were limited by the amount of N being too low for maximum yield.

Yield data for the three growing seasons are presented in Table 3. There was little apparent seasonal effect on crates per acre yield. The spring crop's yield was lower than normal due to disease losses.

In summary, high nitrogen rates and close in-row spacings delayed maturity. The amount of nitrogen and in-row spacing had a greater effect upon per cent marketable heads harvested in the three, 20-inch row plots than in the 30-inch rows. Cabbage head weight increased as the row width and the in-row spacing increased. Generally, the head weight increased as the amount of nitrogen increased. Cabbage head weight was greater at first harvest. Yields per acre generally increased as the amount of nitrogen and spacing increased. Nitrogen may have been a limiting factor in head weight and yield in the three, 20-inch row plots with 9 and 12 inch in-row spacings.

The best overall treatment in this study was the 30-inch rows with 12-inch in-row spacing and 200 pounds N/A. The higher nitrogen rate of 275 pounds N/A at this spacing gave a higher yield, but the heads were larger and there was no significant difference between the yields.

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CARROT RESPONSES TO FERTILIZER LEVELS ON EVERGLADES ORGANIC SOILS[1]

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Additional index words. nitrogen, phosphorus, potassium, plant analysis, sucrose, soluble solids, *Daucus carota.*

Abstract. **Three factorial experiments were conducted on new Everglades organic soil to determine carrot yield and quality responses to fertility level. In Experiment 1, P was applied at 44, 88, and 132, and K at 133, 266, and 398, pounds per acre. Response to P was quadratic with optimum yields at 88 pounds of P. There was no significant response to K.**

In Experiment 2, with higher residual soil P, N was supplied at 0, 40, and 80, P at 44, 88, and 132, and K at 133, 266, 398 pounds per acre. There was no significant marketable weight response to N or P. However, K levels increased size of smaller roots to the intermediate level of K.

In Experiment 3, with the same residual P as in Experiment 2, but with higher residual K, N was applied at 0, 40, and 80, P at 13, 53, and 93, K at 33, 100, and 166, all in pounds per acre. A linear response to N may have been caused by a 3.2" rain 2.5 weeks before harvest which probably leached most of the available NO_3-N from the soil. The quadratic response to P and the linear response to K were mostly an increase in larger size and a decrease in smaller size roots.

In Experiment 2, percent sucrose and alcohol insoluble solids increased linearly with K. In Experiment 3, NP, NK, and NPK interactions were significant for percent sucrose. Treatments did not significantly affect root color.

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Introduction

There seems to be limited literature on the mineral nutrition of carrots. For two consecutive years, Westgate and Forbes (15, 16) found no significant effect on yields with 13 combinations of major and minor nutrients on the peat and muck soils at Zellwood, Fla. On Leon fine sand (5), used in vegetable production for many years and which contained a high P residual, best yields were obtained with 200-250 pounds of N, 200 pounds of K_2O, and 60 pounds of MgO. In a nitrogen source study, also on Leon fine sand (4), $NH_4)_2SO_4$, urea, MagAmP, Feran 21, Uran 32 out yielded $NaNO_3$, NH_4NO_3, and castorpomice. Ureaform sources gave lowest yields. Bernstein and Ayres (2) found that carrots were very susceptible to injury by high salt concentrations in soils. Maynard *et al* (11, 12) found that a deficiency of Ca caused "cavity spot" and that the intensity of the malady was correlated with a Ca/K ratio in the growing media.

Barnes (1) found no effect of N or P on carrot color as determined by carotene content. An increase in N resulted in a decrease in sucrose whereas an increase in P slightly increased the sucrose content. In a sand culture experiment, Southards and Miller (13) found the carotene content of carrot roots to be higher when grown at low levels of N and P than at medium or high levels. Total sugars were highest in carrots grown at low levels of N, P or K.

