
Response of Pepper to Fertilization with Meister Controlled-Release Fertilizers 98-01

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Pepper fertilization studies with Meister controlled-release fertilizers were carried out on an Arredondo fine sand soil at the University of Florida Horticultural Research Unit in Gainesville, Florida in the fall of 1997. Soil for the experiment was plowed and disked and pre-beds were formed on 4 ft centers. Soil samples were taken from the upper 6 inches of soil before bedding.

Fertilizer treatments are described in Table 1, consisting of rates of a Meister 19N-5 P₂O₅-14K₂O polymer-coated controlled-release fertilizer, soluble (ammonium nitrate plus potassium chloride) treatments, zero-N and zero-K checks, and two treatments evaluating effect of a foliar-applied controlled-release N fertilizer. Two methods of fertilizer placements were compared for the Meister fertilizer. The Meister and Coron (foliar) fertilizers were products marketed by Helena Chem. Co., Memphis, TN. Meister is a product of Chisso-Asahi Fertilizer Co., LTD., Tokyo, Japan and Coron is a product of Coron Corp., Souderton, PA.

On 18 August 1997, fertilizers were applied to the soil. For the broadcast placement treatments, fertilizer was spread by hand over the top of the pre-beds and incorporated by rototilling. Following rototilling, the beds were shaped and pressed. Beds were spaced 4-ft apart, center-to-center, were 6 inches in height, and 24 inches across the top surface. For the band placement treatments, fertilizer was placed in a 6-inch-wide band on the bed surface and pressed lightly into the soil.

Following fertilizer application, the beds were fumigated (2 knives) with 98 methyl bromide -2 chloropicrin mixture at 350 lbs per acre (broadcast rate) and covered with white-on-black polyethylene mulch film (Sonoco Film Products, Hartsville, SC). During mulching, drip irrigation tubing was laid on the surface in the center of the bed. Drip irrigation tubing was 10 mil. thick with emitters on 12-inch spacing with 0.5 gal per minute per 100 ft flow rate (Chapin Watermatics, Watertown, NY).

Two treatments were used to test effects of foliar N in addition to reduced rate of N from controlled-release N. At early flowering of peppers and again 14 days later, foliar N was applied with a CO₂-powered back pack sprayer delivering 30 gal/acre solution. Foliar N was Coron controlled-release N applied in each spray at 2 gal/acre.

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Irrigation water was applied as needed to maintain the soil moisture at -10 cb on a tensiometer at 6 inches deep in the soil. Pests and diseases were controlled by timely application of labeled pesticides.

Pepper plants cv Camelot X3R (Peto Seeds Co., Saticoy, CA) were planted on 25 August 1997 in twin rows on each bed. Plant spacing was 12 inches between rows on a bed and 12 inches between plants in a row. Plots were 20 ft in length.

Peppers were harvested twice, 7 and 24 November 1997, graded into extra large, large, medium, and cull fruits, and weighed.

Treatments were replicated four times in a randomized complete-block design. Data were analyzed by analysis of variance and treatment means compared with least significant difference.

Results and Discussion

Fertilization affected yields of extra large, large, and total marketable pepper fruits (Table 2). Highest yields of extra large fruits (most valuable) were with the higher rates of broadcast Meister fertilizer. Similar trends resulted for yields of large fruits and for total marketable fruits from the first harvest. Lowest yields were with the zero N treatment.

Very few extra large fruits resulted with the second harvest which occurred later in the season after periods of cool weather (Table 3). Greatest yields of marketable fruits occurred with controlled-release broadcast soluble fertilizer.

Total season extra large, large, and total marketable fruit yields were affected by fertilization (Table 4). Greatest extra large fruit yields were with the higher rates of broadcast Meister fertilizer. Yields of large and total marketable fruits also were greatest with broadcast Meister at 125 or 175 lb per acre N. Foliar controlled-release N had no effect on yields of pepper at any harvest or for the season.

Broadcast placement of Meister fertilizer was superior to band placement (Table 5). These results are similar to results with fall pepper from 1996 (Hochmuth, 1997a), but different from spring results (Hochmuth, 1997b). These results were the same for first, second, and seasonal fruit production. Pepper yields did not respond to rates of Meister, indicating that amounts of N can be reduced when using controlled-release Meister fertilizer (Table 5).

Summary

1. Controlled-release N was superior to banded soluble fertilizer for pepper yields.
2. With controlled-release N, rates of N can be reduced compared to current recommended rates of soluble N.
3. For fall-grown pepper, broadcast placement resulted in greater yields of pepper compared to band placement.
4. Foliar-applied controlled-release N did not affect pepper yield when used in conjunction with a reduced rate of N applied in a band.

Literature Cited

Hochmuth, G. 1997a. *Response of Pepper to Meister Controlled-Release Fertilizers*. Florida Agricultural Experiment Station, North Florida REC - Suwannee Valley Report 97-02.

Hochmuth, G. 1997b. *Response of Mulched Pepper to Meister Controlled-Release Fertilizer*. Florida Agricultural Experiment Station, North Florida REC - Suwannee Valley Report 97-9

Table 1. Fertilization treatments for evaluation of Meister fertilizer for pepper, Fall 1997, Gainesville, FL.

<u>Treatment</u>	<u>Fertilizer</u>	<u>Placement</u> ^y	<u>N Rate (lb/acre)</u> ^z
1	Meister (19-5-14)	Band	75 (112)
2			125 (188)
3			175 (263)
4	Meister	Broadcast	75
5			125
6			175
7	AN/KCl ^x	Band	175
8		Broadcast	175
9	Check (ON) ^w		0
10	Check (OK) ^w		175
11	Meister ^v	Band	100 (Coron)
12	Meister ^v	Band	100

^z N rate expressed on basis of 6-ft centers; rate on 4-ft bed center basis in parenthesis.

