

Second-Year Evaluation of Peach and Nectarine Production in High Tunnels and Field Plots

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Introduction

Peaches and nectarines are not common in Iowa's commercial fruit production. Although the trees can survive -25°F when fully dormant, fruit buds are damaged at temperatures around 28°F, which often occur in Iowa due to spring frost events. The goal of this project is to test the economic viability of utilizing high tunnels to extend the season and enable these fruits to be grown reliably and successfully in Iowa.

Materials and Methods

Four peach (*Prunus persica*) and nectarine (*Prunus persica* var. *nucipersica*) cultivars were established May 2016 in two plots. Four peach and nectarine cultivars were planted in a newly constructed 96 ft x 42 ft gothic-style high tunnel (HT) and four peach and nectarine cultivars were planted in an open field (F). Within each plot, two peach (Redhaven, Contender) and two nectarine (Redgold, Fantasia) cultivars grafted onto Bailey's rootstock were established. Plots were exact replications arranged in a randomized complete block design with two trees/replication (total of 6 blocks).

Irrigation was installed in each plot and watering was based on soil moisture needs for both plots using environmental monitoring stations installed in each plot. Each station monitors soil moisture, soil electrical

conductivity, soil temperature, solar radiation, leaf wetness, air temperature, and relative humidity at canopy height.

Results and Discussion

Initial caliper measurements were taken November 11, 2016 (Table 1). No significant differences were seen between cultivars for field grown trees. However, there were differences between cultivars grown in the high tunnel. There was a 37 percent difference in caliper growth between Contender (35.7 mm) and Red Haven (24.6 mm). There were no differences among cultivars grown in the high tunnel or in the field.

A late-season (October 5) estimate of chlorophyll content was taken via SPAD 502 (Table 2). A significant difference was seen in the amount of greenness measured in Red Gold in the F plot (48.8) compared with Red Haven, Fantasia, and Contender.

After a successful second season, several differences were seen between the HT and F peach plots. Although statistically significant differences were not seen in caliper growth, visual difference were evident in canopy size in the HT plot over the F plot. Fruit is not expected from these trees for 4-5 seasons, but plant health and establishment data will continue to be collected.

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Table 1. Mean increase in stem caliper over the first growing season.

Cultivar	Trunk growth (mm) ^z		Tree growth (cm) ^y	
	High tunnel	Field	High tunnel	Field
Red Gold	26.3ab ^x	25.6a	147.3a	90.1a
Red Haven	24.6b	21.5a	142.0a	99.4a
Fantasia	29.8ab	23.9a	164.8a	85.3a
Contender	35.7a	31.7a	160.1a	105.8a

^zTrunk growth = end of season (Nov. 11) trunk caliper minus initial trunk (July 11) caliper.

^yGrowth indices = (height + width + width) ÷ 3.

^xMeans (within a column) with the same letters are not statistically different according to Tukey's HSD ($\alpha = 0.05$).

Table 2. Estimate of chlorophyll content using SPAD-502 in high tunnel and field peach trial plantings.

Cultivar	SPAD ^z							
	1		2		3		4	
	High tunnel	Field	High tunnel	Field	High tunnel	Field	High tunnel	Field
Red Gold	46.4a ^y	42.4a	42.3a	37.4a	41.8a	36.0a	47.4a	48.8a
Red Haven	46.8a	42.2a	42.7a	35.2a	40.6a	36.2a	46.9a	45.0b
Fantasia	47.0a	41.6a	43.4a	36.2a	41.8a	36.0a	47.1a	45.1b
Contender	44.6a	43.5a	42.0a	36.2a	50.5a	36.5a	45.6a	45.6b

^zSPAD: Leaf greenness was determined using a handheld 502 SPAD meter (Konica Minolta Optics, Inc., Minolta, Japan); 1 = May 24, 2017, 2 = June 19, 2017, 3 = July 17, 2017, and 4 = October 5, 2017.

^yMeans (within a column) with the same letters are not statistically different according to Tukey's HSD ($\alpha = 0.05$).