# High Tunnel Fruiting Wall Nectarines, Apricots/Apriums, and Plums, Pluots, and Plumcots: Fruiting Phase

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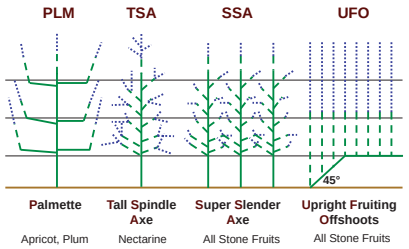
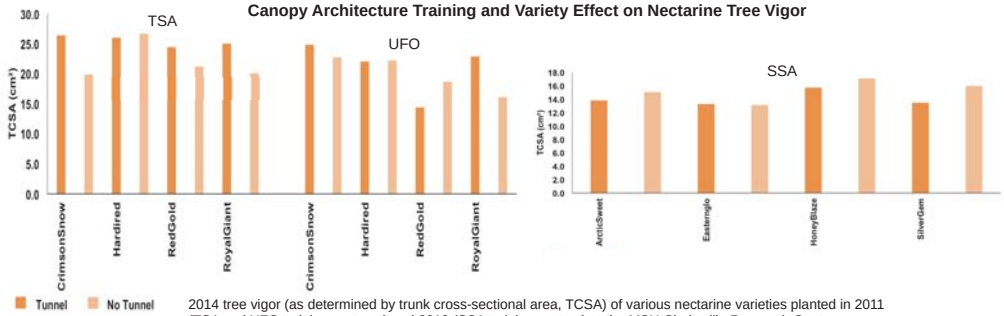
## "Fruiting Wall" Canopy Architectures:

- PLM, Palmette (apricots, plums, plumcots, pluots, and apriums)
- TSA, Tall Spindle Axe (nectarines)
- SSA, Super Slender Axe (all stone fruits)
- UFO, Upright Fruiting Offshoots (all stone fruits)




| Fruit type | Cultivar | Rootstock | Survival (%) | | Crop Rating |
|---|---|---|---|---|---|
| | | | 2013 | 2014 | |
| **Apricot** | | | | | *Rate 1-3* |
| | Apache | apricot seedling | 87 | 78 | 1.4 |
| | Earlyblush | myrobalan | 73 | 40 | - |
| | Goldbar | apricot seedling | 100 | 67 | - |
| | Goldrich | myrobalan | 100 | 27 | - |
| | Goldstrike | apricot seedling | 100 | 87 | - |
| | Harglow | manchurian | 20 | 13 | - |
| | Orangered | myrobalan | 87 | 31 | - |
| | Robada | apricot seedling | 87 | 87 | 1.6 |
| | Tomcot | apricot seedling | 81 | 59 | 1.1 |
| | Wilson Delicious | redleaf peach | 81 | 69 | 1.3 |
| **Aprium** | | | | | |
| | Escort | Citation | 87 | 7 | - |
| | Westcot | Lovell peach | 100 | 73 | - |
| **Nectarine** | | | | | *% w/fruit* |
| Yellow-flesh | Easternglo | Bailey peach | 96 | 96 | 26 |
| | Hardired | Lovell peach | 97 | 84 | 50 |
| | HoneyBlaze | Lovell peach | 96 | 88 | 5 |
| | RedGold | redleaf peach | 81 | 81 | 36 |
| | Royal Giant | redleaf peach | 97 | 97 | 6 |
| White-flesh | | | | | |
| | Arctic Sweet | Bailey peach | 100 | 100 | 8 |
| | Crimson Snow | redleaf peach | 91 | 91 | 59 |
| | Silver Gem | Bailey peach | 100 | 100 | 63 |
| **Plum** | | | | | *Rate 1-3* |
| Red-flesh | AU Rosa | myrobalan | 97 | 97 | 1.3 |
| | Queen Rosa | myrobalan | 100 | 100 | 1.3 |
| **Plumcot** | | | | | |
| | RF 47-1 | myrobalan | 97 | 97 | 1.0 |
| | Satin Spring | redleaf peach | 72 | 72 | 2.2 |
| **Pluot** | | | | | |
| | Flavor Gem | Citation | 100 | 100 | 1.6 |
| | Flavor Grenade | Citation | 100 | 100 | 3.0 |
| | Flavor Heart | Citation | 100 | 100 | 1.1 |
| | Flavorich | Citation | 100 | 100 | 1.4 |
| | Flavor Queen | Citation | 100 | 100 | 2.6 |
| | Flavorosa | Citation | 87 | 81 | 1.4 |

**Canopy Architecture Training and Variety Effect on Nectarine Tree Vigor**




2014 tree vigor (as determined by trunk cross-sectional area, TCSA) of various nectarine varieties planted in 2011 (TSA and UFO training systems) and 2012 (SSA training system) at the MSU Clarksville Research Center.

