



A ripe walnut, ready for harvest.

**Walnut** *Juglans regia* L.

## Chandler transforms the industry

When a grower plants a walnut tree, it is most likely a product of the UC Davis walnut breeding program. Virtually all of the walnut varieties sold in California nurseries are UC Davis varieties. One variety — **Chandler** — accounts for 90 percent of all nursery sales of walnut.

California produces 99 percent of the walnuts grown in the United States, and is the second-largest walnut-producing country in the world, behind China.

Chandler was patented in 1979 by Harold Forde, who co-created the walnut-breeding program in

1948. Chandler gave California growers what they needed to succeed — a highly prolific tree that produces leaves mid-season after most of the rains and freezing temperatures have passed, and produces nuts with the light-golden kernels that consumers love.

Forde and his colleague Eugene Serr started the UC Davis walnut breeding program using selected parents and controlled pollinations. The breeding program is still active, now under the direction of Gale McGranahan.

The goal of the Serr/Forde

breeding program was to increase the yield of high-quality walnuts. Yield is closely related to the number of female flowers produced. Serr and Forde identified a unique flowering type in which flowering buds were produced not just terminally but along a branch. The first genotype (variety or clone) exhibiting this trait was **Payne**, which became an outstanding parent that conferred the lateral fruiting to many of its progeny.

Serr and Forde released ten varieties in 1968. The varieties **Vina**, **Serr**, and **Chico** stood out. Vina,



Eugene Serr (front left, holding the branch) helped start the walnut breeding program at UC Davis in 1948.



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which has high yields but average kernel quality, is still planted today. In 1978, just before he retired, Forde patented three new walnut varieties — **Sunland**, **Howard**, and

**Chandler**. These were the control-pollinated grandchildren of Payne. Sunland had a lovely plump nut, but the tree was almost too vigorous and the kernel color was sometimes too dark. Howard is still a cultivar of interest, making up about eight percent of nursery sales. Chandler, however, took over the industry.

Growers now look to UC Davis to solve Chandler's one major problem: it is too popular. It harvests late in the season, and with the dominance of Chandler, processors are challenged by an end-of-the-season glut.

McGranahan has released two cultivars from crosses made by Serr and Forde. These are **Cisco**, a suitable pollinator for Chandler, and **Tulare**, which was released after 20 years of evaluation. Tulare is very precocious in bearing fruit and harvests mid-season, but does not have Chandler's light-colored kernels which have become the industry standard.

UC Davis' latest varieties include **Livermore**, **Sexton**, **Gillet**, and

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**Forde**. Livermore has a bright-red kernel bred from a darker-purple germplasm introduction. Sexton, Gillet, and Forde are mid-season cultivars that have high yields, jumbo light-colored kernels, and low susceptibility to walnut blight. They also do not have a seed coat shrivel, which can be a problem with Chandler.

"Forde is potentially the new Chandler," says Chuck Leslie, staff research associate with McGranahan's breeding program.

The Walnut Marketing Board has endowed the program, which is working to develop early-harvesting cultivars with all the attributes of Forde and Chandler. Field trials of promising early selections are underway.