

Effect of Organic and UAN-32 Fertilization on Bok Choy and Soil Properties



Touyee Thao and Dave Goorahoo
Department of Plant Science, California State University, Fresno.



INTRODUCTION

- * California leads the nation in agricultural production with over three hundred crops produced annually.
- * Among these crops are specialty vegetables such as Bok Choy, Daikon, Bitter Melons and Nappa cabbage which are commonly grown by the South East Asian Community (SEAC).
- * With the need to increase production and remain competitive in the local, national and global markets, these SEAC growers are often turning to excessive agro-chemical applications to ensure high yields and early maturity.
- * These growers are also faced with environmental regulations, particularly linked to nitrate contamination of water resources.

OBJECTIVE

To evaluate the effect of Organic fertilizer (Phyta Grow 12-0-0) and inorganic (UAN-32) fertilizer on (i) yield of Bok Choy, (ii) soil pH and electrical conductivity, (iii) and soil Nitrate (NO₃)

METHOD AND MATERIAL

Location: Fresno State. A sandy loam soil was used in a greenhouse (pot) study.

DAT: Bok Choy seeds were planted in early November 2011(0 DAT).

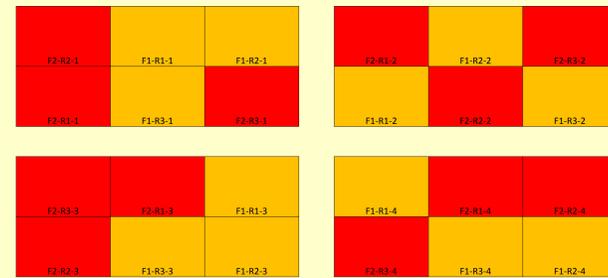
Fertilizer Treatments: Inorganic fertilizer (UAN-32) and Organic fertilizer (Phyta Grow 12-0-0).

Fertilizer Rates: Fertilizer rates were 30, 90 and 150 lbs N/ac.

Irrigation: Irrigation was based on the crop- evapo transpiration (ET_c) requirements, determined primarily by the soil moisture levels in the top four inches in the pots, and visual observation of either leaf turgidity or wilting.

Experimental Design: The experimental setup was a completely randomized block design (CRBD) comprising of 4 blocks of 6 pots each (2 fertilizers x 3 rates). (Fig. 1)

METHOD CONT'D



F1= Fertilizer 1 UAN 32			F2= Fertilizer 2 Phyta Growth 12-0-0		
Rate 1	30 lbs N/ac		Rate 1	30 lbs N/ac	
Rate 2	90 lbs N/ac		Rate 2	90 lbs N/ac	
Rate 3	150 lbs N/ac		Rate 3	150 lbs N/ac	

Figs. 1



Figs. 2. Pictures of Bok Choy research project.

Soil and plant analyses:

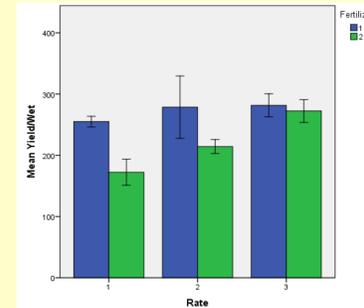
- Soil: EC, pH, and Nitrate (NO₃)
- Plant: Yield, SPAD