## High Value, High Tunnel Stone Fruit Production Optimization

The overall objective of this project is to develop and evaluate two complementary technologies, fruiting wall production systems for stone fruits and high tunnel protective covering structures, to examine their potential for improving Michigan growers' ability to sustainably produce and market high value specialty stone fruit crops like apricots, nectarines, and hybrid plums. The canopy architectures under development are depicted in the graph at left. Since dwarfing rootstocks are not available for these stone fruit crops, the impact of training system on tree vigor (e.g., see graphs above for nectarines) is an important outcome. Thus far, the high density SSA system has had the most moderate vigor, which also includes minimal re-growth following summer hedging, followed by the UFO and lastly the PLM.

The extremely cold winter of 2013-14 resulted in significant apricot tree mortality (see Table at left) and nectarine shoot and flower mortality (most trees had no fruit, and those that did only had a few), while plums (even pluots from California) had full crops. Surprisingly, the two apricots from the USDA breeding program in California, 'Apache' and 'Robada', survived and cropped very well. The June 28 ripening date for 'Apache' was particularly exciting. The tunnels were not covered until after fruit set, resulting in little impact of tunnel on harvest; in 2015, covers will be applied before bloom to explore the potential for even earlier ripening (as well as frost protection). Average ripening dates and fruit sizes are shown in the Tables at right.

## Covering Effects on Fruit Blush and Disease Incidence

In the highly-blushed apricot 'Robada', fruit blush development under the tunnel was minimal (see pictures below), resulting in beautiful large fruit with blemish-free orange skins. The tunnels slightly reduced blush on red-skinned nectarines, but not to the degree seen on apricot. Apricot fruit were 12% to 39% larger under the tunnel as well (see Table at right). Fruit scab (*Cladosporium carpophilum*) was absent under the tunnels, but was prevalent on 'Wilson Delicious' in the open orchard (see below). The high tunnels also protected against leaf diseases, such as bacterial spot (*Xanthomonas campestris* pv. *pruni*), which were prevalent in the open orchard on some varieties (see below, right)). The tunnels did not protect against fruit brown rot (*Monolinia fructicola*), which required protective fungicide sprays.

| Apricot / Aprium | | Fruit Size (g) | |
|---|---|---|---|
| | Ripening Date | Tunnel | No Tunnel |
| **Cultivar** | | | |
| Apache | 6/28 | 46.0 | 41.0 |
| Tomcot | 7/9 | 61.9 | 55.4 |
| Westcot | 7/9 | 106.3 | - |
| Robada | 7/15 | 88.2 | 63.1 |
| Goldbar | 7/18 | 87.5 | - |
| Goldstrike | 7/18 | 89.2 | - |
| Orangered | 7/18 | 41.1 | - |
| Wilson Delicious | 7/28 | 72.4 | 69.7 |

| Nectarine | | Fruit Size (g) | |
|---|---|---|---|
| | Ripening Date | Tunnel | No Tunnel |
| **Cultivar** | | | |
| Silver Gem | 7/30 | 125.0 | 133.1 |
| Easternglo | 8/5 | 101.5 | 117.7 |
| Arctic Snow | 8/8 | 107.9 | 137.3 |
| Crimson Snow | 8/15 | 140.7 | 104.4 |
| Hardired | 8/18 | 128.7 | 108.9 |

| Plum / Plumcot / Pluot | | Fruit Size (g) | |
|---|---|---|---|
| | Ripening Date | Tunnel | No Tunnel |
| **Cultivar** | | | |
| Spring Satin | 7/18 | 54.3 | 50.6 |
| Flavorosa | 7/23 | 53.9 | 62.8 |
| Queen Rosa | 8/5 | 72.8 | 60.2 |
| AU Rosa | 8/8 | 60.6 | 50.2 |
| Flavor Grenade | 8/18 | 42.5 | 41.0 |
| Flavorich | 8/18 | 59.3 | 61.5 |
| RF47-1 | 8/29 | 38.3 | 34.1 |
| Flavor Queen | 8/29 | 73.5 | 74.6 |
| Flavor Heart | 9/3 | 71.9 | 74.0 |
| Flavor Gem | 9/11 | 67.2 | 69.2 |


'Robada' apricot ripening with reduced UV light exposure under the high tunnel plastic cover (left) and uncovered in the open orchard (right).


'Wilson Delicious' apricot with no scab infection under the high tunnel plastic cover (left) and extensive infection in the open orchard (right).


'RF 47-1' plumcot healthy foliage under the high tunnel plastic cover (left) and infected with bacterial spot in the open orchard (right).

This project was supported by financial and in-kind support from the Michigan State Horticultural Society, the USDA-NIFA-AFRI Small Farms grant program (Award #2012-68006-30188), the USDA National Institute of Food and Agriculture (Hatch project #MICL02002), and MSU AgBioResearch.