^y Band was 6-inch wide band of fertilizer on surface center of bed; broadcast involved spreading fertilizer on surface of bed and incorporating with rotiller.

^x Mixture of ammonium nitrate and potassium chloride.

^w Checks were zero N with 175 lb/acre K₂O or 175 lb/acre N with zero K.

^v Treatments 11 and 12 were same except treatment 11 included two foliar sprays of Coron on controlled-release N foliar spray at 2 gal/acre each at early bloom and 14 days later.

Table 2. Response of pepper to fertilization with controlled-release N, first harvest, Fall 1997, Gainesville, FL.

Treatment	Yield (28-lb carton/acre) ^z			
	Extra Large	Large	Medium	Total Marketable
1	31	83	113	228
2	12	93	74	179
3	10	150	136	296
4	29	150	224	403
5	97	278	228	603
6	111	284	196	591
7	35	84	148	266
8	23	237	156	416
9	0	25	29	54
10	12	45	99	156
11	21	107	124	253
12	78	79	158	314
Prob. >F	0.0430	0.0009	0.6455	0.0023
LSD (0.05) ^x	70	124	NS	250

^z Yield in 28-lb cartons per acre (4-ft bed centers).

^y Treatment descriptions in Table 1.

^x Probability of greater F value with least significant difference with P>F was less than 0.05 or not significant (NS).

Table 3. Response of pepper to fertilization with controlled-release N, second harvest, Fall 1997, Gainesville, FL.

Treatment	Yield (28-lb carton/acre) ^z				
	Extra Large	Large	Medium	Total Marketable	Cull
1	0	175	166	341	39
2	0	149	124	273	81
3	9	216	130	355	19
4	0	193	235	429	76
5	0	380	187	567	94
6	16	183	237	435	83
7	0	35	70	105	42
8	0	266	240	507	98
9	0	0	46	46	49
10	0	125	131	256	81
11	0	261	205	466	47
12	0	283	155	439	63
Prob. >F	0.4671	0.0063	0.0080	0.0006	0.0873
LSD (0.05) ^x	NS	170	105	217	NS

^z Yield in 28-lb cartons per acre (4-ft bed centers).

^y Treatment descriptions in Table 1.

^x Probability of greater F value with least significant difference with P>F was less than 0.05 or not significant (NS).

Table 4. Response of pepper to fertilization with controlled-release N, Fall 1997, Gainesville, FL.

Treatment	Yield (28-lb carton/acre) ^z				
	Extra Large	Large	Medium	Total Marketable	Cull
1	31	259	279	569	39
2	12	242	198	452	81
3	18	366	266	650	19
4	29	343	459	831	76
5	97	658	414	1170	94
6	126	467	434	1027	83
7	35	119	218	371	42
8	23	504	396	923	98
9	0	25	75	100	50
10	12	170	230	412	82
11	21	368	313	753	63
12	78	362	313	753	63
Prob. >F	0.0329	0.0002	0.1349	0.0001	0.0873
LSD (0.05) ^x	73	225	NS	340	NS

^z Yield in 28-lb cartons per acre (4-ft bed centers).

^y Treatment descriptions in Table 1.

^x Probability of greater F value with least significant difference with P>F was less than 0.05 or not significant (NS).

Table 5. Main effects of Meister rate and placement for pepper yield, Fall 1997, Gainesville, FL.

Meister Placement	Meister Rate (lb/acre N) ^y	Yield (28-lb carton/acre) ^z				
		Extra Large	Large	Medium	Total Marketable	Cull
----- First Harvest -----						
Band		18	109	108	234	0
Broadcast		79	237	216	532	0
Prob. >F ^x		0.0177	0.0024	0.1320	0.0020	N/A
Significance F-test ^x		*	**	NS	**	NS
	75	30	117	168	315	0
	125	54	186	151	390	0
	175	60	217	166	443	0
	Prob. >F	0.5426	0.0910	0.9738	0.4378	N/A
	LSD (0.05)	NS	NS	NS	NS	NS
----- Second Harvest -----						
Band		3	180	140	323	46
Broadcast		5	252	220	477	84
Prob. >F ^x		0.6813	0.1377	0.0175	0.0289	0.0026
Significance F-test ^x		NS	NS	*	*	**
	75	0	184	200	385	57
	125	0	264	155	420	88
	175	12	199	184	395	51
	Prob. >F	0.1412	0.3458	0.4735	0.8997	0.0282
	LSD (0.05)	NS	NS	NS	NS	25
----- Season Harvest -----						
Band		20	289	247	557	46
Broadcast		84	489	435	1009	84
Prob. >F ^x		0.0155	0.0115	0.0474	0.0007	0.0026
Significance F-test ^x		*	*	*	**	**
	75	30	300	368	700	57
	125	54	450	306	811	88
	175	72	416	350	839	51
	Prob. >F	0.3588	0.2202	0.8349	0.5434	0.0282
	LSD (0.05)	NS	NS	NS	NS	25

^z Yields in 28-lb cartons per acre (4-ft bed centers).

^y Meister rate in terms of lb/acre N based on 6-ft beds, typical pepper bed spacing.

^x Probability of greater F value and significance of F-test at 5% (*) or 1% (**) probability levels, or not significant (NS).