

EFFECT OF FOLIAR APPLIED POTASSIUM NITRATE AND SCORE FOLIAR NUTRIENTS
ON BELL PEPPER YIELDS

2013

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INTRODUCTION/OBJECTIVES:

To verify results of a small replicated test in 2012 in which potassium nitrate (KNO₃) was applied as a foliar feed to bell peppers. This test utilized the same concentrations of KNO₃ applied in large field size blocks.

METHODS AND MATERIALS:

A field of healthy, vigorously growing bell peppers on Live Oak Farms was chosen for the experimental site.

On April 29, 2013, prior to any field applications of KNO₃, a preliminary test for phytotoxicity was conducted. Six pepper plants at the end of a row were treated with 10 pounds of KNO₃ per acre, and another six rows received 5.0 pounds of KNO₃ per acre. After one week it was noted that the high rate caused some leaf tip necrosis. Therefore, it was decided to use the 5.0 pound per acre rate for this study.

Twenty four 60 inch beds were treated with KNO₃ applied by the grower's equipment. This number of beds was chosen because they resulted in 3.7 acres. Since the packing house handles about 4.0 acres of peppers per day, the 24 beds were a convenient number.

Another 24 beds were treated with Score Foliar Nutrients. Again the plot size was chosen for packing house convenience. Any other 3.7 acre block in the field would serve as the untreated check.

The 3.7 acre block of KNO₃ treated peppers was harvested, taken to the packing house, graded and packed, all in the same day. Similarly, the 3.7 acre block of Score treated peppers was harvested, graded and packed in the same day. The untreated check data was collected for all the rest of the field. These peppers were also harvested in approximately 4.0 acre blocks and treated in the same manner as the KNO₃ and Score blocks.

TREATMENTS:

MATERIALS	RATES	TIMINGS
1 Potassium Nitrate	5.0 lbs/a	May 20, June 3, 2013
2. Score Foliars (12-47-4)	1.0 qt/a	May 20, June 3, 2013
Albion Micro nutrients (0-0-24)	1.0 qt/a	May 20, June 3, 2013
3. Untreated Check	-----	-----

Site Location: Live Oak Farms, Le Grand, California

Host Crop Variety: Classic

Plot Description and Size: 3.7 acres per each of three treatments

Experimental Design: Not Replicated

Application Conditions:

FIRST APPLICATION:

Date: May 20, 2013
Time: 10:00 a.m.
Wind: 8 MPH NW
Sky: Clear
Temperature: 70 F

SECOND APPLICATION:

Date: June 3, 2013
Time: 3:00 p.m.
Wind: Light NW
Sky: Clear
Temperature: 77 F

ASSESSMENTS:

The number of 20 pound cartons of bell peppers obtained from 3.7 acres, after two harvests of green fruits, in KNO₃ treated, and Score treated blocks. Number of 20 pound cartons of bell peppers harvested from non-treated acreage of the same field.

RESULTS:

Table 1 – Numbers of 20 Pound Cartons of Bell Peppers on Two Harvest Dates for each of Three Treatments.

TREATMENTS:

MATERIALS	FIRST PICK	SECOND PICK	TOTAL CARTONS
1 Potassium Nitrate	1465.94	218.64	1684.58
2. Score Foliars (12-47-4) Albion Micro nutrients (0-0-24)	1165.13	299.72	1464.85
3. Untreated Check	890.60	365.00	1255.60

Table 1 shows numbers of 20 pound cartons of peppers from each of two harvests and their sums. It can be seen that KNO₃ treated peppers out yielded the untreated check by 428.98 cartons/acre, and the Score treatment by 219.73 cartons/acre.

Tables 2a, 2b and 2c are actual packout sheets from Live Oak Farms for the blocks utilized in this study. Fruits were graded into four categories (Jumbo, Ex-Large, Large, and Medium). The tables give the number of cartons of each as well as net weights and % of fruit in each category.

In the first harvest, the KNO₃ treatment had 164 cartons or 4.8% of the peppers in the Jumbo category. The Score treatment had 116 cartons or 7.3%, while the untreated check had 375 cartons or 13.1% in the Jumbo category.

In the first harvest, the KNO₃ treatment had 1765 cartons or 52.3% of the peppers in the extra large category. The Score treatment had 260 cartons or 16.4%, while the untreated check had 1248 cartons or 43.5% in the extra large category.

