

Pistachio Rootstock Evaluation

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Introduction

The rootstock *Pistache atlantica* is the most commonly grown variety in Arizona pistachio orchards. However, this variety is susceptible to the disease caused by *Verticillium dahliae*, a fungus found in many Arizona soils.

A second problem occurring in Arizona pistachio orchards is cold damage. Air temperatures in Arizona orchards are significantly colder than those occurring in pistachio growing areas in California. Therefore, the ideal rootstock for Arizona would be a variety with tolerance to both *V. dahliae* and cold temperatures.

The five rootstocks chosen for evaluation reportedly have the following attributes. *P. atlantica* is susceptible to *V. dahliae*; *P. integerrima* is tolerant to *V. dahliae*; UCB-I is tolerant of both *V. dahliae* and cold temperatures; the qualities of both *P. integerrima* X *P. atlantica* and *P. integerrima* X *P. terebinthus* are not known.

Materials and Methods

Five rootstocks were chosen for evaluation: *P. atlantica* (2 yr-old trees from S & J Ranch, Pinedale, CA), *P. integerrima*, called Pioneer Gold I (2 yr-old trees from S & J Ranch), *P. integerrima* X *P. atlantica*, also known as Pioneer Gold II, (2-yr-old trees from Pioneer Nursery), *P. integerrima* X *P. terebinthus* (2-yr-old trees from Pioneer Nursery), and a University of California selection called UCB-I (1-yr-old trees from S & J Ranch).

Twenty-four trees of each rootstock were planted 4/25/89 at Triple A Pistachio, Cochise, AZ. The soil is a silty loam with 1 % organic matter and a pH of 7.3. Trees were spaced 18 feet by 18 feet. No fertilizer was applied at the time of planting. The site had not been farmed previously. Trees were treated with 7 lbs. zinc sulfate per acre 11/1/89.

Twenty trees of each rootstock were budded to the Kerman (female) variety and four trees of each were budded to the Peters (male) variety on 9/15/89.

Trees were evaluated periodically for growth, frost damage, and other horticultural characteristics. Bud growth was evaluated on a scale of 0 to 3; 0 = dead, 1 = alive but no growth, 2 = visible growth, 3 = vigorous growth. Rootstock growth was evaluated on a scale of 0 to 4; 0 = dead, 1 = dieback to ground, 2 = dieback of limbs with trunk healthy, 3 = tip dieback with limbs healthy, 4 = good growth.

Results

P. atlantica: Four of 24 trees had tip dieback immediately following planting. Weather records at the AzMet station in Bonita showed minimum temperatures of 28 degrees F on 4/27/89 and 30 degrees F on 4/28/89. After one year of growth, 23 of 24 trees survived. Of the 23 trees, 20 had surviving buds. Mean bud growth had a rating of 1.2 (+ or - 0.7). Rootstock growth had a mean value of 4.0.

P. integerrima: Four trees of this species also had frost damage immediately following planting in the spring of

1989. After one year of growth, 23 of 24 trees survived. This rootstock did not abscise leaves at first frost (29 degrees F recorded at AzMet station on 10/27/89, 22 degrees F on 10/30/89) as did the other rootstocks. The leaves froze in mid-December; minimum temperatures recorded at the AzMet station were 11 degrees F on 12/12/89 and 12/13/89. All of the surviving trees had a live bud on 4/5/90. At this time, bud growth had a mean value of 1.0 (+ or - 0.8). Rootstock growth had a mean rating of 2.6 (+ or - 0.8).

P. integerrima X P. atlantica: These trees were not damaged by freezing temperatures following planting in 1989. After one year of growth, 23 of 24 trees survived; 21 of these trees had live buds on 4/5/90. Mean bud growth was 1.4 (+ or - 1.9). Rootstock growth had a mean value of 3.3 (+ or - 1.1).

P. integerrima X P. terebinthus: None of the trees were damaged by freezing temperatures following the 1989 planting. Twenty-two of 24 trees survived; 20 of these had live buds on 4/5/90. These trees had a mean bud growth rating of 1.59 (+ or - 1.1). They had vigorous rootstock growth, with a mean rating of 3.7 (+ or - 0.6).

UCB-I: No freeze damage was evident on these trees following cold temperatures immediately after planting. Twenty-three of 24 trees survived after one year; 22 of these had live buds on 4/5/90. The mean bud growth rating was 1.2 (+ or - 0.4) This rootstock variety was the last to leaf out in the spring of 1990, with a mean rootstock rating of 3.3 (+ or - 1.3).

Conclusions

The results of one year's study indicate that the hybrid **P. integerrima X P. terebinthus** may perform as well or better than the standard rootstock **P. atlantica**. Although **P. atlantica** suffered frost damage after planting in 1989, it had the best rootstock growth after one year. **P. integerrima X P. terebinthus** had good rootstock as well as bud growth after one year. **P. integerrima** had the poorest rootstock and bud growth of all the varieties tested. Additionally, it suffered frost damage following planting and was slower to enter dormancy in the fall. The varieties **P. integerrima X P. atlantica** and UCB-I rated intermediate.