

# **2000 Nickels Field Trials of Self-Compatible Almonds**

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## **Introduction & the Importance of Testing New Almonds at Nickels**

Continued profitability of Sacramento Valley almond production relies upon dependable and quality production with reduced inputs. The breeding of improved, self-fruitful and disease and pest resistant varieties adapted to local conditions offers opportunities to meet these demands while remaining both ecologically and economically acceptable. Breeding success depends upon locating sources of needed germplasm, the efficient indexing, testing and transfer of selected genes through controlled crosses, the generation of large numbers of progeny from controlled crosses to ensure recovery of the rare, horticulturally superior individuals, and the thorough testing of promising selections in the range of soil and weather types typical of California almond production. A key objective of the UCD almond breeding program is a series of almond varieties having kernel and tree qualities comparable to 'Nonpareil' but with self-compatibility to allow single-variety blocks, thus reducing orchard management needs and improving insect pollination efficiency. The Nickels Field Trials allow the testing of advanced UCD breeding selections for local performance including both positive (good adaptation) and negative (vulnerabilities to local diseases, weather, etc.) responses. An

example of such a long term project was the ongoing rootstock trials which has resulted in the release of the '*Nickels*' rootstock based on early testing at the Nickel's Research plots. The objective of the present trials is to determine whether new self-compatible UCD selections can perform as well in solid orchard blocks as in the alternating row of cross pollinizers now used by the industry. Solid variety block would result in significant savings to growers as they would greatly facilitate orchard management (i.e. spray, irrigate and harvest, etc. at one time for each orchards rather than row-by-row [variety-by-variety] as is presently practiced. Good performance in solid blocks would also support the ability of self-compatible almond cultivars to produce more consistently from year-to-year despite weather differences, particularly at the time of flowering.

## **Summary 2000**

Results closely followed 1999 responses. Four advanced UCD almond selections (UCD25-75, UCD34-26, UCD45-8 and UCD 36-52) which had previously shown evidence for self-compatibility of pollen on their own stigma/pistil were planted in both 4-tree x 4-row solid blocks and also in a separate plantings where all selections were interplanted. The goal was to evaluate capacity for self-fertilization in the presence of adequate honey-bees as pollinators. [Individual crop set of interior 4 trees of the 16 in a 4x4 planting will set primarily from self-pollen. Their set was compared with crop set on peripheral and interplanted trees which are pollinated by both self and nearby outcrossed pollen. Similar sets on both the interior and peripheral trees would indicate opportunities for single cultivar plantings, while dramatic differences would indicate poor selfing (pollen transfer from the anther to near by sigma on these self-compatible

flowers).

As in 1999, selection UCD 36-52 was the only selection to produce an acceptable crop in any of the trials. Selection UCD25-75 had a moderate crop with significant crop not being successfully shaken and harvested owing to a poor tree structure for mechanical harvest. As in 1999, considerable within-tree variability was observed for this selection, but with most nuts setting on interior wood, it was hard to knock due to the peach-like growth habit of this item. Both selections UCD34-26 and UCD45-8 showed poorer crop, due to low nut distribution throughout the tree and overly open tree structure, respectively.

UCD 36-52 produced a moderate to good crop primarily on interior spurs and webii-like radial branches. The kernels are more heart-shaped than typical California varieties, being similar in size and shape to the *Marcona*

variety popular in Spain. UCD36-52 produced comparable crops in both solid block plantings and in interplanted blocks. Interplanted trees showed a slightly higher though not significantly different yield when compared to solid block trees. In smaller scale selfing studies involving hand selfed-enclosed limbs, UCD 36-52 had previously appeared to have only marginal levels of self-compatibility. Both self-compatibility and self-and cross-pollinating mechanisms, however, remain poorly understood in almond and continued research on both basic mechanisms and field performance is required.

Evaluations at this block will continue approximately two additional years to allow observation of mature tree performance. In addition, controlled crosses have been made between UCD selection showing high self-compatibility with breeding lines possessing superior tree and nut quality. Progeny from these crosses will be readily for regional testing by the end of 2001.

**Figure 1.**

*Crop size (in pounds/acre/x1000 for solid blocks of Selection 36-52 compared with the crop of adjacent trees which were interplanted with pollinizers of different genotypes.*

