walnuts.org

WALNUT IMPROVEMENT PROGRAM

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Objectives

1. Provide the California walnut industry with improved cultivars and rootstocks.
2. Develop and maintain germplasm with an array of useful traits for breeding.
3. Develop and apply new physiological, molecular, and computational tools for more efficient walnut breeding.

Background

The Walnut Improvement Program develops improved scion cultivars and new rootstocks with pathogen and abiotic stress resistance for the California walnut industry, improves our understanding of the genetics of the crop, and maintains breeding resources. Scion breeding targets include improved disease and insect resistance, a range of harvest dates, increased yield and precocity, good kernel color stability, shelf life, and yield of kernel halves.

2020 Results

- This year we released 'Wolfskill' (Chandler x Solano), a mid-season variety with Chandler color and better fill that harvests 10-14 days before Chandler.
- DNA markers were developed for prediction of lateral bearing, precocity, and leafing date in new seedlings.
- We discovered a genetic source of extreme precocity, whose offspring produce floral buds in the first year and nuts in the second year.
- We continue to refine techniques for walnut micropropagation and to distribute experimental rootstocks to cooperating pathologists for testing.
- We continue to develop greenhouse procedures for identifying Armillaria-resistant rootstocks.
- We began screening the breeding program for variation in resistance to rancidity, with the goal of producing new cultivars with longer shelf life.
- A computer vision system was implemented to measure kernel color objectively and quantitatively, and the system was validated against human scoring of color on more than 50,000 kernels.
- We continue to work towards solutions for blackline disease (cherry leaf roll virus or CLRV), including the development of both CLRV-tolerant rootstocks and CLRV-resistant scions.

TABLE 1. Nuts and kernels of ‘Wolfskill’, our new release.