

# Effects of Early Pruning on ‘Florida-47’ and ‘Sungard’ Tomatoes

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The effects of early pruning on the growth and yield of ‘Florida-47’ and ‘Sungard’ tomatoes (*Lycopersicon esculentum* Mill.) were assessed in west-central Florida. Each cultivar was established in separate experiments. The four pruning treatments consisted of leaving one, two, and three main stems in the tomato plants below the first flower cluster, and a non-pruned control. Early pruning had significant effects on ‘Sungard’ and ‘Florida-47’ plant height at 3 and 4 weeks after transplanting, respectively. Tomato plants with a single stem were 13% and 10% taller than the ones in the non-pruned control, respectively. However, this effect disappeared 1 and 2 weeks later in ‘Sungard’ and ‘Florida-47’. Regardless of the cultivar, early pruning did not influence both early and total tomato marketable yield, with average yields ranging between 12.7 and 17.2 ton/acre. This cultural practice did not affect the partitioning to different fruit categories in both ‘Sungard’ and ‘Florida-47’ tomatoes. The data suggested that early pruning can temporarily change plant architecture of ‘Sungard’ and ‘Florida-47’ tomatoes, explaining the perceived increased plant vigor in comparison with the non-pruned control. However, the effect disappeared during the growing season and did not reflect on marketable yields of both tomato cultivars.

Pruning is a field operation aimed to remove unwanted lateral and basal branches or suckers in tomato. This cultural practice takes place between 2 and 4 weeks after transplanting (WAT) and it could be accomplished once or twice during that period, removing shoots from ground level up to the first fork below the first flower cluster (Olson et al., 2006). Because different cultivars have varying plant architecture and growth habits, the effect of this practice on tomato can widely vary. Short determinate cultivars might require only minimal pruning, whereas the opposite might be necessary for vigorous and tall cultivars (Olson et al., 2006). McGraw et al., (2007) indicated that pruning small basal branches helps maintaining the balance between vegetative and reproductive biomass.

The literature differs about the effect of pruning on tomato yield. Burgis and Levins (1974) suggested that pruning could increase yield of determinate cultivars. Cockshull et al. (2007) stated that the presence of side shoots in greenhouse-grown tomato reduced the number of marketable fruits carried on each flower cluster, but increased total fruit yield. Other research indicated that pruning improved early yield, but reduced total yield (Sikes and Coffey, 1976). Carlton et al. (1994) found no effect of pruning all side branches below the first flower cluster on tomato yield. Other production practices (e.g., spacing) could interact with pruning on their effects on tomato yields, increasing net returns when: 1) plants were either spaced less than 18 inches apart and were pruned early; or 2) when plants were spaced 18 to 30 inches apart and were either pruned early or not pruned (Davis and Estes, 1993).

Two drawbacks of pruning are the current high cost of hand labor and the potential for transmitting diseases with cutting implements. On the first aspect, surveys among growers have estimated that the cost of pruning can be about \$40/acre. Carlton et al. (1994) and Damicone and Brandenberger (2007) suggested that pruning increased the number of tomato plants infected by bacterial canker [*Clavibacter michiganensis* (Smith) Davis. = *Corynebacterium michiganensis*]. The majority of open-field tomato growers in Florida use this practice, but the scientific basis for its use needs to be justified for modern cultivars. Therefore, the objective of this study was to determine the effect of early pruning on the growth and yield of selected tomato cultivars.

## Materials and Methods

Four field trials were conducted between 2005 and 2006 at the Gulf Coast Research and Education Center of the University of Florida in Balm. The soil was a sandy, siliceous, hyperthermic Oxyaquic Alorthod with 1.5% organic matter and pH 7.3. ‘Florida-47’ and ‘Sungard’ transplants in the four true-leaf stage were separately planted on polyethylene mulched beds, and established 2 ft apart on single rows on the center of each bed. Drip irrigation tubing (0.45 gal/min per 100 ft of bed; T-Tape Systems International, San Diego, CA) was buried 1 inch deep down on the bed center. Irrigation was supplied both through drip and subsurface irrigation at rates of 5000 and 8000 gal/acre per day, respectively. The water table was maintained between 18 and 24 inches deep and constantly monitored with observation wells located in the fields. Plant nutrients were supplied under non-limiting conditions through drip irrigation following current local recommendations (Olson et al., 2006).

Each cultivar was established in separate experiments using

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Table 1. Response of 'Florida-47' and 'Sungard' tomato plant height to early pruning, Balm, FL, 2005–06.