A study was conducted to determine optimum N, P, and K levels for maximum yields and quality on Everglades organic soils so that P and K requirements for carrots grown on these soils could be predicted from soil test procedures used at the Belle Glade AREC. Nitrogen was included in two of the experiments to determine if N might be limiting. The N supplying power of these soils is usually sufficient for most vegetable crops; however, some crops have been found to need supplementary N. The experimental basis for studies with these soil tests to predict the nutrient requirements for maximum yield and quality of crops, has been well established (6, 7, 9), and correlations have been made for most crops grown in the area.

Materials and Methods

Field plots. Three orthogonal factorial experiments were conducted on new sawgrass peat soil which had been in temporary pasture of ryegrass for two to three years. Environmental factors that affected results of the two latter experiments are given in Table 1 along with planting dates. Experiments 1, 2 and 3 were conducted in 3 consecutive years. Experiment 1 was in a 3x3, P and K randomized complete block design. Treatments are given in Table 2. Experiments 2 and 3 were 3x3x3, N, P, and K, also arranged in randomized complete blocks. Materials were premixed and weighed for each 19′ x 35′ plot, broadcast by hand, and disked into the soil. Micronutrients to supply 12 Cu, 8 Zn, 8 Mn, and 1.5 B (pounds per acre) were added to all fertilizer mixes. Five beds, each 45″ in width, were thrown up across each plot and six rows of the cultivar 'Waltham Hi-Color 9' were seeded in one operation, on each bed, by the grower-cooperator. Carrots from fifteen feet of the center bed were harvested for yield and quality studies.

Soil analysis. Soil samples were taken from each plot before fertilization and again 8 weeks after treatments were applied in all experiments. They were processed for pH, P, and K according to methods used at the Belle Glade AREC (14).

Market grades. Harvested roots were graded according to marketable roots and culls. Marketable roots were separated into four grades on the basis of size, 1.5″x6″ or larger, 1.5″x4″ or more, .75″x6″ to 1.5″x6″, .75″x4″ to 1.5″x4″. Culls were separated into groups because of small size (< .75″x4″), forks, cracks, and decayed roots. Due to lack of space, only data on culls because of small size and weight of all culls are included here.

Plant analysis. Plant leaf samples were taken 60 days after seeding and at maturity. The oldest sound leaf (petiole + lamina) from 50 plants per plot were taken, dried, and ground in a stainless steel Wiley mill. Root tissue was taken at harvest from the 4 inch center portion of 10 roots of the 1.5″x6″ and .75″x6″ sizes. Nitrogen was determined by microkjeldahl, P by the molybdivanadophosphate method (8); K, Ca, Mg, Cu, Zn, Mn, and Fe by absorption spectophotometry (3); and B by the quinalizarin method (10).

Quality studies. Exp. 2. Ten carrots were taken (1″-1.25″ in diameter) from each plot and were sampled by taking an equal number of thin, transverse slices from the middle portion of each root. A 25-g sample was placed in boiling ethanol for sugar and alcohol-insoluble solids analysis. Dry weight was determined on a 50-g sample held at 158°F. Another 50-g sample was frozen for later color determination with the Hunter Color and Color Difference Meter.

Exp. 3. Ten carrots were sampled, 3/4″-1″ diameter) as above, with an additional 10-g sample frozen for soluble solids determination.

In both experiments, samples taken immediately after carrots from each plot were washed and graded at Belle Glade, were placed in polyethylene bags and cooled at 35°F. Upon completion of the washing and grading, the carrots were transported to Gainesville, Fl. and held at 35°F, until tests for quality were conducted. Sampling was done by replication over a four-day period.

Results and Discussion

Soil analysis. Results of Experiment 1 are given in Table 2. For Experiments 2 and 3, soil test before fertilization showed pH levels averaging 5.82 and 6.02 respectively and each had water soluble P residuals of 8 pounds per acre. The 0.5 *N* acetic acid soluble K residuals were 36 and 104 pounds per acre, respectively. Samples taken 60 days after fertilizer applications were excessively high in both P and

Table 1. Summary of environmental conditions with planting and harvest dates for three carrot fertility experiments.

