¹	175±5.5	12.0	4.4	3.3	1865
	B ²	170±8.5	7.0	3.8	6.4	1120
2	A	176±7.0	12.8	4.9	2.8	1973
	B	142±8.3	5.8	4.0	6.1	1126
3	A	191±7.6	12.6	5.1	2.9	1803
	B	195±12.7	10.1	4.5	4.2	1411
4	A	181±7.1	14.4	5.0	2.5	2178
	B	176±10.1	5.6	5.2	6.0	867
5	A	191±8.7	18.1	4.2	2.5	2569
	B	157±9.7	5.9	5.1	5.2	1023
6	A	177±4.5	17.0	5.2	2.0	2619
	B	193±14.9	7.7	4.8	5.2	1088
7	A	186±7.8	13.6	4.5	3.0	2002
	B	161±14.5	9.1	4.7	3.7	1538
MEAN ALL PAIRS						
1-7	A	182±2.2	14.26	4.76	2.71	2129
(incl.)	B	171±4.2	7.31	4.58	5.26	1166
Difference						
(A minus B		11±4.7	7.05*	0.14**	2.55*	963*

1. "Carefully" handled.

2. "Commercially" handled

3. Based on original number of roots bedded.

* Differences are considered significant.

** Differences are considered insignificant.

Table 6. Influence of Handling Seed Stock on Plant Production of the Triumph Sweetpotato, 1936.

Pair	Treat- ment	Mean Weight Roots (Grams)	No. Plants Per root ³	Mean Weight Plant (Grams)	Grams Root per Gram Plant ²	Plants per 60 Pound ³ Bushel ³
INDIVIDUAL PAIRS						
1	A ¹	92±5.1	9.8	5.1	1.8	2899
	B ²	108±4.9	6.2	5.8	3.0	1557
2	A	97±5.5	9.7	4.6	2.1	2735
	B	123±5.6	8.2	6.5	2.3	1817
3	A	116±7.1	12.0	5.1	1.8	2841
	B	100±3.9	7.6	5.6	2.3	2059
4	A	115±6.3	11.3	5.8	1.7	2648
	B	88±3.4	6.0	5.3	2.7	1843
5	A	139±8.2	11.8	5.7	2.0	2297
	B	136±7.1	8.1	7.1	2.3	1626
6	A	118±5.7	11.8	6.2	1.0	2728
	B	148±9.0	6.8	6.1	3.4	1262
7	A	161±8.3	12.7	6.3	1.9	2143
	B	112±5.0	8.5	7.1	1.8	2053
MEAN ALL PAIRS						
1-7 (incl.)	A	117±2.6	11.30	5.54	1.75	2613
	B	113±2.0	7.34	6.20	2.54	1745
Difference (A minus B)		4±3.2**	3.96*	0.66**	0.79*	868*

1. "Carefully" handled.

2. "Commercially" handled.

3. Based on original number of roots bedded.

* Difference considered significant.

