

Differences in Organic Fertilizer Response

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Geraniums at 65 Days After Planting



Sustane 8-4-4 at 0.93 lb. N per cu. yd. =
12 lb. Sustane per cubic yard of media



Par 4 9-3-5 at 1.13 lb. N per cu. yd. =
12.6 lb. Par 4 per cubic yard of media

Organic Fertilizer Trials on Geraniums: Geraniums grown with Sustâne 8-4-4 and Par 4 9-3-7

Trial Performed at The Ohio State University, 2010 • Claudio Pasian, Ph.D.
Report Prepared by Jon Sammons, Director of Research, Sustâne Natural Fertilizer

Trial Summary: The results suggest a grower can produce a more vigorous geranium (nearly double shoot dry weight) with no difference in plant quality, flower number, or relative chlorophyll content (SPAD) using 15% less nitrogen when geraniums are fertilized with Sustâne 8-4-4 compared to Par 4 9-3-7 (Table 1).

Table 1. Trial Result Summary – Comparison of the best performing treatments of Sustâne 8-4-4 and Par 4 9-3-7.

Treatment	Trt. Rate	Dry Wt. (g)	Quality Rating	Flower Number	SPAD
Sustâne 8-4-4	0.96 lb. N	9.6a ²	3.3a	1.0a	45.1a
Par 4 9-3-7	1.13 lb. N	4.9b	3.5a	0.3a	46.8a

² Means within the same column followed by different letters are significantly different according to Student-Newman-Keuls at $\alpha=0.05$.



Sustâne 8-4-4

Applied at 0.96 lb. actual nitrogen*
per yd³ potting substrate
65 Days after Planting

*N rate = 12 lb. Sustâne per cu. yd.



Par 4 9-3-7

Applied at 1.13 lb. actual nitrogen
per yd³ potting substrate
65 Days after Planting

*N rate = 12.6 lb. Par 4 per cu. yd.

Organic Fertilizer Trials on Geraniums: Geraniums grown with Sustâne 8-4-4 and Par 4 9-3-7

Objective:

Evaluate the performance (shoot dry weight, plant quality, number of flowers, and relative chlorophyll content) of geraniums fertilized with Sustâne organic 8-4-4 and Par 4 organic 9-3-7.

Material and Methods:

The study was performed in the Howlett Hall Greenhouse on the Columbus, Ohio campus of The Ohio State University. Geranium plugs were transplanted into 6.5-inch diameter plastic containers on July 14, 2010. The potting substrate was a commercially available soilless mix (70% peat moss : 30% perlite, by vol.) with no nutrient charge. Prior to transplanting, potting mix was amended with Sustâne 8-4-4 or Par 4 9-3-7 according to manufacturer's recommended rate (1x). Three additional incorporation rates were also evaluated; 0.5x, 0.75x, and 2x. Rates for both Sustâne 8-4-4 and Par 4 are listed in Table 2. Throughout the study, plants were hand watered to maintain adequate soil moisture.

At the conclusion of the experiment, September 18, 2010, plants were assigned a quality rating, foliage was measured for SPAD reading (using Minolta SPAD meter), total number flowers were recorded, and plant shoot dry weight was obtained. For quality rating, a numerical value between 1 and 5 was assigned to each plant, where 1 indicated lowest quality and 5 indicated the greatest quality; minimum rating of 3 indicated plants of "salable" quality. SPAD measurements, or relative chlorophyll content, reported are the average value of three leaves per plant, arranged throughout the canopy (1 bottom leaf, 1 middle leaf, and 1 top leaf). Flower number was obtained by counting the number of open flowers on each plant and is reported as average number of flowers per plant. Shoot dry weight was obtained by harvesting all plant material above the soil surface, placing shoots of each plant in a paper bag, and oven drying to constant weight at 55 C and was reported as average dry weight (g) per plant. Linear regression procedures within Sigmaplot were used to describe changes in dry weight, quality, flower number, and SPAD with varying rates of fertilizer. Data were analyzed using ANOVA procedure within Sigmaplot and means were separated using Student-Newman-Keuls test at $\alpha=0.05$ level of significance.

Results and Conclusion:

Plants fertilized with Sustâne 8-4-4 exhibited a linear increase in shoot dry weight, quality rating, and SPAD with increasing fertilizer rate while, plants fertilized with Par 4 9-3-7 resulted in a linear decrease in shoot dry weight, quality rating, and SPAD with increasing fertilizer rate (Table 2). There was no relationship between fertilizer rate and flower number for either of the fertilizers tested (Table 3). Of the incorporation rates tested, the best performing rate for Sustâne 8-4-4 and Par 4 9-3-7 was the 2x rate (0.96 lb. N/yd³) and the 0.5x rate (1.13 lb. N/yd³), respectively.

Shoot dry weight of plants grown with Sustâne 8-4-4 at the 2.0x rate were almost twice the size of plants grown with Par 4 9-3-7 at the 0.5x rate (Table 2). Plants had equal quality rating, number of flowers and, relative chlorophyll content (SPAD) when grown with Sustâne 8-4-4 and Par 4 9-3-7 at 2.0x and 0.5x rates, respectively (Table 2). The results suggest Sustâne 8-4-4 may be more efficacious at lower nitrogen rates than Par 4 9-3-7, as geraniums with twice the dry weight and with equal quality, flower number and SPAD were produced with Sustâne 8-4-4 using 15% less nitrogen per cubic yard of potting substrate compared to the best performing Par 4 9-3-7 rate.

Table 2. Geranium dry weight, quality rating, flower number, and SPAD when fertilized with Sustane 8-4-4 and Par 4 9-3-7, each incorporated at four rates per cubic yard of potting substrate.

Treatment	lb. Fertilizer per yd ³	lb. Nitrogen per yd ³	Dry Weight (g)	Quality Rating	Flower Number	SPAD	
Sustane 8-4-4	2.0x	12.0	0.96	9.6a²	3.3b	1.0a	45.1ab
	1.0x	6.0	0.48	6.9b	2.3c	1.0a	31.6bc
	0.75x	4.5	0.36	5.1c	1.8d	0.7ab	32.0bc
	0.5x	3.0	0.24	3.7c	1.4d	0.3ab	27.5c
Linear Regression			<0.0001	<0.0001	NS	<0.0001	
Par 4 9-3-7	2.0x	50.0	4.50	0.8d	1.4d	0.0b	13.4d
	1.0x	25.0	2.25	3.8c	3.0b	0.0b	44.8 a
	0.75x	18.8	1.69	4.6c	4.1a	0.3ab	47.6a
	0.5x	12.55	1.13	4.9c	3.5b	0.3ab	46.8a
Linear Regression			<0.0001	<0.0001	NS	<0.0001	

² Means within the same column followed by the same letter are not significantly different according to Student-Newman-Keuls at $\alpha=0.05$.