Treatment	Plant ht (inches) <sup>a</sup>			
	Florida-47		Sungard	
	4 WAT	6 WAT	3 WAT	4 WAT
	----- inches -----			
No pruning	34.4 b	54.0 a	15.8 b	28.2 a
1 stem	38.0 a	50.4 a	17.8 a	24.3 a
2 stems	33.8 b	46.4 a	14.0 b	27.1 a
3 stems	32.4 b	50.6 a	13.4 a	26.3 a

<sup>a</sup>Values followed by the same letter within each fruit category do not differ at the 5% significance level.

a randomized complete-block design with four replications. The four pruning treatments consisted of leaving one, two, and three main stems in the tomato plants below the first flower cluster, and a non-pruned control. Hand shears were used to achieve shoot removal at 2 WAT. Tomato plant height was measured from the plant base to the newest apical growing point in the stem at 3 and 4 WAT for 'Sungard' and at 4 and 6 WAT for 'Florida-47'. Marketable yields were collected at 10 and 12 WAT and the fruits were classified as extra-large, large, and medium, following current market standards (Sargent et al., 2005). Resulting data were analyzed with General Linear Model procedure to determine treatments effects ( $P=0.05$ ) and treatment means were separated with the Waller–Duncan test (SAS Institute, 2000).

### Results and Discussion

Early pruning had significant effects on 'Sungard' and 'Florida-47' plant height at 3 and 4 WAT, respectively (Table 1). Plants with a single main stem were the tallest among all treatments, regardless of the cultivars. 'Sungard' and 'Florida-47' tomato plants with a single stem were 13% and 10% taller than the ones in the non-pruned control, respectively. However, this effect disappeared 1 and 2 weeks later in 'Sungard' and 'Florida-47'. 'Sungard' plant height measurements at 4 WAT revealed no significant differences among treatments, with an average plant height of 26.5 inches. A similar trend occurred with 'Florida-47' plants and the average plant height was 50.3 inches.

Regardless of the cultivar, early pruning did not influence both early and total tomato marketable yield, with average yields ranging between 12.7 and 17.2 ton/acre (data not shown). At the

same time, this cultural practice did not affect the partitioning to different fruit categories in both 'Sungard' and 'Florida-47' tomatoes. This data suggested that early pruning can temporarily change plant architecture of 'Sungard' and 'Florida-47' tomatoes, explaining the perceived increased plant vigor in comparison with the non-pruned control. However, the effect disappeared during the growing season and did not reflect on marketable yields of both tomato cultivars. These results agree with previous research reported by Carlton et al. (1994). Growers avoiding pruning could save in labor costs about \$40 per acre of 'Florida-47' and 'Sungard' tomatoes. Nevertheless, the effect of this practice in situations of high-foliar disease pressure still needs to be assessed to offer tomato growers a complete recommendation on whether to exclude pruning as a cultural practice.

### Literature Cited

- Burgis, D.S. and R.A. Levins. 1974. Pruning determinate tomato plants will increase dollar return. Proc. Fla. State Hort. Soc. 87:122–124.
- Carlton, W.M., M.L. Gleason, and E.J. Braun. 1994. Effects of pruning on tomato plants supporting epiphytic populations of *Clavibacter michiganensis* subsp. *michiganensis*. Plant Dis. 78:742–745.
- Cockshull, K.E., L.C. Ho, and J.S. Fenlon. 2007. The effect of the time of taking side shoots on the regulation of fruit size in glasshouse-grown tomato crops. J. Hort. Sci. Biotechnol.
- Damicone, J.P. and L. Brandenberger. 2007. Common diseases of tomatoes, Part II: Diseases caused by bacteria, viruses, and nematodes. Fact Sheet EPP-7626. Okla. Coop. Ext. Serv., Okla. State Univ.
- Davis, J.M. and E.A. Estes. 1993. Spacing and pruning affect growth, yield, and economic returns of staked fresh-market tomatoes. J. Amer. Soc. Hort. Sci. 118:719–723.
- McGraw, D., J. Motes, and R.J. Schatzer. 2007. Commercial production of fresh market tomatoes. Fact Sheet F-6019. Okla. Coop. Ext. Serv., Okla. State Univ.
- Olson, S.M., W.M. Stall, M.T. Momol, S.E. Webb, T.G. Taylor, S.A. Smith, E.H. Simonne, and E. McAvoy. 2006. Tomato production in Florida, p. 407–426. In: S.M. Olson and E.H. Simonne (eds.). Vegetable production handbook for Florida, 2006–2007. IFAS Publ., Univ. of Fla.
- Sargent, S.A., J.K. Brecht, and T. Olczyk. 2005. Handling Florida vegetable series—Round and roma tomato types. Fact Sheet SS-VEC-928. IFAS Publ., Univ. of Fla.
- SAS Institute. 2000. SAS user's guide. Version 8.1. SAS Inst., Cary, NC.
- Sikes, J. and D.L. Coffey. 1976. Catfacing of tomato fruits as influenced by pruning. HortScience 11:26–27.