PANSY GROWTH AND MINERAL NUTRIENT CONTENT

Daniels10-4-3 vs. Traditional Inorganic Fertility

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Introduction

In the fall of 2000, with the assistance of 4 excellent Georgia growers, Progress Grower Supply evaluated the performance of pansies fertilized with Daniels 10-4-3 fertilizer. Daniels is a liquid fertilizer formulated from an oil seed extract base. This fertilizer has been extensively trialed throughout the US, but data reported from these trials has been primarily in a documentary form. The objective of the fall 2000 trials was to evaluate the performance of this fertilizer in a number of production environments and to have media, tissue and plant growth comparisons performed by an independent evaluator. In this case, analysis and evaluations were performed by Micro-Macro Analytical Laboratory in Athens Ga.

Pansies were grown at 4 locations. Two locations were in the metropolitan Atlanta area, one in N. Central Georgia and the other in S.E. Georgia. The 4 growers that participated in this trial were excellent pansy growers and the Daniels 10-4-3 was compared to their standard fertility programs. Nitrogen supplied from the Daniels fertilizer was equal the N supplied in the growers standard fertility program. Growers, at the various trial locations, grew different pansy varieties and had different planting schedules, but within each location, pansies used for the fertilizer comparison were planted on approximately the same date.

Results and Discussion:

Table 1 presents the fresh weights of pansies obtained from the 4 trial locations. In each trial, fertilization with the Daniels 10-4-3 produced larger plants with greater fresh weight than the pansies fertilized with the growers standard fertilizer. Increases in fresh weight varied from 11.66% with the Majestic Giants to 24.60% with the Delta Yellow variety. Consistently, all pansy varieties tested, at all locations, were more compact, with less internode elongation and more axillary breaks than that observed with the growers standard fertilizer.

Media and Tissue Analysis:

Saturated media extract (SME) analysis of pansy media obtained from the various trial locations is reported in Table 2. The saturated media extract procedure is a method that determines the soluble nutrients that are immediately available to plants. With few exceptions, nutrient levels did not vary greatly between treatments. However, the slight differences that were observed did result in consistently lower ECs (soluble salts) with the Daniels treatment. This may have been due to the increased nutrient uptake by the larger plants plant grow and/or a portion of the plant nutrients were in an organic form (non ionic) that is not detected by soluble salts measurements. Growers should be advised that media EC values may be lower than that observed with conventional inorganic fertilizers when plants are fertilized with similar rates of Daniels. Location #4 (Table 2) is a good example, EC values with Daniels fertilization was 1.3. Fertilization with similar N rates of Excel 15-2-20 resulted in an EC of 2.1.

Similar observations have been reported from other trials evaluating Daniels fertilizer and growers should not attempt to obtain high EC's values when fertilizing with this product. EC values stated on the Daniels label are ~40% less than comparable EC values of inorganic fertilizers. Common sense should be used here, if a grower is obtaining adequate growth with this product, do not be overly

Table 1: Fresh weights of pansies grown at 4 Georgia production locations. Growers standard fertility program v. Daniels 10-4-3.

Variety	Fertilizer	Fresh Weight (grams/plant)	% increase/decrease
Crystal Bowl Yellow	Total Grow 20-0-15	8.5	
Crystal Bowl Yellow	Daniels 10-4-3	10.5	+19.04 %
Dark Eyed Lemon	Excel 15-2-20	2.6	
Dark Eyed Lemon	Daniels 10-3-4	3.1	+16.12 %
Delta Yellow	Excel 15-2-20	6.1	
Delta Yellow	Daniels 10-3-4	8.1	+24.60 %
Majestic Mixed	Excel 15-2-20	5.83	
Majestic Mixed	Daniels 10-3-4	6.60	+11.66 %

concerned if EC values are lower than that observed with similar rates of inorganic fertilizers. In this trial, there were no consistent differences in media pH values when plants were fertilizer with the growers standard fertilizer or Daniels.

With the exception of Iron, results from tissue analysis of pansies (Table 3) fertilized with the grower's standard fertilizer or Daniels 10-4-3 were quite similar. This is surprising because a substantial growth response was observed with the Daniels fertilizer treatments. Increased Iron content of plant tissue has also been reported in turf fertilized with Daniels. The substantial differences in plant growth were probably not due to the increased Iron alone. Pansy plants from all treatments contained sufficient levels of Iron and the shorter internodes and increased axillary breaks observed with pansies receiving Daniels are not consistent with the benefits of elevated Iron.