In the first harvest, the KNO₃ treatment had 852 cartons or 25.3% of the peppers in the Large category. The Score treatment had 751 cartons or 47.5%, while the untreated check had 780 cartons or 27.2% in the Large category.

In the first harvest, the KNO₃ treatment had 591 cartons or 17.5% of the peppers in the Medium category. The Score treatment had 454 cartons or 28.7%, while the untreated check had 468 cartons or 16.3% in the Medium category.

The test was not replicated and therefore could not be analyzed statistically, but there were very strong trends regarding yields. These data indicate that KNO₃ applications might result in more extra large fruits (52.3%) and more total cartons (1465.94) than the other two treatments. The Score treatment had the highest percentages of large and medium fruits.

Tables 2a, 2b and 2c – Packout Sheets for Three Pepper Blocks on Live Oak Farms

Live Oak Farms
 13401 E. Jefferson Street
 Le Grand, CA 95333
 Phone: (209) 389-4576

1st Pick

Packout by Grower Block

Packer: Live Oak Ranch

Period From: Jul 16, 2013
 Thru: Jul 16, 2013
 To-Date From: Jul 16, 2013
 Thru: Jul 16, 2013

Acres: 3.7

Block: 2013 Field 16 Block 3 - Classic Trial
 Commodity: Bell Peppers Variety: Classic

		Period				Year to Date				
Style	Label	Size	Cartons	Net Lbs.	Size %	Tot %	Cartons	Net Lbs.	Size %	Tot %
Green	A - Live Oak	Jumbo	164	4592	4.864%	3.024%	164	4592	4.864%	3.024%
Green	A - Live Oak	Ex Large	1765	49420	52.343%	32.541%	1765	49420	52.343%	32.541%
Green	A - Live Oak	Large	852	23856	25.267%	15.708%	852	23856	25.267%	15.708%
Green	A - Live Oak	Medium	591	16548	17.527%	10.896%	591	16548	17.527%	10.896%
Total Label:			3372	94416	100.000%	62.168%	3372	94416	100.000%	62.168%
Green	E - California	CA	1238	34664	100.000%	22.824%	1238	34664	100.000%	22.824%
Total Label:			1238	34664	100.000%	22.824%	1238	34664	100.000%	22.824%
Green	K - LO Euro	Ex Lg Euro	467	13076	57.371%	8.610%	467	13076	57.371%	8.610%
Green	K - LO Euro	XXL Euro	347	9716	42.629%	6.397%	347	9716	42.629%	6.397%
Total Label:			814	22792	100.000%	15.007%	814	22792	100.000%	15.007%
Total Style:			5424	151872		100.000%	5424	151872		100.000%
Total Label:			0	0	.000%		0	0		
Total Style:			0	0			0	0		
Total Packed:			5424	151872			5424	151872		

	Period	To-Date
Units:	321	321
Cartons/Unit:	16.90	16.90
Units/Acre:	43.38	43.38
Cartons/Acre:	732.97	732.97
Net Wt:	0	
Packed Wt:	151872	
Packout %:	0.00%	

1465.94

Potassium Nitrate

3.7 acres

Live Oak Farms
 13401 E. Jefferson Street
 Le Grand, CA 95333
 Phone: (209) 389-4576

1st Pick

Packout by Grower Block

Grower: Live Oak Ranch

Period From: Jul 17, 2013
 Thru: Jul 17, 2013
 To-Date From: Jul 16, 2013
 Thru: Jul 17, 2013

Acres: *1.4*

Block: 2013 Field 16 Block 3 - Classic Trial
 Commodity: Bell Peppers Variety: Classic

.....Period.....						Year to Date.....				
Style	Label	Size	Cartons	Net Lbs.	Size %	Tot %	Cartons	Net Lbs.	Size %	Tot %	
Green	A - Live Oak	Jumbo	116	3248	7.337%	2.691%	280	7840	5.653%	2.876%	
Green	A - Live Oak	Ex Large	260	7280	16.445%	6.031%	2025	56700	40.884%	20.801%	
Green	A - Live Oak	Large	751	21028	47.502%	17.421%	1603	44884	32.364%	16.466%	
Green	A - Live Oak	Medium	454	12712	28.716%	10.531%	1045	29260	21.098%	10.734%	
Total Label:			1581	44268	100.000%	36.674%	4953	138684	100.000%	50.878%	
Green	E - California	CA	1094	30632	100.000%	25.377%	2332	65296	100.000%	23.955%	
Total Label:			1094	30632	100.000%	25.377%	2332	65296	100.000%	23.955%	
Green	F - RPC	Ex Large	1090	30520	100.000%	25.284%	1090	30520	100.000%	11.197%	
Total Label:			1090	30520	100.000%	25.284%	1090	30520	100.000%	11.197%	
Green	K - LO Euro	Ex Lg Euro	336	9408	61.538%	7.794%	803	22484	59.044%	8.249%	
Green	K - LO Euro	XXL Euro	210	5880	38.462%	4.871%	557	15596	40.956%	5.722%	
Total Label:			546	15288	100.000%	12.665%	1360	38080	100.000%	13.970%	
Total Style:			4311	120708		100.000%	9735	272580		100.000%	
Total Label:			0	0	.000%		0	0			
Total Style:			0	0			0	0			
Total Packed:			4311	120708			9735	272580			