** Difference considered insignificant.

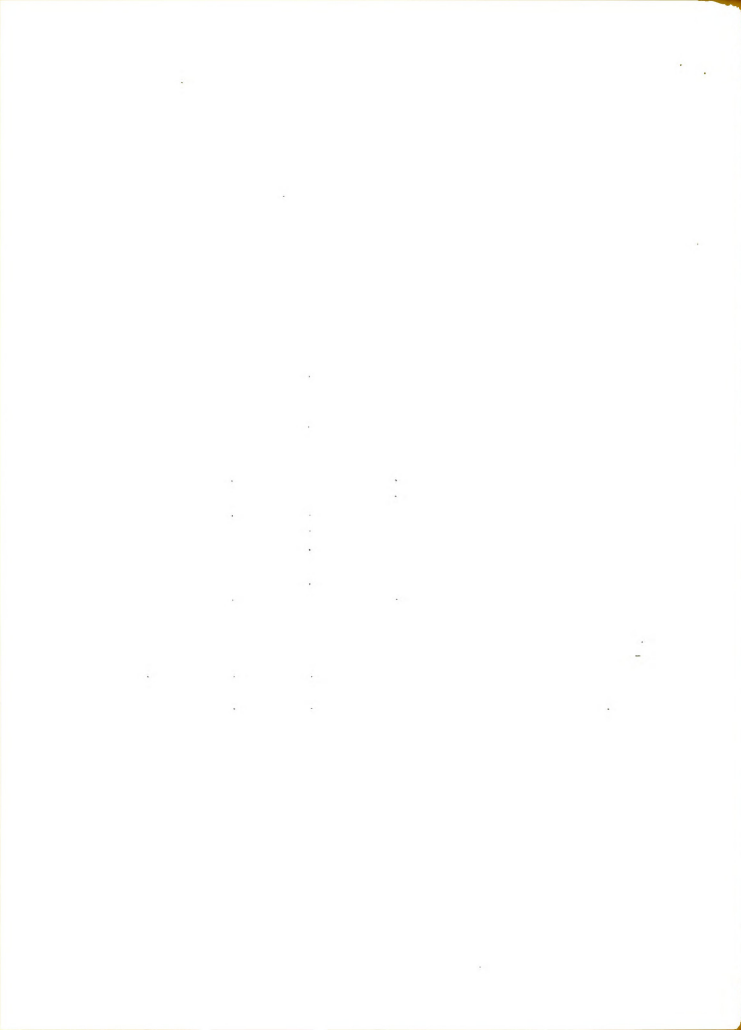


Table 7. Influence of Handling Seed Stock on Earliness of Sprouting of the Triumph Sweetpotato, 1936.

Pair	Treat- ment	Number plants per bushel at various pullings								
		1	2	3	4	5	6	7	8	9
INDIVIDUAL PAIRS										
1	A ¹	337	211	309	174	290	104	118	302	174
	B ²	0	59	134	173	117	106	138	163	80
2	A	405	233	354	162	166	119	119	190	188
	B	0	70	157	131	172	154	120	98	138
3	A	344	206	306	133	222	113	157	129	215
	B	0	112	155	143	134	180	121	134	171
4	A	273	283	261	145	173	126	167	140	151
	B	0	122	219	90	217	102	153	122	117
5	A	186	197	206	134	163	210	151	98	157
	B	0	19	67	217	156	78	117	114	141
6	A	233	213	308	202	206	182	137	148	206
	B	0	22	102	65	163	36	129	112	102
7	A	109	151	244	182	125	108	126	100	207
	B	0	53	117	57	109	106	168	149	200
MEAN ALL PAIRS										
1-7 (incl.)	A	269	213	284	160	192	137	129	158	185
	B	0	65	136	125	152	109	135	127	135
Difference (A minus B)		269	148	148	35	40	28	4	31	50

A "Carefully" handled.

B "Commercially" handled.

earlier and therefore produce more plants per bushel of seed stock for early setting than "commercially" handled seed stock. They indicate a saving to the grower in bedding space for production of early plants.

The difference in plant production between the two lots is undoubtedly associated with the differences in the extent and the degree of bruising of the two lots. At the end of the plant production period a careful examination of the roots of both lots revealed that the bruised areas were larger and deeper on those of the "commercially" handled lots than on those of the "carefully" handled lots. No plants were produced in the bruised areas. The data show that the "carefully" handled lots averaged 4.9 ± 0.15 lesions per root in 1935 and 4.9 ± 0.08 in 1936. The "commercially" handled lots averaged 7.7 ± 0.26 lesions per root in 1935 and 8.6 ± 0.18 in 1936. The difference in 1935 of 2.8 ± 0.3 and of 3.7 ± 0.19 in 1936 in favor of the "carefully" handled lots is considered significant.