Exp. No.	Temperature	Soil moisture	Planting date	Harvest date	Days from seeding to maturity
1	Near normal	Good	Dec. 24	April 21	120
2	Above normal	Very dry	Jan. 7	May 10	123
3	Above normal	Very dry to April 1	Dec. 20	April 16	120

Table 2. Experiment 1. Effect of varying rates of P and K on soil test results in pounds per acre and yield of carrot roots in tons (US) per acre.

Material and rate applied	Before fertilization			After fertilization		Yields, tons (US)/A	
	Soil pH	Soil test P	Soil test K	Soil test P	Soil test K	Marketable roots	Cull roots
P, pounds per acre							
44	7.05	3	23	10	162	17.7	1.2
88	7.14	3	21	16	158	20.7	0.9
132	7.05	3	24	21	158	20.5	1.0
Sig.[z]		N.S.	N.S.	**, L.	N.S.	**, Q.	N.S.
K, pounds per acre							
133	7.07	3	23	16	124	19.8	1.0
266	7.10	3	23	16	156	19.5	1.1
398	7.06	3	24	16	198	19.6	1.0
Sig.[z]		N.S.	N.S.	N.S.	**, L.	N.S.	N.S.

[z]*, ** (L. or Q.), or N.S. Differences between rates of materials are significant at the .05, .01 (Linear or Quadratic), or are not significant respectively.

K. It is believed this was due to lack of reaction between the fertilizer and soil in the extremely dry soil condition and the below normal rainfall (Table 1). Consequently, these values and results are not used here. Scores of experiments and field observations have shown that approximately 8.7 pounds of P and 1.67 pounds of K raise soil test levels 1 pound of P and 1 pound of K per acre (7) in old soil while 6.7 pounds of P and 2 pounds of K are required in the new soil used in these experiments.

Yields. Soil moisture conditions (Table 1) were good during the growth period of Experiment 1. Table 2 summarizes the results of this experiment. Yields increased to the 88 pounds rate of P, indicating that the threshold level for P was below 16 pounds water soluble P per care, but above the lowest level of 10 pounds. No significant yield effects were found due to increases in K, but as growth conditions were good, it was concluded that, under the conditions of this experiment the threshold level for K was < 124 pounds of 0.5 *N* acetic acid soluble K per acre.

For Experiment 2, summarized in Table 3, soil tests before fertilization showed 8 pounds of water-soluble P and an average of 36 pounds of 0.5 *N* acetic acid soluble K per acre. With the P and K added shown in Table 2, soil test levels after fertilization were expected to show 15, 21, and 27 pounds of P and 100, 170, and 240 pounds of K per acre. Total yields were not significantly affected by the different P or K levels. However, yields of the .75″x6″ or larger size roots were significantly increased at the intermediate level of K with a corresponding decrease in 0.75″x4″ and small size culls. This indicated, under the conditions of this experiment, an increase for K a little above the lowest level. Nitrogen did not significantly increase yields.

For Experiment 3, the residual water soluble P level before fertilization was 8 pounds per acre. The three rates of applied P given in Table 4 was expected to raise soil test levels to 10, 16, and 22 pounds per acre. The average K level by soil test before fertilization was 104 pounds K per acre and the K applied was expected to raise levels to 120, 160, and 200 pounds of 0.5 *N* acetic acid soluble K per acre. Interestingly, an increase in almost a ton of marketable roots per acre was found at the highest rate of N over the no nitrogen treatment. The increase may have been due to the leaching of available N by the 3.2 inches of rainfall on April 1, 2.5 weeks before harvest. The highest marketable yield of roots was again at the intermediate P rate, decreasing at the highest rate. The increased marketable yield was due to an increase in the 1.5″x6″ or larger grade. Effects of potassium treatments were again not pronounced although yields of the largest roots were significantly increased by the addition of K at the expense of smaller sized grades and possibly culls.

