

Plant Population and Cultivar Selections for Optimum Yield in Processing Tomatoes – 2008

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Objective

To test three processing tomato cultivars planted at three plant populations for optimum yields and quality.

Materials and Methods

Transplants of three processing tomato cultivars ('TSH 4,' 'Gem 331,' and 'H9704') were obtained from Hirzel's and planted to the field at the North Central Ag Research Station in Fremont, Ohio. Variety selection was based on using an early, mid-season, and late season maturing cultivar. Plots were established on a Hoytville silty clay loam in four replications and twin rows. Plant populations for each cultivar were 6,500, 8,700, 10,500, and 13,100 plants/A using in-row plant spacings of 32, 24, 20 and 16 inches apart, respectively. Twin rows were spaced 18 inches apart. Plants were transplanted to the field on May 22, 2008. 'TSH 4' and 'Gem 331' were machine harvested on September 4, and 'H9704' was machine harvested on September 23. Marketable red, green and culled fruit yields were calculated along with percent red fruit at harvest and average fruit size based on 50 fruit from each replication.

Results

Yields were below normal in 2008 in all varieties due to a wet spring and very hot, dry summer. The longer maturing cultivar 'H9704' had higher yields in all plant populations compared to 'TSH 4' and 'Gem 332' (Table 1). There were no differences in yield, average fruit size, or percent red fruit at harvest for the early maturing ('TSH 4') and mid-season maturing ('Gem 331') cultivars. Yields for 'H9704' showed no differences due to plant population in red or green fruit yields, average fruit size, and percent red fruit at harvest, but there was a significant difference in culled fruit with a significant increase at populations of 10,500 and 13,100 plants per acre (Table 1). Average fruit size ($p=0.13$) and percent red fruit ($p=0.06$) for 'H9704' tended to peak at the 8,700 plants/A density.

Conclusion

With increasing costs of processing tomato transplants and variations in yield potential between cultivars, more research is needed to determine the optimum plant population for specific cultivars for maximum marketable yields and cost efficiency.

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Table 1. Plant Population and Cultivar Selections for Optimum Yield in Processing Tomatoes - 2008

Cultivar: 'TSH 4'						
Plant Population (# plants/A)	In-row Spacing (inches)	Red T/A	Green T/A	Cull T/A	Average Fruit Size (lb.)	Percent Red Fruit at Harvest
6,500	32	8.5	3.0	3.4	0.12	56
8,700	24	6.9	2.5	3.1	0.12	55
10,500	20	8.1	3.1	3.7	0.11	53
13,100	16	9.4	3.7	3.2	0.12	57
LSD (0.05)		NS	NS	NS	NS	NS
p value		0.297	0.468	0.218	0.349	0.805
CV		28.8	33.0	22.0	14.3	15.1

Cultivar: 'Gem 331'						
Plant Population (# plants/A)	In-row Spacing (inches)	Red T/A	Green T/A	Cull T/A	Average Fruit Size (lb.)	Percent Red Fruit at Harvest
6,500	32	7.1	3.8	3.8	0.11	47
8,700	24	8.1	3.4	3.7	0.11	49
10,500	20	8.3	3.2	4.3	0.10	53
13,100	16	9.7	3.0	4.0	0.10	58
LSD (0.05)		NS	NS	NS	NS	NS
p value		0.51	0.196	0.531	0.48	0.425
CV		36.3	29.8	15.5	18.1	20.4

Cultivar: 'Heinz 9704'						
Plant Population (# plants/A)	In-row Spacing (inches)	Red T/A	Green T/A	Cull T/A	Average Fruit Size (lb.)	Percent Red Fruit at Harvest
6,500	32	9.7	5.9	6.1	0.10	44
8,700	24	14.1	5.2	5.2	0.12	53
10,500	20	12.1	5.8	7.9	0.10	45
13,100	16	11.8	5.8	7.6	0.11	46
LSD (0.05)		NS	NS	1.34	NS	NS
p value		0.21	0.41		0.13	0.06
CV		51.5	18.6	22	25.5	15.7