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Response of Mulched Cauliflower, Lettuce, and Squash to Radifarm Biostimulant 99-01

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Material and Methods

Research with lettuce, cauliflower, and squash response to Radifarm biostimulant (LidoChem, Inc., Hazlet, NJ) was carried out at the University of Florida Horticultural Research Unit in Gainesville, FL during the fall-winter season of 1998. The objective was to evaluate crop response to foliar sprays of Radifarm biostimulant.

The soil used for the research was an Arredondo fine sand that tested (Mehlich-1) medium-low in K, high in P, Mg, Ca and micronutrients, with a pH range from 6.4 to 6.8. The soil was plowed and disked in preparation for fertilization and bedding. Beds were formed on 4-ft. centers with a combination rototiller-bed press. Final beds were 6 inches in height and 24 inches across the top. During rototilling, 300 lbs. per acre of a 13-4-13 (N-P_2O_5-K_2O) complete analysis fertilizer (IMC, Tifton, GA) was incorporated in the soil. Beds were fumigated with methyl bromide, and drip-irrigation tube (Chapin Watermatics, Inc., Watertown, NY) with 12-inch emitters, 0.4 gal/100 ft./min and 10 mil. thick walls was placed on center surface of bed. Beds were covered with black polyethylene mulch (0.5 mil. thick) (Sonoco, Mt. Olive, NC).

Lettuce ('South Bay') and cauliflower ('Candid Charm') transplants were planted on 13 Oct. and squash (Zucchini) seeds were planted on 15 Oct. 1998. Lettuce was planted in twin-row fashion with 12 inches between plants and 12 inches between rows. Cauliflower was also planted in twin-rows with 24 inches between plants and 12 inches between rows. Squash was planted in twin-row fashion on 18-inch spacing. Plot lengths were 20 ft. long for lettuce and 25 ft. long for both cauliflower and squash.

Foliar treatments of Radifarm biostimulant were applied according to the following rates and schedule:

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Table 1. Treatments used in Radifarm studies, fall 1998, Gainesville, FL.

Treatment No.	Description
- Lettuce and Cauliflower -	
1.	Control - water only.
2.	Radifarm at transplanting at 600 ml/1000m^2.
3.	Radifarm at transplanting at 600 m./1000m^2 plus injection of 600 ml/1000m^2 seven days later.
4.	Radifarm at transplanting at 1000 ml/1000m^2.
5.	Radifarm at transplanting at 1000 m./1000m^2 plus injection of 600 ml/1000m^2 seven days later.
- Squash -	
1.	Control - water only.
2.	Radifarm at transplanting at 200 ml per plant of a solution of 250 ml Radifarm in 100 liter water.
3.	Radifarm as #2 plus injection of 600 ml/1000m^2 seven days later.
4.	Radifarm at transplanting at 600 ml/1000m^2.
5.	Radifarm at transplanting at 600 ml/1000m^2 plus injection of 600 ml per 1000 m^2 seven days later.
There were five replications for each of the above treatments for each of the three crops.	

Irrigation was supplied by drip irrigation to maintain soil moisture potential at -10 cb on a tensiometer with the ceramic tip placed 6 inches deep in the soil in the root zone. Diseases and insects were controlled by timely applications of labeled pesticides.

Fertilizer injections were made on a weekly basis through the growing season as recommended in the Vegetable Production Guide for Florida published by the University of Florida.

On 2 Nov. and 17 Nov., two whole lettuce plants and roots were sampled for dry weight measurements and on 2 Nov. and 19 Nov. for cauliflower. On 2 Nov. and 20 Nov., two whole squash plants and roots were sampled for dry weight measurements.

Lettuce heads were harvested at maturity on 2 Dec. then weighed and graded for firmness, tip burn, and stem length. Cauliflower was harvested at maturity on 15 Dec., again on 20 Dec., and weighed. Squash fruits were harvested every third day from 20 Nov. to 20 Dec. Fruits were graded into marketable (well shaped, no defects) and

unmarketable, then counted and weighed. At harvest, whole leaves were analyzed for N, P, and K concentrations. All data were analyzed by analysis of variance.