Plant analysis. Analysis of carrot leaf tissue (Table 5) sampled at 60 and 120 days is included to inform growers and others interested in tissue analysis about what to expect in carrot leaf tissue at these stages in plants grown under similar conditions. The tissue analysis (Table 6) of mature roots is also included to enable growers to "trouble shoot" in a postmortem analysis. In the leaf tissue, nitrogen application did not show up with increased N in the tissue, probably because, when sampled at 60 days, the N supply was high. By maturity, after rainfall, the N supplying power of the soil had restored any deficiencies in the plant tissue. The P content of the leaf tissue may be a good indicator of the P status of the plant and soil, but the K data indicate that potassium differences may not become pronounced until the plant is rapidly increasing in weight. Plant tissue micronutrient data are more reliable than soil tests in estimating the micronutrient status of the soil. Unfortunately the danger of an *Alternaria* leaf blight epidemic necessitated the spraying of the crop several times with Cu and Mn bearing fungicides, so leaf tissue data for these nutrients are not included. All of the elements except B were at a higher concentration in the tissue at the early sampling than at the later sampling.

Quality studies. These studies were not conducted with material from Experiment 1.

For Experiment 2, the percent sucrose increased significantly as the potassium level increased with the values

Table 3. Exp. 2. Yields in tons (U.S.)/acre of carrot roots as affected by varying rates of N, P and K applied to the soil.

Materials and rates	Total marketable	Marketable by grades			Culls	
		1.5″x6″	.75″x6″	.75″x4″	Small size	Total
N, pounds per acre						
0	16.96	0.37	11.40	5.19	2.97	4.33
40	16.39	0.34	10.13	5.88	3.19	4.72
80	16.54	0.33	10.70	5.51	3.03	4.54
Sig.[z]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
P, pounds per acre						
44	16.62	0.29	10.72	5.61	3.35	4.81
88	16.50	0.33	10.46	5.71	3.28	4.78
132	16.75	0.43	11.02	5.27	2.58	4.05
Sig.[z]	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
K, pounds per acre						
133	16.15	0.35	9.29	6.61	3.58	5.07
266	17.03	0.47	11.91	4.64	2.75	4.27
398	16.71	0.33	11.02	5.33	2.86	4.27
Sig.[z]	N.S.	N.S.	**, Q.	**, Q.	**, Q.	**, Q.

[z]*, ** (L. or Q.), or N.S. Differences between rates of a particular material are significantly different at the .05, .01 (Linear or Quadratic), or not significant respectively.

Table 4. Exp. 3. Carrot yields in estimated tons (U.S.)/acre of marketable grades and culls as affected by varying rates of N, P, and K applied to the soil.

Materials and rates	Total Marketable	Marketable roots by size				Culls	
		1.5"x6"	1.5"x4"	.75"x6"	.75"x4"	Small size	Total
N, pounds per acre							
0	16.54	5.40	.299	7.43	4.31	.840	3.03
40	16.72	3.87	.295	8.03	4.52	.867	2.60
80	17.47	4.40	.314	8.32	4.44	.786	2.78
Sig.[z]	*, L.	N.S.	N.S.	*, L.	**N.S.**	N.S.	N.S.
P, pounds per acre							
13	17.11	3.97	.254	8.36	4.53	.819	2.83
53	17.26	4.84	.352	7.77	4.30	.825	2.69
92	16.34	3.95	.302	7.65	4.44	.849	2.88
Sig.[z]	*, Q.	*, Q.	N.S.	N.S.	N.S.	N.S.	N.S.
K, pounds per acre							
33	16.84	3.54	.194	8.14	4.97	.964	3.02
100	16.68	4.61	.341	7.63	4.10	.721	2.71
166	17.19	4.61	.372	8.02	4.19	.808	2.66
Sig.[z]	N.S.	*, L.	**, L.	N.S.	*, L.	N.S.	N.S.

