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Evaluation of Peach and Nectarine Production in High Tunnel 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 in May 2016. Two plots were established, four peach and nectarine cultivars were planted in a newly constructed 96 ft by 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 EC, soil temperature, solar radiation, leaf wetness, air

temperature and relative humidity at canopy height.

Results and Discussion

Initial caliper measurements were made at 30 cm above the graft union shortly after planting on July 11 and at the end of the growing season on November 11 (Table 1). No significant differences were seen between cultivars. Initial canopy height and width were not taken, but a measurement was made in the fall to reflect total height and width in two directions. There were differences among cultivars grown in the high tunnels, but not for cultivars grown in the open field. Contender was larger in size compared with Red Gold and Fantasia.

A late season estimate of chlorophyll content was taken September 29 via SPAD 502 (Table 2). A significant difference was seen in the amount of greenness measured in Red Gold in both HT and F plots (52.5 and 51.8, respectively) compared with Red.

After a successful establishment season, several differences were seen between the HT and F peach plots. Although statistically significant differences were not seen in caliper growth, visual differences 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		Growth indices (cm) ^y	
	HT	F	HT	F
Red Gold	15.5a ^x	10.5a	123.3b	86.5a
Red Haven	12.9a	8.8a	132.2ab	94.5a
Fantasia	11.4a	7.3a	117.8b	78.4a
Contender	11.3a	7.4a	157.0a	88.4a

^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	
	High tunnel	Field
Red Gold	52.5a ^y	51.8a
Red Haven	48.6b	46.9b
Fantasia	47.0b	46.5b
Contender	46.4b	46.0b

^zSPAD: Leaf greenness was determined using a handheld 502 SPAD meter (Konica Minolta Optics, Inc., Minolta, Japan).

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