DEVELOPING PEDESTRIAN ORCHARD SYSTEMS

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Economic pressures are forcing growers to reevaluate all farming practices. For production practices, labor costs dominate all others. Over the past few years, much has been learned about the relationship between tree height, production potential, and labor cost savings. Both dwarfing and standard rootstocks have been studied, but never within a comparison as part of an overall system.

Furthermore, while we have demonstrated that orchard height can be significantly and successfully reduced, even while using vigorous rootstocks such as Nemaguard, we still do not know if a true pedestrian orchard, i.e. one in which no ladders are at all necessary, is economically feasible over the long-term.

To understand these issues better, we have begun several trials that will explore the relationships between tree from, orchard density and rootstock vigor. Our overall goal will be to maintain tree height at about 7-8' thus establishing a pedestrian orchard. Within those constraints we will investigate how successful and how suitable such a strategy is.

METHODS

Trial 1: "Owen T" Plum

In March 2007 a block of "Owen T" plums growing on the semi-dwarfing rootstock Citation (about 75-80% of the vigor of Nemaguard) were planted at Kearney. Two row spacings/tree height configurations are used: 1) standard 18 foot wide rows in which the trees will be grown to standard height (12-14 feet tall); and 2) 15 foot wide rows in which the tree will be kept at a pedestrian height (7-9 feet tall). Tree conformation within each includes three training systems: 1) 6-leader Hex-V trees, 2) 4-leader Quad-V trees, and 3) 2-leader Kearney V trees planted at 12, 8, and 4 feet apart respectively. This design will allow us to make comparisons between tree height, tree density, and per acre scaffold count, (table1). Trees are growing well and are anticipated to bloom and produce some crop in 2008.

Table 1. Per acre tree and scaffold counts for "Owen T" plums on "Citation" rootstock, growing at differing densities and conformations and planted at the Kearney Ag Center in March 2007.

Row Spacing	Tree Form	Trees/acre		Scaffolds/acre	
		15' row	18' row	15' row	18' row
4'	Kearney-V	726	605	1452	1212
8'	Quad-V	363	303	1452	1212
12'	Hex-V	242	202	1452	1212

Trial 2: "Springcrest"/"O'Henry" Height and Rootstock Comparison

In order to derive yield data in 2008 an established block of five year old "Springcrest" and "O'Henry" peaches was differentially topped in the fall of 2007 prior to dormant pruning. One-half of the orchard was topped at 8' and the other at 10'. The shorter trees were topped even lower during dormant pruning – i.e. approximately 7-8' – with the primary purpose of making them into true pedestrian trees. Within each height, there are four rootstocks, Nemaguard, UC Controller 9, Hiawatha, and UC Controller 5 (listed from greatest to lowest vigor). This block will allow us to compare yield, fruit quality, and tree response across inherent vigor potential to limited/restricted tree height. This block is large enough that we will also be able to gain experience with the horticultural procedures such as summer pruning and light management, which are needed to manage pedestrian orchards.

Trial 3: Tree Form and Rootstock

An orchard block is being established at the Kearney Agricultural Center. In 2006, the low-volume microsprinkler irrigation system was installed. Trees were scheduled to be planted in 2006 but due to poor rooting percentage in the nursery insufficient trees were available. Potted trees are now growing at Burchell Nursery for planting in the spring of 2008. Two varieties will be used, Spring Flame 22, an early, vigorous peach and Summer Flare® 28, a late-season, heavy-bearing nectarine, and they will be planted to the following systems.

Rootstock	Spacing	Density (tree/acre)	Scaffolds per acre	Form
Nemaguard	12'x16'	227	1362	6-leader Hex V - tall
Nemaguard	12'x16'	227	1362	6-leader Hex V
UC Controller 9	12'x16'	227	1362	6-leader Hex V
UC Controller 9	7' x 14'	445	1780	4-leader Quad V
UC Controller 5	7' x 14'	445	1780	4-leader Quad V
UC Controller 5	5' x 14'	622	1244	2-Leader Kearney V

All trees will be kept at a height of 7-9 feet with the exception of treatment #1, which will be allowed to grow to an industry standard of 12-13 feet. Trees will be planted in non-replicated demonstration blocks that are four rows wide and 10 trees long.