[z]*, ** (L. or Q.), or N.S. Differences between averages on rates of the same materials are significantly different at the .05, .01, (Linear or Quadratic), or are not significantly different respectively.

being 1.8, 1.9, and 2.0% for the low, middle and high level, respectively. There was no effect of nitrogen or phosphorus.

The percent dry weight increased significantly with potassium level with the values for the low, middle, and high levels being 11.6, 11.9, and 12.2%, respectively. Roots at the low level of phosphorus had a significantly higher dry weight (12.2%) than the two higher levels (11.8% each).

The percent alcohol-insoluble solids of roots produced at the low potassium level (4.4%) was significantly lower than the middle level (4.6%) and the high level (4.8%).

Root color was not affected by either nutrient.

For Experiment 3, there was no individual nutrient effect on sucrose but the NK, NP, and NPK interactions were highly significant. The percent sucrose increased when nitrogen was added at the low potassium level (Table 7), whereas nitrogen additions decreased sucrose at the two higher K levels, at the low P level and at the high K and high P level. Increasing K at the low N level increased sucrose at all P levels, whereas at the high N level, sucrose decreased with K increase at the low and high levels of P.

There was no practical difference in dry weight due to treatment.

Table 5. Exp. 3. Carrot leaf tissue content (dry wt. basis) of several macro and micro-nutrients at two sampling dates as affected by rates of N, P and K applied to the soil. Differences between fertilizer rates are significant only where indicated.

Nutrient,[x] and days from seeding		K pounds/acre			P pounds/acre			N pounds/acre		
		33	100	166	13	53	92	0	40	80
% N,	60	5.23	5.16	5.16	5.12	5.14	5.29	5.16	5.09	5.30
	120	3.44	3.47	3.50	3.29	3.59	3.53	3,48	3.45	3.48
% P,	60	.58	.58	.58	.55	.58	.61[z]	.57	.58	.59
	120	.31	.30	.30	.21	.31	.38[z]	.29	.31	.30
% K,	60	5.06	5.25	5.30	5.29	5.21	5.10	5.23	5.22	5.16
	120	3.01	3.11	3.60[z]	3.40	3.10	3.22	3.15	3.27	3.30
% Ca,	60	1.57	1.49	1.44	1.48	1.46	1.56	1.47	1.57	1.46
	120	1.10	1.06	1.10	1.07	1.09	1.10	1.09	1.07	1.09
% Mg,	60	.46	.43	.43	.44	.43	.45	.44	.45	.43
	120	.32	.32	.34	.30	.34	.33	.33	.32	.33
B, ppm	60	31	32	30[y]	32	31	30	31	32	30
	120	36	37	35	36	37	35[y]	35	36	37[z]
Zn, ppm	60	88	98	85	99	77	96[y]	81	94	97
	120	41	40	41	43	41	39	37	41	44[z]
Fe, ppm	60	125	127	121	126	116	131	119	127	126
	120	66	70	72	68	70	69	67	66	74

[z]Significant linear increase or decrease at the .05 level or higher.
[y]Significant quadratic response at the .05 level or higher.
[x]Copper and manganese were freely applied to the foliage of these plants in the disease control program and these values are not given.

Table 6. Exp. 3. Carrot root content at harvest (dry weight basis) of several plant nutrients as influenced by nitrogen, phosphorus, and potassium treatments.

Material and rate	Nutrient[z] % N	% P	% K	% Ca	% Mg	ppm B	ppm Mn	ppm Cu	ppm Zn	ppm Fe
K, pounds per acre										
33	2.29	.55	3.80	.36	.18	30	6.2	6.0	41	35
100	2.23	.56	4.15	.34	.19	30	7.0	5.9	46	38
166	2.28	.53	4.44	.34	.19	31	7.1	6.9	37	36
Sig.	N.S.	N.S.	y**	N.S.	N.S.	N.S.	y*	y*	N.S.	y*
P, pounds per acre										
13	2.19	.45	4.04	.34	.17	31	6.6	6.6	41	36
53	2.27	.57	4.04	.35	.19	31	6.8	6.1	41	37
92	2.34	.62	4.30	.34	.19	30	6.9	6.0	42	36
Sig.	y**	y**	y*	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
N, pounds per acre										
0	2.25	.53	3.97	.34	.19	30	6.4	6.4	42	37
40	2.26	.56	4.24	.33	.18	31	6.9	6.2	39	36
80	2.29	.54	4.18	.33	.19	31	7.0	6.2	44	36
Sig.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