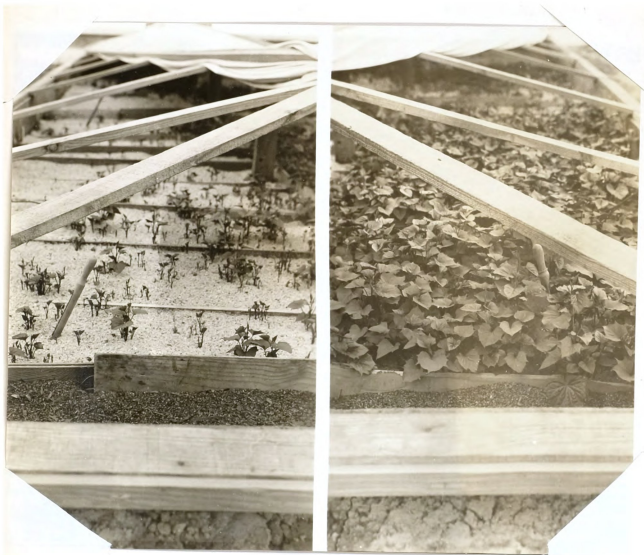
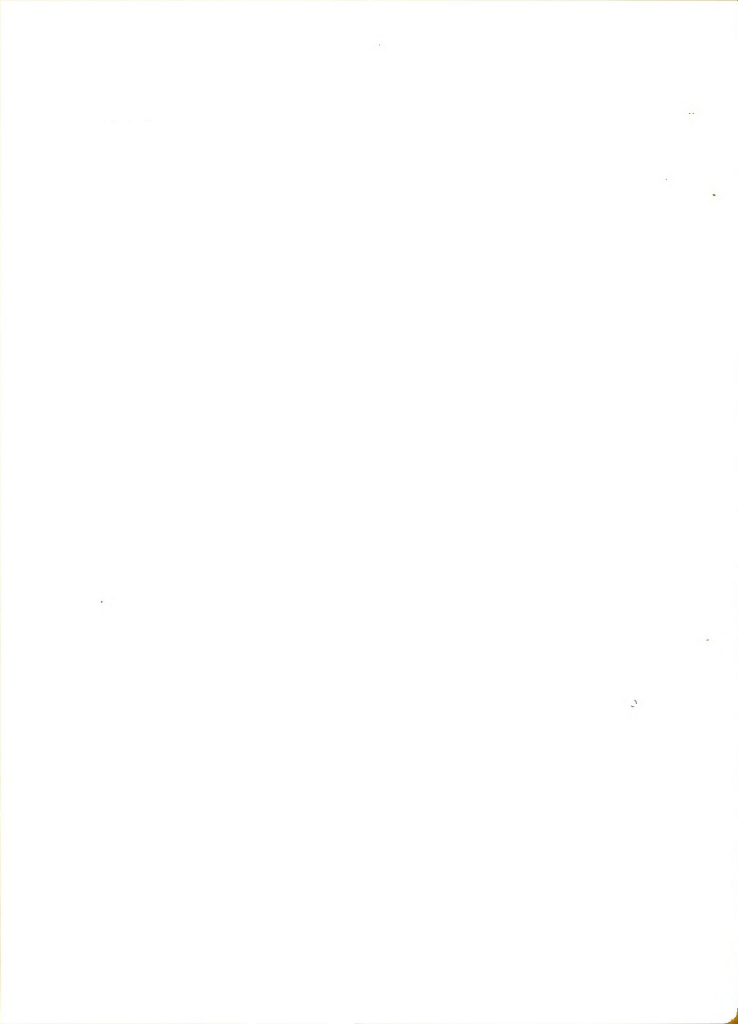


Figure 2. Effect of handling seed stock on plant production. "Commercially" handled lot at left, "carefully" handled at right. Photographed on day of first pulling from "carefully" handled lot, four weeks from date of bedding.