In addition to mineral nutrients, seed endosperm contains many complex organic compounds that are beneficial to the plant growth. In this authors opinion, the organic fraction (soybean seed extract) of the Daniels fertilizer was a significant contributor to the outstanding quality of the pansy plants fertilized with Daniels. Results provided in Tables 2 and 3 indicate that the pansy plants absorbed similar levels of nutrients when fertilized with a Daniels 10-4-3, Total Grow 15-0-20 or Excel 15-2-20. The dense, compact growth of the pansies fertilized with the Daniels, however, may have been due to a mild growth regulator effect due to some unknown chemical in the soybean seed extract.

Conclusions:

Growth and quality of pansies fertilized with Daniels 10-4-3 fertilizer were consistently superior to all of the inorganic fertilizers tested. At all trial locations, pansies were larger, more compact, contained more axillary breaks and were of better quality than plants grown with conventional fertility. This fertilizer should be a valuable asset in pansy fertility management programs.

Table 2: Mineral nutrient analysis of pansy media obtained from 4 different growing locations. The growers standard fertility program compared to Daniel's 10-4-3 fertilizer.

Location	#1		#2		#3		#4	
	Total Grow 20-0-15	Daniels 10-4-3	Excel 15-2-20	Daniels 10-4-3	Excel 15-2-20	Daniels 10-4-3	Excel 15-2-20	Daniels 10-4-3
Nutrient	ppm							
Nitrate	54	57	45	30	22	16	175	104
Ammonium	12	12	5	6	3	2	23	16
Phosphorus	2	1	3	2	2	4	14	6
Potassium	48	30	43	33	27	10	47	71
Calcium	35	24	34	30	11	9	186	118
Magnesium	35	20	34	28	9	7	123	79
Iron	0.37	0.16	0.18	0.17	0.02	0.15	0.39	0.16
Manganese	0.19	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Boron	0.03	0.02	0.06	0.05	0.05	0.03	0.10	0.11
Copper	0.07	0.05	0.04	0.03	0.01	0.03	0.01	0.04
Zinc	0.59	0.28	0.29	0.27	0.11	0.17	0.03	0.17
Molybdenum	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.01
Sodium	30	22	3528	13	13	49	66	
Aluminum	0.01	0.02	0.24	0.20	0.06	0.02	0.35	0.24
pH	6.2	6.2	6.05.9	6.4	6.2	5.7	5.3	
EC (dS/m)	0.8	0.5	0.7	0.6	0.3	0.2	2.1	1.3

Table 3: Tissue nutrient levels of pansies grown at 4 different production operations. Growers standard fertility program compared to Daniel's 10-4-3. Nitrogen rates were approximately the same.

Location	#1		#2		#3		#4	
Variety	C.B. Yellow		Dark Eyed LemonDelta-Yellow			Majestic mixed		
Fertilizer	Total Grow 20-0-15	Daniels 10-4-3	Excel 15-2-20	Daniels 10-4-3	Excel 15-2-20	Daniels 10-4-3	Excel 15-2-20	Daniels 10-4-3
	percent							
N	5.12	4.96	5.84	5.26	4.85	4.93	5.37	5.48
P	0.54	0.66	0.71	0.64	0.68	0.76	0.96	1.10
K	4.60	5.98	6.74	5.97	4.58	3.40	5.52	3.40
Ca	0.52	0.60	0.79	0.80	1.02	0.81	1.22	1.69
Mg	0.44	0.53	0.59	0.65	0.71	0.64	0.81	1.15
S	0.23	0.24	0.24	0.31	0.24	0.24	0.22	0.35
	ppm							
Fe	122	237	128	150	184	217	265	317
Mn	80	69	56	31	160	91	429	406
B	19	21	20	23	19	21	24	31
Cu	10	8	8	7	14	15	12	12
Zn	68	74	95	91	62	49	113	156
Mo	0.81	0.17	1	2	5	0.5	0.7	0.3
Na	470	480	497	426	574	521	1992	2088
Al	83	44	203	146	564	616	143	156