PERFORMANCE OF FOUR OWN ROOTED WALNUT CULTIVARS VS. ON PARADOX ROOTSTOCK

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ABSTRACT

Selected walnut cultivars are propagated primarily by grafting or budding in the nursery or in the field on seedlings of northern California black (Juglans hindsii), Paradox hybrid (J. hindsii or other x J. regia) or selected English rootstock (J. regia) in California. A grower’s cost to purchase trees varies depending on the rootstock selected and method used to propagate trees, but is always a large capital investment. Micro-propagated own-rooted cultivars represent an economical alternative to conventionally propagated trees; they also may have potential in areas where commonly used rootstocks (J. hindsii and J. hindsii x J. regia) are undesirable because of cherry leafroll virus (blackline) hypersensitivity. Imported micro-propagated Chandler and Vina own-rooted trees are growing in the nursery row at Burchell Nursery. Howard and Tulare clones have been initiated into tissue culture and will soon be moved to the multiplication phase. All four own-rooted cultivars will be ready for the field test plot sites in spring 2002.

OBJECTIVES

Compare long-term growth and yield performance of own-rooted Chandler, Vina, Howard and Tulare trees with trees on seedling Paradox rootstock in two locations.

PROCEDURES

Chuck Leslie of the UCD Pomology Department initiated the walnut clones, Howard and Tulare, into culture. Select mother trees of Howard and Tulare were used as stock material. Multiple cuttings of fresh green growing material were excised and initiated into tissue culture. The excised shoot tips were sterilized and placed on specially formulated medium to support growth in test tubes. Once the shoots began growing without contamination in the test tubes they were moved to the multiplication process. The initiation phase of the procedure took 6 months.

During the multiplication phase, the shoots will be divided into small pieces every three weeks as growth permits, during the winter of 2000-2001 for both clones. Once a large culture base of shoots is established (about 2-3 months), individual shoots can be removed to grow in an elongation phase. This phase involves the right combination of growth hormones to encourage the elongation of the shoots. The shoots in the multiplication phase will need to be maintained all year and used as a source of new shoots for the elongation phase. Once the shoots have completed the elongation phase (6-8 weeks) then the shoots go through a root induction phase for a limited amount of time (one week). After the root induction phase, the shoots are moved to a root
expression phase for 2-4 weeks. Once roots form on the shoots, they are moved out to a greenhouse where they are acclimated for two months.

Acclimated micro-propagated Chandler and Vina clones up to 20 cm were imported from Spain during the summer of 2000 and grown in the greenhouse. They were transplanted to the nursery row in October 2000 as approximately 2-inch plants.

RESULTS AND DISCUSSION

The first year of the study was devoted to initiation, maintenance and multiplication of Howard and Tulare cultivars in tissue culture and to growing imported own-rooted Chandler and Vina trees in the nursery row. The Howard was initiated into Burchell Nursery’s proprietary in vitro production system after establishing it was free of bacteria: There are 50 shoot cultures in the Burchell Nursery laboratory. The Tulare is in the process of increase in vitro and will be screened for bacteria before introduction into the system. Both the Howard and Tulare will be rooted in vitro in spring 2001 and then moved to the greenhouse in early summer. Depending on growth, these plants will either continue to grow in the greenhouse or be planted to the nursery row. Both clones are scheduled for release in the spring of 2002. The Chandler and Vina will grow in the nursery row until released with the Howard and Tulare clones for the field plots in 2002.

A grower cooperator with an approximately 3-acre field plot site was located in Sutter County. The site was previously planted to pistachios but had been fallow for three years. The site was then treated with methyl bromide and will remain fallow until the trees are planted in 2002. A site will be located in San Joaquin County and prepared for a 2002 planting. Greg Browne and Mike McKenry will screen a sufficient number of own-rooted trees of each cultivar in 2001 for Phytophthora and nematode resistance.