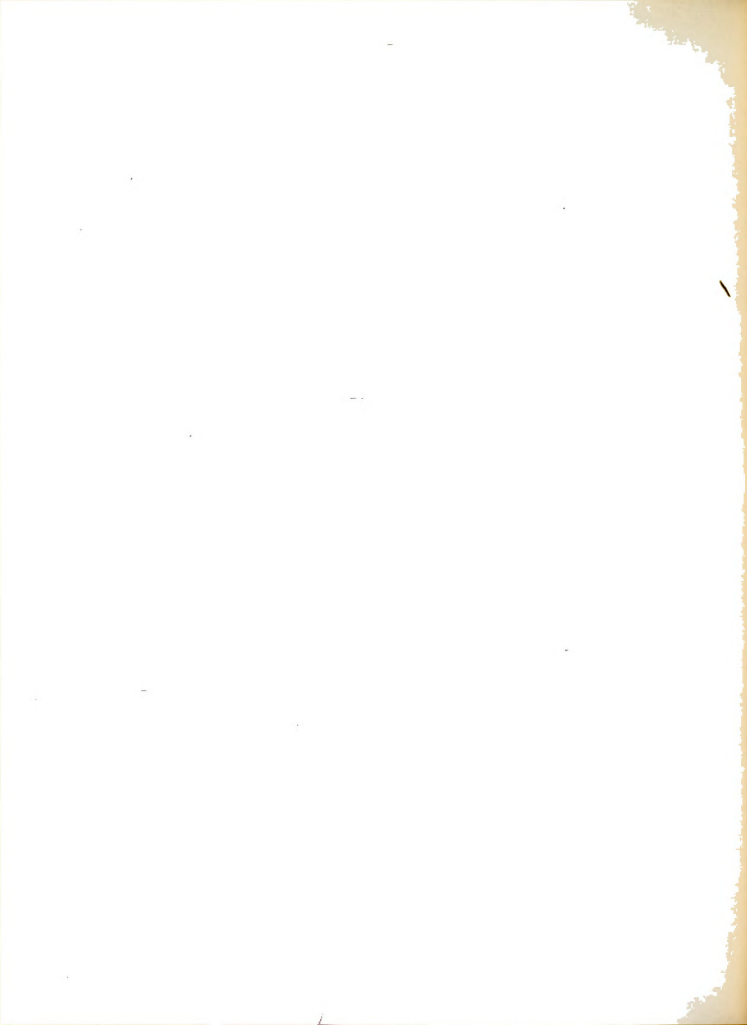
S U M M A R Y

In these investigations two lots each containing seven bushels of roots were harvested from a uniform field. One lot was handled "carefully" during the harvest by placing the roots directly from the row into cloth-lined crates, and the other lot was handled "commercially" by throwing the roots into "heap" rows and then placing them into nonlined crates. Both lots were artificially cured at a high temperature and a moderately high humidity 17 days in 1934 and 12 days in 1935. They were then stored at a temperature of approximately 55° F. 80 days in the 1934-35 work and 84 days in the 1935-36 work. Each lot was weighed at two week intervals to obtain the rate of shrinkage. The decayed roots were weighed at the end of the storage period to determine the percentage of decay. The roots of the two lots were placed in adjacent positions in a propagating bed. Data were obtained on the weight and number of plants produced.

Data have been presented which show, under the conditions of these experiments, that "carefully" handled seed stock loses less weight and has less decay in storage, and produces significantly more plants per root and per bushel than "commercially" handled seed stock.



These results have great practical significance. Seed stock can be handled "carefully" by placing the roots directly from the rows into boxes, crates, hampers or baskets having a smooth inside and storing in these containers at a cost actually below the cost of "commercial" handling usually practised. In "careful" handling only one handling of the roots is necessary--that of placing them into the containers. In "commercial" handling they are usually handled three times--thrown into "heap" rows, then placed into wagons or trucks for hauling, and finally placed into storage. The cost of storage containers would not exceed the cost of labor for two handlings of the roots. Even if the cost of "careful" handling were greater, it would pay for itself because it resulted in a 62 per cent increase in plant production. These results indicate a considerable possible saving to the grower from "careful" handling in the required storage and bedding spaces for production of unit quantity of plants. "Careful" handling would actually reduce the cost of production. Consequently growers should handle their seed stock sweetpotatoes as carefully as possible.



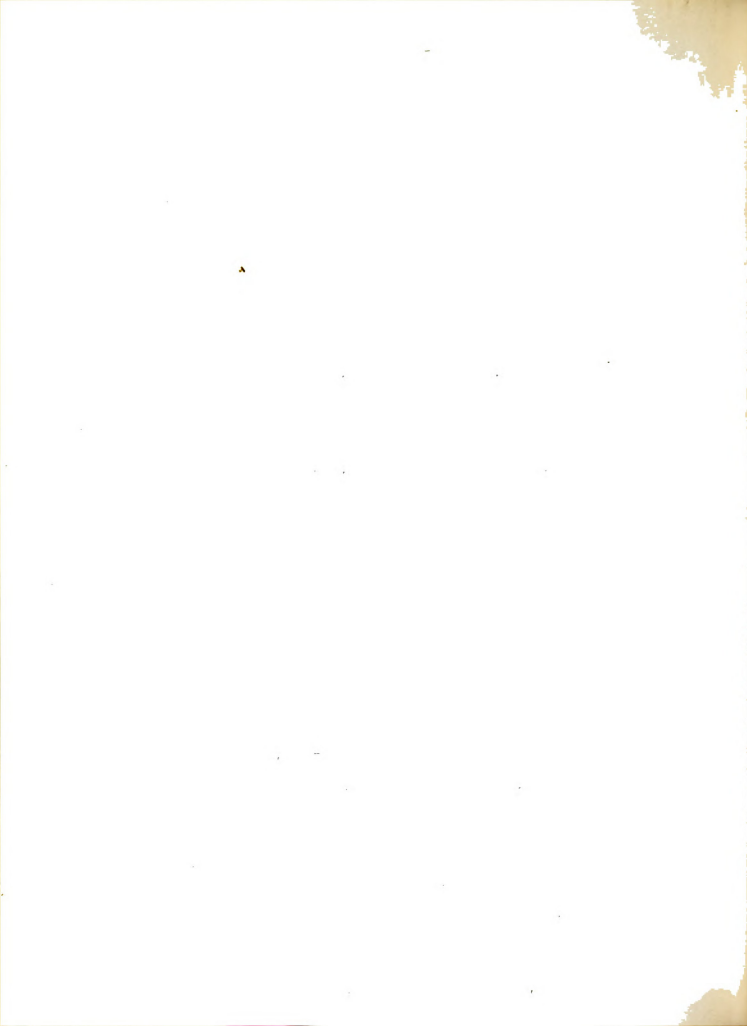
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