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2-15-1943

Progress Report on Research Project 118 [:]  
Improving Vegetable Yields & Quality by Cultural  
Practices

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**Recommended Citation**

McCrory, S.A. and Snyder, L.C., "Progress Report on Research Project 118 [:] Improving Vegetable Yields & Quality by Cultural Practices" (1943). *Agricultural Experiment Station Horticulture Pamphlets*. Paper 1.  
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Progress Report on Research Project 118  
IMPROVING VEGETABLE YIELDS & QUALITY  
BY CULTURAL PRACTICES

Agricultural Experiment Station

South Dakota State College

Brookings, South Dakota

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## Progress Report on Vegetable Studies\*

In March 1942, a project was started to study the effect of cultural practices on the yield and quality of garden vegetables. The vegetables were grown under a lath shade and in the open. It was planned to grow a half of the vegetables under irrigation, but due to the wet season this phase of the experiment was omitted. The lath shades were supported on frames two feet and three feet above the low and tall growing vegetables respectively. These shades were used throughout the growing season. Three fertilizer treatments, including manure, Vigor, superphosphate, and a check plot were used on each of the above treatments. Nineteen vegetables listed in the accompanying tables, were grown. The yields represent fourteen feet of row for all of the vegetables except cucumbers, eggplant, peppers, tomatoes, potatoes and sweetcorn where thirty-two feet of row was used. Spacing between rows was three feet for the fourteen foot rows and four feet for the thirty-two foot plantings.

Table 1 shows the vitamin and mineral content of vegetables grown under shade and in the open. Carotene was a little higher under shade while vitamin C was considerably lower. The mineral content showed little difference. The vitamin and mineral content showed no consistent variations between the different fertilizer treatments.

In table 2, the yields were consistently higher in the open than under shade. This may have been due, at least in part, to the cold, wet season. Under both the shade and in the open, plots treated with Vigoro gave the highest yield followed by manure, superphosphate and the check plots.

Table 3 rates the vegetables according to the vitamin and mineral content of their edible portions. This table may be somewhat misleading since it does not consider yields, ease of production, season of availability, palatability and cost of production.

Another phase of the experiment concerned the lengthening of the garden season by the use of transplants and the fall garden. Transplanted vegetables were ready to use as much as three weeks earlier than field seeded. In most cases the yields were greatly increased by the use of transplants. In the case of celery, celeriac, eggplant and tomatoes, field seeding did not seem practical.

The above results should be considered as preliminary since they are based on a single season which could not be considered normal for South Dakota. The plan for 1943 involves the use of several more fertilizers and a greater replication of treatments.

\* S. A. McCrory and L. C. Snyder, Associate and Assistant Professors in Horticulture in Cooperation with the Experiment Station Chemistry Department

TABLE I

## VITAMIN AND MINERAL CONTENT\*

Kind and Variety of Vegetable	Moisture (%)		Carotene (mgms.-per 1000gms.)		Vitamin C (mgms.-per 100gms.)		Calcium (%)		Phosphorus (%)		Iron (parts per Million.)		
	Shade	Open	Shade	Open	Shade	Open	Shade	Open	Shade	Open	Shade	Open	
Beans, Snap- Pencil Pod Black Wax	92.5	92.2	1.16	1.00	11.55	15.40	.063	.059	.022	.021	13.08	13.56	
Beans, Lima (Baby Potato)	71.3	70.6	2.04	2.46	23.20	21.80	.095	.101	.056	.055	37.39	37.29	
Beets - Red	Tops	93.5	93.1	29.58	27.96	15.45	24.49	.111	.109	.017	.018	35.18	32.23
	Roots	89.8	90.0					.058	.057	.025	.023	26.98	25.32
Chard, Swiss (Lucullus)	94.2	93.3	23.04	17.21	23.34	27.74	.080	.091	.014	.019	21.36	24.45	
Cabbage (Golden Acre)	95.7	93.3	1.01	1.77	24.93	32.38	.064	.076	.014	.017	8.69	11.56	
Cauliflower (Snowball)	92.5	91.7	1.05	1.03	85.05	87.65	.060	.066	.020	.022	16.61	17.47	
Carrots (Danvers Half-long)	92.0	93.2	10.38	18.72	5.57	5.98	.048	.043	.019	.015	17.52	10.66	
Corn, Sweet-Bentley-Type A Golden Cross	79.7	78.8	1.44	1.27	9.30	9.20	.063	.059	.048	.049	23.70	21.44	
Cucumber (Early Cluster)	97.4	97.9			4.80	4.81	.019	.018	.010	.009	4.25	4.65	
Eggplant (Early Long Purple)	93.4	94.2			3.65	2.93	.019	.016	.011	.012	8.83	7.77	
Kale (Dwarf Curled)	91.8	91.0	21.79	24.50	54.53	76.80	.378	.383	.021	.023	24.84	27.20	
Lettuce (Grand Rapids)	93.4	93.1	3.38	3.37	32.22	32.59	.123	.117	.021	.019	33.26	29.02	
Onions (Sweet Spanish)	93.2	93.3	2.09	1.26	15.70	19.01	.109	.094	.017	.013	14.98	15.05	
Peas (Alaska)	81.5	80.3	.79	1.97	31.97	36.43	.133	.130	.057	.057	38.35	43.85	
Pepper (Windsor A)	94.8	94.7	9.90	3.09	32.30	46.20	.018	.015	.013	.011	10.10	9.92	
Potato (Warba)	85.1	83.2			15.62	20.70	.064	.068	.028	.030	15.35	13.93	
Spinach (King of Denmark)	90.2	90.1	15.29	11.94	46.39	62.62	.147	.144	.029	.028	26.68	26.95	
Tomato (Bounty)	96.0	95.9	7.62	8.08	9.45	12.10	.015	.016	.015	.013	7.54	8.14	
Turnips (Tokyo)	92.4	92.9	20.47	19.94	51.12	55.48	.269	.256	.019	.018	32.13	31.64	
AVERAGE	90.54	90.17	9.44	9.10	26.11	31.28	.097	.096	.024	.023	20.84	20.61	

\* Vitamin and Mineral analyses were made by G.F. Gastler, E.I. Whitehead and A.L. Moxon.

