

# FERTILIZATION OF FRESH MARKET TOMATOES PRODUCED UNDER HIGH TUNNELS

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MICHIGAN STATE  
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EXTENSION

Haygrove tunnels, 24' by 200',  
established in 2005.



## The Problem:

Field rates for tomato  
were too high for tunnels



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Field rates for tomato  
were too high for tunnels

Many fruit showed  
physiological disorders



What influences green core and gray wall?

- Nitrogen levels
- N : K ratio
- Temperature
- Light levels

Two Nitrogen Levels in 2005:

0.5 and 1.0 #N/A/Day

Five K Treatments

- 1 : 1      N : K
- 1 : 2
- 1 : 3
- 1 : 4
- 1 : 3 + foliar CaNo3

Preplant fertilizer:

40#/A N as Ammonium Nitrate

250#/A K

Cal-fortified at 100#/A

Sulfur at 25#/A

Boron at 2#/A

N : K Treatments were applied weekly through the drip from 20 June to 12 September as 3-0-20 + 28-0-0

Foliar CaNo3 was applied 28 July and 4, 11, 18 August at 10#/A

Fumigated with 300#/A 67/33% Methyl Bromide/chloropicrin

Irrigated and pests controlled according to commercial recommendations



Yield in 25# cartons of 'Mt Spring' as influenced by five nutrient treatments at SWMREC in 2005. Plant spacing was 5.5' between rows and 1.5' in the row for 5280 plants/acre.

Treatment (#/acre/day)	Total Yield	Yield No 1 Large	Fruit Weight	Yield No. 2	Yield No. 1 Small	Yield Cull	Green Core	Gray Wall
0.5N : 0.5K	3221	1773	301	466	398	585	4	5.4
0.5N : 1.0K	3050	1652	294	485	512	400	5.5	5.0
0.5N : 1.5K	3096	1651	301	422	559	463	4.1	4.2
0.5N : 2.0K	3030	1573	323	531	424	502	4.1	4.6
0.5N : 1.5K + foliar CaNO3	3008	1566	300	426	447	569	4.5	4.0
Lsd 0.05	ns	ns	28	ns	ns	ns	1.1	1.1

Yield in 25# cartons of 'Mt Spring' as influenced by five nutrient treatments at SWMREC in 2005. Plant spacing was 5.5' between rows and 1.5' in the row for 5280 plants/acre.

Treatment (#/acre/day)	Total Yield	Yield No 1 Large	Fruit Weight	Yield No. 2	Yield No. 1 Small	Yield Cull	Green Core	Gray Wall
1N : 1K	3306	1831	303	579	397	499	3.7	4.6
1N : 2K	3253	1757	310	573	462	461	3.9	5.2
1N : 3K	3019	1719	315	434	405	461	3.4	4.2
1N : 4K	3244	1775	308	485	513	471	3.5	4.2
1N : 3K +Foliar CaNO3	3325	1657	297	679	435	553	3.3	4.9
Lsd 0.05	ns	ns	ns	195	ns	ns	ns	ns

Comparison of 'Mt. Spring' grown in and out of tunnels (25# boxes/a).

Trait	Out	In	Change
Total Yield	2677	3229	+552
No. 1 Large	1082	1748	+666
FW(gms)	276	307	+31
No. 2	399	550	+151
No. 1 Small	345	442	+97
Cull	851	489	-362
Fruit No.			+20,000

Trial repeated in 2006 using:

0.25 and 0.50 #N/A/day

No foliar CaNo3

Pre-plant only

Affect of five N : K ratios at a base of 0.50# N/acre/day on yield of 'Mt. Spring' in 25 lb cartons/acre. Plants were set 5.5 feet between rows and 1.5 feet in the row (5280 plants per acre). 2006

N:K Drip applied	Total Yield	Yield No. 1 Large	Fruit Weight	Yield No. 2	Yield No. 1 Small	Yield Cull	Gray Wall	Green Core
1 : 2	2875	1771	316	330	427	347	6.17	6.69
1 : 3	2672	1684	309	248	381	359	5.42	4.62
1 : 1	2661	1619	311	298	460	284	6.62	5.87
1 : 4	2523	1422	310	325	372	404	6.50	5.87
1 : 5	2178	1268	291	212	416	283	5.20	5.62
none	2158	1154	289	255	417	333	6.12	5.75
Lsd .05	677	477	21	ns	ns	ns	1.37	1.50

Affect of five N : K ratios at a base of 0.25# N/acre/day on yield of 'Mt. Spring' in 25 lb cartons/acre. Plants were set 5.5 feet between rows and 1.5 feet in the row (5280 plants per acre). 2006

N : K Drip applied	Total Yield	Yield No. 1 Large	Fruit Weight	Yield No. 2	Yield No. 1 Small	Yield Cull	Gray Wall	Green Core
1 : 5	2691	1594	301	368	401	329	5.7	6.9
1 : 3	2687	1472	302	488	445	282	6.5	6.7
1 : 2	2605	1466	298	281	452	405	6.4	6.8
1 : 4	2503	1350	297	446	400	307	6.7	6.8
none	2449	1426	306	304	385	334	6.7	7.4
1 : 1	2146	1282	300	203	362	299	6.0	6.6
Lsd .05	ns	ns	ns	206	ns	ns	ns	ns

Yield and fruit characteristics of tunnel-grown 'Mt Spring' tomato in 2005 and 2006 at the Southwest Michigan Research and Extension Center.

0.50#N	Year	
	2005	2006
Total Yield	3081	2511
Yield No. 1	1643	1486
Fruit Wt.	304	304
Green Core	4.4	5.74
Gray Wall	4.6	6.00

Daily temperature and solar radiation between 1 August and 16 September at SWMREC.

	Year	
	2005	2006
Avg. Maximum T	82.1	77.8
Avg. Minimum T	60.8	59.6
Mean T	71.4	68.7
Avg. Radiation	515.4	389.7

**Conclusions:**

Light and Temperature important

Pre-plant plus 0.5# Nitrogen/A/day appears best

N : K at 1 : 3 appears best

**Other Vegetable Crops Observed in Tunnels:**

- Lettuce
- Cucumbers
- Peppers
- Okra
- Flowers

**Potential Problems:**

- Water management
- Fertilizer management
- Variety selection
- Physiological disorders?
- ????????????????????

**ECONOMICS????????**