[z]Copper and manganese were applied to the foliage in the pest control program.
[y]* or **. Significant linear increase or decrease at the .05 or .01 level, respectively.

Table 7. Exp. 3. Percentage sucrose of carrot tissue (fresh weight basis) grown on varying N, P and K levels.[z]

P applied	13			53			96		
N applied	0	40	80	0	40	80	0	40	80
K applied:									
33	1.1	1.2	1.3	0.9	1.4	1.2	1.2	1.3	1.3
100	1.6	1.4	1.3	1.1	1.3	1.2	1.3	1.1	1.2
166	1.4	1.1	1.2	1.2	1.0	1.5	1.4	1.4	1.0

[z]N x P x K interaction significant at the .01 level.

The percentage alcohol-insoluble solids of the low P level (4.3) was significantly higher than the middle (4.2) and high (4.2) levels. There was no effect of N and K.

Color was not affected by N, P, or K levels.

Conclusions

Extremely dry soil conditions of Experiments 2 and 3 nullified value of tests taken after fertilizer was applied. However, experience with these soil tests in many fertilizer experiments enables interpretation of data obtained.

The results of three factorial fertilizer experiments with carrots in bed culture on the organic soils of the Everglades indicated the following:

1. The threshold level for P by soil test methods used at IFAS AREC, Belle Glade is near 15 pounds of water soluble P per acre.
2. The threshold level for K is probably near 125 pounds 0.5 *N* acetic acid soluble K per acre.
3. Carrots may respond to supplementary nitrogen following heavy rains even in loose well-aerated soil.
4. Leaf tissue tests on carrots may be valuable on organic soils for the following purposes:
   a) To determine P status of the plant and soil as found in the tissue taken 60 days after seeding.
   b) To determine micronutrient status of the plants and soil for micronutrients not used in the pest control program.
5. Along with leaf analysis, root analysis may be used in "postmortem" diagnosis of limited yields due to nutritional troubles.
6. Tissue tests are most profitably used in conjunction with soil tests for verification of the predicted nutrient requirement and further adjustment of nutrient levels at an early stage of growth.
7. Nitrogen deficiencies can be diagnosed when they are occurring by methods of N determination used here. However, on soil with high N supplying power, deficiencies may be missed by these methods. Perhaps a quick tissue test for NO_3-N would be more flexible.
8. Fertilization does affect quality in very complex nutrient interactions.

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AQUATIC CROPS VS. ORGANIC SOIL SUBSIDENCE[1]

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Additional index words. poisonous snakes.

Abstract. **South of Lake Okeechobee lies the largest contiguous expanse of organic soil in the world. This soil is being lost (subsiding) as a result of microbiological oxidation at the rate of 10 to 12 in. (25-30 cm.) per decade. Much of the 700,000-acre (280,000-ha.) Everglades Agricultural Area gion will be unsuitable for conventional farming in 25 years. Adoption of aquatic and semi-acquatic crops can extend the agricultural productivity of this and other similarly affected regions indefinitely.**

There is an existing demand and ready market for Asiatic vegetables such as water spinach (Ipomoea aquatica) **and Oriental water chestnut** (Eleocharis dulcis). **Swamp fern** (Ceratopteris thalictroides) **is a popular tropical vegetable well suited to the Florida climate. It may be possible to develop wild rice** (Zizania aquatica) **as a mechanized, high-revenue crop. Jungle rice** (Echinochloa colonum) **could afford nourishing wetland pasture. Experimental culture of some of these and other soil-saving aquatics has been undertaken at AREC-Belle Glade.**