TABLE 2

YIELD IN POUNDS\*

Kind and Variety of Vegetable	Shade					Open				
	Manure	Vigoro	Super- phosphate	Check	Average	Manure	Vigoro	Super- phosphate	Check	Average
Beans, Snap (Pencil Pod Black Wax)	6.8	8.8	8.1	9.7	8.4	14.6	16.4	16.0	10.7	14.4
Beans, Lima (Baby Potato)	1.4	2.7	2.0	1.4	1.9	7.3	5.2	5.1	3.5	5.3
Beets (Detroit Dark Red)	9.1	8.9	9.9	9.6	9.4	26.9	38.5	25.9	32.5	31.0
Chard, Swiss (Lucullus)	17.0	15.7	15.1	11.7	14.9	54.4	69.3	49.7	34.1	51.9
Cabbage (Golden Acre)	20.1	28.8	20.7	21.6	22.8	31.3	22.7	28.9	40.9	31.0
Cauliflower (Snowball)	3.8	9.5	5.3	9.0	6.9	24.9	20.6	21.8	12.6	20.0
Carrots (Danvers Half-long)	4.3	6.3	7.1	6.6	6.1	15.8	17.2	11.6	9.4	13.5
Corn, Sweet - Bantam - Type A Golden Cross	29.9	33.4	29.3	34.8	31.9	37.4	47.4	38.8	38.6	40.6
Cucumber (Early Cluster)	40.3	58.8	55.9	41.5	49.1	246.5	157.3	200.3	132.9	184.3
Eggplant (Early Long Purple)	9.1	4.8	2.7	5.2	5.5	50.1	56.5	51.2	55.0	53.2
Kale (Dwarf Curled)	6.6	8.3	4.1	5.1	6.0	9.2	14.7	9.1	12.4	11.4
Lettuce (Grand Rapids)	5.8	12.2	7.3	7.3	8.2	20.4	26.5	17.1	13.7	19.4
Onions (Sweet Spanish)	2.9	3.4	1.6	1.4	2.3	6.6	8.6	3.9	2.8	5.5
Peas (Alaska)	0.2	0.3	0.3	0.3	0.3	0.6	1.0	0.8	0.6	0.8
Pepper (Windsor A)	7.9	12.9	9.6	14.6	11.3	43.0	57.4	41.3	28.6	42.6
Spinach (King of Denmark)	4.0	4.4	3.0	4.4	4.0	5.9	7.8	5.5	5.4	6.2
Tomato (Bounty)	114.4	109.7	90.8	80.4	98.8	206.8	240.1	193.5	153.1	198.4
Turnips (Tokyo)	1.3	4.4	2.1	1.1	2.2	1.8	9.4	2.6	2.7	4.1
Total - (All Vegetables)	284.9	333.3	274.9	265.7	290.0	803.5	816.6	723.1	589.5	733.6

\* Unit of row - 14 feet for all vegetables except cucumbers, eggplants, peppers, potatoes, tomatoes, and sweet corn where the unit was 32 feet.

TABLE 3

## VEGETABLE RATING CHART

Rank	Vitamin C	Carotene	Calcium	Phosphorus	Iron	Vitamins and Minerals
1	Cauliflower	Beet (tops)	Kale	Peas	Peas	Kale
2	Kale	Kale	Turnips	Beans, Lima	Beans, Lima	Spinach
3	Spinach	Turnips	Spinach	Corn, Sweet	Beets (tops)	Turnips
4	Turnips	Chard, Swiss	Peas	Spinach	Turnips	Peas
5	Peppers	Carrots	Lettuce	Potatoes	Lettuce	Beans, Lima
6	Peas	Spinach	Beets (tops)	Beets (Roots)	Spinach	Beets (tops)
7	Lettuce	Tomatoes	Onions	Kale	Beets (roots)	Lettuce
8	Cabbage	Peppers	Beans, Lima	Cauliflower	Kale	Chard, Swiss
9	Chard, Swiss	Lettuce	Chard, Swiss	Beans, Snap	Chard, Swiss	Cauliflower
10	Beans, Lima	Beans, Lima	Cabbage	Lettuce	Corn, Sweet	Corn, Sweet
11	Beet (tops)	Onions	Potatoes	Turnips	Cauliflower	Onions
12	Potatoes	Eggplant	Cauliflower	Beet (tops)	Onions	Potatoes
13	Onions	Cabbage	Beans, Snap	Carrots	Potatoes	Cabbage
14	Beans, Snap	Peas	Corn, Sweet	Chard, Swiss	Carrots	Carrots
15	Tomatoes	Corn, Sweet	Beets (Roots)	Cabbage	Beans, Snap	Beans, Snap
16	Corn, Sweet	Beans, Snap	Carrots	Onions	Cabbage	Pepper
17	Carrots	Cauliflower	Cucumbers	Tomatoes	Peppers	Beets (Roots)
18	Cucumbers		Eggplant	Peppers	Eggplant	Tomatoes
19	Eggplant		Peppers	Eggplant	Tomatoes	Eggplant
20			Tomatoes	Cucumbers	Cucumbers	Cucumbers