	Period	To-Date
Units:	261.5	582.5
Cartons/Unit:	16.49	16.71
Units/Acre:	35.34	78.72
Cartons/Acre:	582.57	1310.54
Net Wt:	0	
Packed Wt:	120708	
Packout %:	0.00%	

1165.13 Boxes @ Acre

Score
3.7 acres

Live Oak Farms
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 Le Grand, CA 95333
 Phone: (209) 389-4576

1st Pick

Packout by Grower Block

Packer: Live Oak Ranch

Period From: Jul 18, 2013
 Thru: Jul 18, 2013
 To-Date From: Jul 08, 2013
 Thru: Jul 18, 2013

Acres: ~~47.14~~

Block: 2013 Field 16 Block 3 - Classic - Drip
 Commodity: Bell Peppers Variety: Classic

.....Period					Year to Date				
Style	Label	Size	Cartons	Net Lbs.	Size %	Tot %	Cartons	Net Lbs.	Size %	Tot %
Green	A - Live Oak	Jumbo	375	10500	13.062%	6.559%	1911	53508	12.412%	6.602%
Green	A - Live Oak	Ex Large	1248	34944	43.469%	21.830%	5997	167916	38.949%	20.717%
Green	A - Live Oak	Large	780	21840	27.168%	13.644%	4422	123816	28.720%	15.276%
Green	A - Live Oak	Medium	468	13104	16.301%	8.186%	3067	85876	19.919%	10.595%
Total Label:			2871	80388	100.000%	50.219%	15397	431116	100.000%	53.190%
Green	E - California	CA	1500	42000	100.000%	26.238%	6479	181412	100.000%	22.382%
Total Label:			1500	42000	100.000%	26.238%	6479	181412	100.000%	22.382%
Green	F - RPC	Ex Large	630	17640	100.000%	11.020%	2399	67172	100.000%	8.288%
Total Label:			630	17640	100.000%	11.020%	2399	67172	100.000%	8.288%
Green	K - LO Euro	Jumbo Euro	0	0	.000%	.000%	444	12432	9.503%	1.534%
Green	K - LO Euro	Ex Lg Euro	376	10528	52.514%	6.577%	2729	76412	58.412%	9.428%
Green	K - LO Euro	XXL Euro	340	9520	47.486%	5.947%	1499	41972	32.085%	5.178%
Total Label:			716	20048	100.000%	12.524%	4672	130816	100.000%	16.140%
Total Style:			5717	160076		100.000%	28947	810516		100.000%
Total Label:			0	0	.000%		0	0		
Total Style:			0	0			0	0		
Total Packed:			5717	160076			28947	810516		

	Period	To-Date
Units:	339	1728
Cartons/Unit:	16.86	16.75
Units/Acre:	7.19	36.66
Cartons/Acre:	121.28	614.06 890.60
Net Wt:	0	
Packed Wt:	160076	
Packout %:	0.00%	

Field
 32.5 Acres

CONCLUSIONS:

This field study which employs the grower's cultural practices, verifies the finding of an earlier, small scale randomized complete block test. Foliar applied KNO_3 during fruit formation and development can result in increased yields.

This was a well conducted, closely monitored test with unarguable results. The only issue might come from the untreated check values being from 32.5 acres while the treatments values were from 3.7 acres each. Workers may have begun harvesting the large block when fruits were somewhat less mature in order to harvest most fruits at peak maturity. This is only an assumption, however.



May 20, 2013 – Date of first foliar applications



June 3, 2013 – Date of second applications



June 10, 2013 – Test in progress



July 13, 2013 – Date of first harvest



July 27, 2013 – Date of second harvest