Walnut 'RX1' - *Phytophthora*-Resistant Rootstock

UC Davis, UC ANR, & USDA Agricultural Research Service, USA

***Phytophthora* crown and root rots can cause extensive tree losses that degrade and occasionally decimate walnut orchards. Seedlings generated from various sources were tested for host-plant resistance to these diseases in greenhouse and field trials. A single seedling derived from DJUG 29.11, an accession maintained by the National Plant Germplasm System (NPGS) genebank location in Davis, California, showed excellent resistance in trials. It was clonally propagated and has now become a major commercial rootstock known as 'RX1', selling more than 1.7 million trees since its release.**

Photo by Chuck Fleck, Sierra Gold Nurseries, 2024.

Commercially grown 'RX1' walnut rootstock.

PROJECT GOALS

✓ Develop and release a commercially viable walnut rootstock with host-plant resistance to *Phytophthora* crown and root rot

Problems Addressed

Species of *Phytophthora* are widespread in orchard soils, can move across locations through surface water, are difficult to control, and can be deadly to trees. Young trees are particularly susceptible and can collapse and die rapidly, or trees may go years before succumbing, while experiencing reduced growth and yield. Chemical control options are limited. Proper water management is helpful but not always successful in prevention, particularly on poorly drained or periodically flooded soils. Resistant rootstocks provide an additional disease management tool.

Solutions Developed

A collaboration between the University of California and the NPGS repository in Davis, CA sought to develop novel walnut rootstocks. They produced 'RX1', an open pollinated hybrid seedling from a little walnut female parent (DJUG 29.11) and an English walnut male parent. 'RX1' performed very well in a screening for *Phytophthora* resistance during the Paradox Diversity Study and was therefore propagated for further testing. This line has also been found to be less susceptible to crown gall disease and lesion nematode. 'RX1' was patented and released commercially in 2010.

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