

IMPLICATIONS OF USING NARROWER BED TOP WIDTHS IN THE PRODUCTION OF BELL PEPPERS AND CANTALOUPE

William Terry Kelley
Extension Horticulturist
wtkelley@uga.edu

and

David B. Langston, Jr.
Extension Plant Pathologist
University of Georgia
P.O. Box 1209
Tifton, GA 31793
dlangsto@uga.edu

Introduction

The phase out of methyl bromide has precipitated a need to reduce usage of the all purpose fumigant. Methyl bromide is currently only available to Georgia growers through existing stocks and Critical Use Exemption. Reduction in methyl bromide use can extend the life of existing stocks and make it more likely to continue Critical Use Exemption for future production. Traditionally, growers in Georgia have used bed widths of 32 to 36 inches for plastic mulch covered beds. By reducing bed top widths, and thus fumigating a smaller area, it would be possible to reduce the amount of methyl bromide applied by as much as 60%. It could also reduce the amount of plastic needed and thus reduce disposal costs. Therefore a study was undertaken to evaluate the effects of narrower bed tops and lower rates of methyl bromide on pepper and cantaloupe growth and yield.

Methods

Bed top widths of 36, 30 and 24 inches were each tested with broadcast rates of 400 pounds and 300 pounds per acre of both 67:33 and 50:50 methyl bromide:chloropicrin. Plots were established at the Tifton Vegetable Park on the Coastal Plain Experiment Station (elev. 382 feet) at Tifton, GA in the Fall of 2005. The plot area was deep turned and disced. Pre-plant applications of 800 and 600 lbs. 10-10-10 were applied to the pepper and cantaloupe areas, respectively, and roto-tilled into the beds. Fumigant was applied at the same time as plastic mulch and drip tape were installed with a Kenneco Super Bedder. Bed pans were changed for each treatment to create the various widths. Bed widths were the main plot and methyl bromide rates the sub plot. Each bed was 50 feet long and there were four beds in each main plot. Methyl bromide at 400 lbs./A 67:33, 400 lbs./A 50:50, 300 lbs./A 67:33, and 300 lbs./A 50:50 were each applied to one bed in the main plot. Each bed was then planted half in cantaloupe and half in bell pepper. Plots were 20 feet long with two rows of pepper planted per bed with 12 inches between plants and one row of cantaloupe planted per bed with two feet between plants.

Commercially produced “Heritage” variety (Harris Moran Seed Co.) bell pepper and “Athena” variety (Syngenta Seed Co.) cantaloupe transplants were planted into the beds on August 25, 2005. The soil was a Tifton sandy loam (fine-loamy siliceous thermic Plinthic Kandiudults). All beds were on six foot centers and fertilizer rates were constant across plots within a crop. There were four replications. Otherwise normal cultural practices were employed. Pepper was harvested five times between October 31 and December 21, 2005. Cantaloupes were harvested on November 7, 2005 and data collected on yield and plant growth. Three plants from each plot were harvested and the top dried and weighed. The roots from these plants were weighed fresh. Data was analyzed using the Statistical Analysis System and means separated using Least Significant Difference.

Results and Discussion

Results are presented in Tables 1 and 2. Neither methyl bromide rate nor bed top width had any effect on cantaloupe growth and yield. The wider bed widths produced more large, extra large and total pepper and had a greater percent marketable than the narrowest width. However, it must be noted that these plots were exposed to very cool temperatures from just before the first harvest through the final harvest. Results could be vastly different in a full normal growing season. The root and top weights of pepper were highest on the narrowest beds. There was virtually no effect of methyl bromide rate on pepper growth and yield. Narrower bed top widths did not negatively impact cantaloupe growth. The pepper appeared to do better with the wider bed tops, but more work is needed to confirm these results during a the Spring season.

Table 1. Yield per plot by grade, total yield per acre, root fresh weight and top dry weight of bell peppers grown on three different bed top widths with four different methyl bromide rates at Tifton, Georgia in 2005.

Treatment	Yield/Acre (28-Pound Boxes)				Root Fresh Weight (g)	Top Dry Weight (g)	Avg. Fruit (g)	Percent Marketable
	Ex. Large	Large	U.S. No. 2 ¹	Total				
Bed Width								
24 inches	3.1 b	72.9 b	47.3 a	123.2 b	227.4 a	262.7 a	120.7 a	61.9 b
30 inches	5.1 ab	90.6 ab	32.4 a	128.0 ab	185.0 b	209.8 b	129.8 a	67.6 ab
36 inches	12.0 a	123.0 a	47.3 a	178.7 a	203.0 b	192.8 b	132.5 a	73.6 a
MBr rate								
400 # 67:33	12.0 a	97.4 a	51.7 a	161.2 a	203.7 a	211.7 a	129.8 a	64.3 a
300 # 67:33	3.8 ab	88.5 a	38.6 a	130.8 a	199.9 a	236.9 a	123.1 a	68.2 a
400# 50:50	8.3 ab	97.6 a	36.7 a	142.6 a	200.5 a	209.2 a	130.6 a	67.4 a
300# 50:50	2.7 b	98.5 a	37.4 a	138.6 a	216.4 a	229.3 a	127.3 a	70.9 a
Mean of Test	6.7	95.5	41.1	143.3	205.1	221.8	127.7	67.7
L.S.D.-Width (0.05)	7.9	47.2	21.5	53.9	23.5	34.5	16.3	11.6
L.S.D.-Rate (0.05)	9.1	54.5	24.8	62.3	27.2	39.9	18.8	13.4
C.V. (%)	139.9	58.6	62.0	44.7	13.6	18.5	15.1	20.3

¹Plots consisted of a single row with two rows per bed and 20 plants per row spaced 12 inches apart.

Table 2. Yield and number of fruit per acre, marketable yield and number of fruit per acre, root fresh weight and top dry weight of cantaloupes grown on three different bed top widths with four different methyl bromide rates at Tifton, Georgia in 2005.

Treatment	Yield/Acre ¹				Root Fresh Weight (g)	Top Dry Weight (g)	Avg. Fruit (g)	Percent Marketable
	Total Number	Total Weight	Marketable Number	Marketable Weight				
Bed Width								
24 inches	5203 a	20537 a	1482 a	7142 a	39.7 a	255.6 a	5.3 a	28.2 a
30 inches	5022 a	16863 a	1301 a	7384 a	39.5 a	256.5 a	5.8 a	26.6 a
36 inches	5082 a	19790 a	1331 a	7330 a	45.4 a	309.7 a	5.2 a	27.6 a
MBr rate								
400 # 67:33	4800 a	17448 a	1575 a	9144 a	41.5 a	296.7 a	5.9 a	31.7 a
300 # 67:33	4840 a	18884 a	1371 a	7284 a	40.1 a	274.6 a	4.9 a	29.0 a
400# 50:50	5808 a	21308 a	1291 a	5731 a	42.3 a	275.3 a	4.9 a	22.9 a
300# 50:50	4961 a	18612 a	1250 a	6982 a	42.1 a	249.1 a	5.8 a	26.1 a
Mean of Test	5102	19063	1371	7285	41.5	273.9	5.4	27.5
L.S.D.-Width (0.05)	909	3882	696	3685	8.5	71.0	1.3	14.0
L.S.D.-Rate (0.05)	1050	4482	804	4256	9.8	82.0	1.4	16.1
C.V. (%)	21.1	24.1	60.2	60.0	24.3	30.7	27.4	60.5

¹Plots consisted of a single bed with one row per bed and 10 plants per row spaced 24 inches apart.