RESULTS

Pots	Fertilizer	Rates	Rep	Yield/Wet	Yield/ Dry	EC	pH	Avg SPAD	NO ₃
1	F2	R2	1	218.5	11.1	4.1	7.75	39.9125	12
2	F1	R1	1	243.3	12.5	3.27	7.77	40.6875	1
3	F1	R2	1	218.8	11.1	0.8	7.85	41	6
4	F2	R1	1	141.4	8.3	1.99	7.78	34.1625	1
5	F1	R3	1	307.6	12.3	2.26	7.91	39.675	6
6	F2	R3	1	274	12.8	2.03	7.85	43.7375	11
7	F2	R1	2	213	13.7	1.21	7.94	37.8	1
8	F1	R2	2	380.4	18.3	1.79	7.48	41.6125	8
9	F2	R3	2	239	14.2	3.65	7.73	32.5875	1
10	F1	R1	2	271.9	14.5	2.49	7.83	37.075	6
11	F2	R2	2	232.2	12.1	0.9	8.11	36.975	1
12	F1	R3	2	129	9.3	1.62	7.91	30.375	1
13	F2	R3	3	303.5	17.8	2.91	8.05	35.9	12
14	F2	R1	3	163.2	10.3	1.99	7.94	37.6875	1
15	F1	R1	3	249.9	16.5	1.2	8.07	40.275	5
16	F2	R2	3	193.1	10	3.25	7.83	38.4	10
17	F1	R3	3	245.3	11.1	1.79	7.94	47.25	1
18	F1	R2	3	236.7	16.1	2.52	7.98	38.6875	1
19	F1	R1	4	119.2	6.8	0.49	8.05	42.7875	1
20	F2	R1	4	72	5.7	1.47	7.91	33.4125	1
21	F2	R2	4	160.7	11.2	0.97	7.93	41.925	11
22	F2	R3	4	141.6	8.9	1.14	8.03	37.7375	1
23	F1	R3	4	292.5	13.9	0.96	7.89	39.375	7
24	F1	R2	4	101.7	8.6	2.22	7.86	40.75	6

Table 1. Data's Collected

RESULTS CONT'D



• At harvest, there were significant differences in yield due to both fertilizer type ($P= 0.03$) and application rates ($P= 0.09$) with the mean weight of Bok Choy heads being 275 ± 16 g and 219 ± 20 g for the plants treated with the UAN-32 and ORG-12, respectively. (Fig. 3)

Fig. 3. Bok Choy yield correspond to fertilizers rates

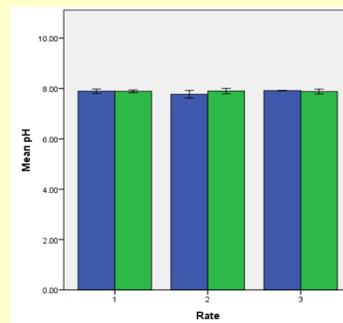


Fig. 4. Mean for soil pH

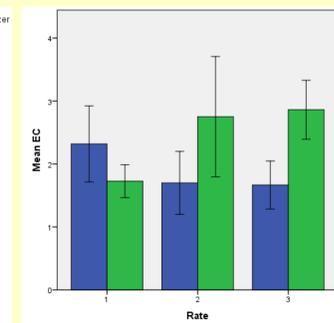


Fig. 5. Mean for soil EC

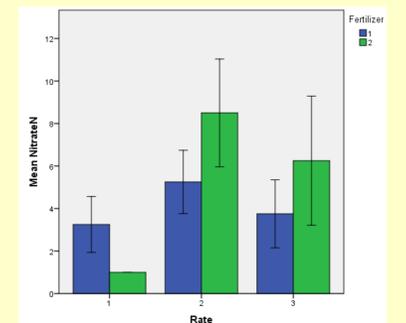


Fig. 6. Mean for soil Nitrate (NO₃)

• There was no significant difference in soil pH ($P= .697$) to fertilizers types and application rates ($P= .808$) (Fig. 4)

• There was no significant difference in soil EC ($P= .394$) to fertilizers types and application rates ($P= .868$) (Fig. 5)

CONCLUSIONS

• The result show that inorganic fertilizer (UAN-32) have a higher yield on Bok Choy crop as compare to slow release (Phyta Grow 12-0-0) organic fertilizer.

• There is an effect on Bok Choy yield at different fertilizer rates (30, 90 and 150 lbs N/ac) for both organic and inorganic fertilizer. (Fig. 3)

• However at 90 lbs and 150 lbs N/ac, (UAN-32) inorganic fertilizer have comparable yield. Concluding that 150 lbs N/ac for Bok Choy isn't necessary. (Fig. 3)

• At 150 lbs N/ac, (Phyta Grow 12-0-0) organic fertilizer yield similar result to inorganic fertilizer at 90 lbs and 150 lbs N/ac.

• In this experiment there was no significant difference in soil pH and EC as a result of the fertilizer treatments. (Fig.3&4)

• These findings are encouraging as SEAC growers seek out innovative fertilization technique for enhancing vegetable production

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CORRESPONDING AUTHORS: touyee1@mail.fresnostate.edu