Results

Treatments had no effect on lettuce yields, firmness, tipburn, or internal stem length (Table 2). Lettuce root growth was not improved as measured by root:shoot ratios.

Table 2. Response of Lettuce to Radifarm biostimulant, fall 1998, Gainesville, FL

Treatment	Firmness rating [z]	Tipburn rating [y]	Stemlength inches [x]	Root:shoot ratios (dry wt)		Yield 50-lb ctn/acre
				2 Nov	17 Nov	
1	2.7	4.2	2.8	0.090	0.053	310
2	2.9	3.7	3.1	0.100	0.045	270
3	2.6	4.3	2.6	0.133	0.048	295
4	2.7	4.2	3.3	0.083	0.043	290
5	2.8	4.2	3.2	0.073	0.045	310
Prob.	0.9582	0.5619	0.3538	0.6322	0.6765	0.7787
Significance	NS	NS	NS	NS	NS	NS

[z] Firmness rating 1=firm; 5= loose.
[y] Tipburn rating 1=serious; 5=none.
[x] Stemlength=length of internal stem core.

Cauliflower yield was not affected by treatment (Table 3). Growth and yield of cauliflower was very good and yields with all treatments were similar. Root:shoot ratios were similar with all Radifarm treatments.

Table 3. Response of cauliflower to Radifarm biostimulant, fall 1998, Gainesville, FL.

Treatment	Root:shoot ratios (dry wt.)		Yield 23-lb ctns./acre
	2 Nov	19 Nov	
1	0.088	0.095	1220
2	0.085	0.085	1315
3	0.083	0.083	1200
4	0.083	0.090	1140
5	0.085	0.090	1220
Prob.	0.9909	0.9147	0.6510
Significance	NS	NS	NS

Neither squash yield variable measured was affected by treatment (Table 4). Root:shoot ratio was not affected by Radifarm biostimulant.

Table 4. Response of zucchini squash to Radifarm biostimulant, fall 1998, Gainesville, FL.

Treatment	Root:shoot ratio (dry wt.)		Yield (42-lb ctn./acre)		
	2 Nov	20 Nov	No 1 Grade	No 2 Grade	Total Market
1	0.055	0.010	155	125	280
2	0.060	0.013	140	80	220
3	0.035	0.015	150	85	235
4	0.068	0.010	170	70	240
5	0.045	0.013	160	30	190
Prob.	0.4905	0.4449	0.9388	0.2659	0.3621
Significance	NS	NS	NS	NS	NS

In summary, for three vegetable crops studied, Radifarm biostimulant did not influence plant growth, yield, or root growth at the rates used in this study. For all crops leaf tissue concentration of N, P, and K at harvest was adequate and no treatment effects were noted except for squash where P concentration in leaves was greatest with treatment 2 and lowest with treatment 5.

Table 5. Whole-leaf tissue N, P, and K concentrations at harvest.

Crop	Treatment	Whole-leaf conc. (%)		
		N	**P**	**K**
Lettuce	1	4.1	0.30	7.8
	2	4.2	0.30	8.2
	3	4.3	0.33	8.1
	4	4.3	0.30	7.9
	5	4.5	0.33	7.1
	Significance	NS	NS	NS
Squash	1	4.4	0.93	4.4
	2	4.8	1.00	4.9
	3	4.5	0.98	4.8
	4	4.4	0.98	4.7
	5	4.5	0.90	4.7
	Significance	NS	*	NS
Cauliflower	1	4.3	0.63	1.9
	2	4.2	0.65	1.8
	3	3.8	0.60	1.9
	4	3.7	0.58	1.9
	5	3.7	0.60	1.9
	Significance	NS	NS	NS