



It's Déjà vu all over again! More Stunted Pistachio Trees in the Orchard.

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A decade or more ago I was invited into a number of growers' pistachio orchards to observe a relatively high degree of variability in tree growth exhibited by Kerman scions grafted onto UCB-1 rootstocks. At that time, some growers were removing up to 20% of the trees in some blocks. After a hiatus of 10 years or so, I, again, am visiting growers' orchards to observe a relatively high degree of variability in tree growth exhibited by Kerman and Golden Hills scions grafted onto UCB-1 rootstocks grown from seed. I am not seeing this variability on clones derived from selected UCB-1 rootstocks. This variability, which includes what I would consider an unacceptably high proportion of stunted trees, appears to be the result of some degree of incompatibility between rootstock and scion.

UCB-1 is a commonly used rootstock for pistachio production in the United States. Seed for the UCB-1 rootstock is produced by crossing a selected *P. atlantica* female tree with a selected *P. integerrima* male tree. Pollen from the stamens of the male tree is collected and introduced onto the flowers of the female tree. This type of cross is referred to as closed since there is a single female and male genotype used in the cross. However, even though the seeds are produced from the same parent, they are not identical. Variability exists, as a result of "crossing over" of the chromosomes early in the natural development of each seed. Variability can also be introduced if the female flower is not adequately protected from foreign pollen, for example, from *P. chinensis* (i.e. Chinese pistachio) pollen contaminating a flowering rachis of the UCB-1 female tree at a commercial nursery. UCB-1 seedling trees that do not conform to standards that are known to produce adequate rootstocks for the industry are known as "off-type" trees.

Some seed nurseries, that have been producing UCB-1 for many years, are able to readily recognize and rogue (that is remove from production and destroy) off-type UCB-1 seedlings. Recognition of off-type seedlings may be something of an art that usually comes with years in the business. For example, a frequently observed off-type is a slow-growing tree with unusually small leaves. Off-type trees are rogued so that they do not end up in a grower's field where they will produce a slow-growing stunted tree. Ten years ago, in some nurseries, sometimes upward of 25% of the seedling rootstock trees were rogued.

It is not difficult to get into the business of producing UCB-1 seed. Budwood from the parent trees is available from Foundation Plant Services at the University of California, Davis. With these buds, a potential nurseryman is able to produce UCB-1 seed, once the trees flower. However, there is more to producing good seed for the industry than simply waiting for the trees to flower and making

crosses. Ideally, UCB-1 seeds will be produced in nurseries far from sources of contaminating male pollen. The genus *Pistacia* is wind pollinated and pollen can travel for many miles. The prospective nurseryman must know how to protect the tree from foreign pollen to prevent production of off-type trees. This is usually accomplished by bagging the female flower well before any pollen from any tree in the *Pistacia* genus becomes air-borne. Even the male flower should be bagged to prevent foreign pollen from landing on the male flowers prior to its collection for pollination. Pollen collected from the flowers of the *P. integerrima* male parent may be injected into the protective bag covering the female flower with a syringe, obviating the need to remove the bag to fertilize the flower inside and greatly reducing the chance of contamination. Even perfect protection from foreign pollen will not prevent the need for roguing off-type trees that result naturally as a result of chromosomal “crossing over” between the *P. atlantica* and *P. integerrima* parents.

Unfortunately for many growers, problem Kerman and trees of other varieties produced from off-type UCB-1 rootstocks are sometimes not readily recognizable until they have been in the ground for three or four years. The incompatible trees apparent today are the result of poor roguing practices three or more years ago.

Growers buying trees from nurseryman should not hesitate about asking how the nursery produces its rootstock seed and its protocols for roguing off-type rootstock trees. At planting, if the rootstocks in the delivery truck appear to have a lot of variability in tree size and leaf size and form, that is not a positive sign. It takes long enough to get pistachio trees in production under the best conditions without the added frustration of going back to the orchard in future years and removing trees that will not have the capacity to produce adequate yields.

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