South of Lake Okeechobee lies the largest contiguous expanse of organic soil in the world. This soil, formed of decomposed sawgrass and other marsh plants, is light, fibrous peat which, when drained, begins to shrink from dehydration, settlement and compaction, and, most of all, microbiological oxidation. As a result of fifty years of drainage, this Everglades peat is bein gsteadily lost, subsiding at the rate of 10-12 in. (25-30 cm.) per decade. The soils farthest from the Lake are thinnest and will be the first to disappear entirely (26), exposing the underlying formation of limestone—impermeable in the northern portion, porous in the southern portion (25). It is estimated that much of the 700,000-acre (280,000-ha.) Everglades agricultural region (half now in sugarcane) will be unsuitable for conventional farming in another 25 years (4, 25). (Table 1). The economic impact of such a disaster would extend far beyond the communities bordering the southern end of the Lake.

The rate of soil loss by oxidation is inversely related to the water table (25, 26). Maintenance of water tables at a depth of a few inches (cms) or actually flooding the area will slow down oxidation and halt soil subsidence. This remedy does not mean that agricultural activity must be abandoned. Adoption of aquatic and semi-aquatic crops could extend the productivity of the Everglades, and other similarly affected regions, indefinitely. While a sudden changeover from conventional agriculture is not recommended, it must be recognized that the sooner a shift is made the better in critical areas to protect what soil remains, and also that the costs of raising traditional crops will increase as soils become shallower and yields decrease. Crops that may not presently appear competitive with standard produce may thus become more so in time.

Table 1. Extent of Everglades agricultural area with 1 ft. (30 cm.) or less of organic soil—past, present and estimated future at current rate of subsidence.

Year	Area	
1912	633 acres	(264 ha.)
1925	3,800 "	(1,583 ha.)
1940	5,000 "	(2,083 ha.)
1950	10,800 "	(4,500 ha.)
1960	28,000 "	(11,667 ha.)
1970	67,700 "	(28,208 ha.)
1980	105,000 "	(43,750 ha.)
1990	170,900 "	(71,208 ha.)
2000	286,700 "	(119,458 ha.)

Calculated from Stephens, J. C. and L. Johnson. 1951. Subsidence of organic soils in the upper Everglades region of Florida. *Proc. Soil Sci. Soc. Fla.* 11:191-237.

There is an existing demand and ready market in this country for certain Asiatic and tropical American vegetables which are ideal crops for wetlands. Some of these are already being grown in southern Florida in a very limited way, especially by Chinese and Cuban farmers. Experimental culture of some of these and other soil-saving aquatics has been undertaken at AREC-Belle Glade.

As an example of what can be done—WATERCRESS, *Nasturtium officinale* R. Br., a native of northern Asia and Europe and widely cultivated in temperate and subtropical regions of the world, has recently become established as a crop in Florida. There have been small commercial plantings at Moultrie, on the St. Johns River, at St. Augustine, Boynton and near Belle Glade and Clewiston, and there have been trial plantings near Ft. Lauderdale. The largest operation is that of B & W Growers at Oviedo. The owners, large-scale growers in Pennsylvania, have found that watercress can be grown here by means of water flowing from artesian wells into ditches 40 ft. (12 m.) wide and 300 ft. (91.5 m.) long. The plants are started in dry beds and the water level gradually increased. Pesticide spraying is done by helicopter. Harvesting is manual but preparations are being made for mechanical harvesting. A caterpillar has been a serious pest in some plantings; but the main obstacle seems to be the prevalence of water moccasins. One farmer has found that if he stamps on the ground, causing the typical tremor in Everglades peat, these poisonous snakes are scared away and he can work his plot safely.

One of the most appealing of tropical wetland vegetables is WATER SPINACH, *Ipomoea aquatica* Forsk. (*I. reptans*

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