

Field Evaluation of Almond Rootstocks

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PROJECT SUMMARY

Objectives:

This project encompasses several long-term trials located throughout the almond growing regions of California. Each field trial separately evaluates the field performance of numerous rootstocks compared to long-time local standards, Nemaguard and/or Lovell. Each trial location presents different production challenges and include the following objectives:

- Evaluate alternative rootstocks irrigated with low quality (saline) irrigation water in alkaline, heavy soil (Stanislaus County) and high N, low pH, low CEC, sandy soil (Merced County).
- Evaluate alternative rootstocks under very high boron conditions (Yolo County).
- Evaluation of alternative rootstocks for tolerance to Armillaria root and crown rot (Stanislaus County).
- Evaluation of rootstocks in unfumigated replant locations in sandy (Stanislaus) and heavy (Butte) soil.

Background and Discussion:

Selecting the appropriate rootstock for specific soil conditions is critically important for the long-term success of an almond orchard. Rootstocks influence the vigor of a tree, anchorage, and date of crop maturity. More importantly, rootstocks can guard against soil-borne pathogens like nematodes, crown gall, Phytophthora, Verticillium wilt and oak root fungus; they can even effect above ground pathogen susceptibility in the case of bacterial blast. Tolerant rootstocks enable plantings into areas with chemical soil challenges such as high pH, sodium, chloride or boron.

Nemaguard and Lovell, long-time industry standard rootstocks, have some significant flaws. Both perform poorly in heavy, alkaline soils and are susceptible to Phytophthora, oak root fungus, crown gall and other diseases. Nemaguard is also susceptible to ring nematode and bacterial canker while Lovell is highly susceptible to rootknot nematode and crown gall. This project involves a number of separate field trials evaluating over 25 different rootstocks from various breeding programs around the globe.

Some of the highlights documented in these field trials include:

- High chloride tolerance of most peach x almond hybrids, Rootpac R and Viking.
- Rootstocks least tolerant to chloride include Lovell, Krymsk 86, and Nemaguard.
- Most peach x almond hybrids and Viking accumulate significantly less hull boron than other rootstocks. However, no tested rootstock appears to be highly tolerant of excessive boron.
- Lovell, Krymsk 86, Atlas, Cadaman, and HBOK 50 accumulate the most hull B.
- Krymsk 86, PAC9908-02, Hansen, and Viking have exhibited very good anchorage while Hansen x Monegro (HM2) has unacceptably poor anchorage.
- Atlas appears to be tolerant to Verticillium wilt disease while Lovell and Hansen appear highly susceptible.
- Hansen, Krymsk 86, & Brights 5 can host high levels of ring nematodes while Krymsk 86 can also host substantial numbers of root knot and root lesion nematodes.
- Krymsk 86 and Rootpac-R showed the highest potassium leaf levels (Butte)

Project Cooperators and Personnel: Joseph Connell, UCCE – Butte County (Emeritus); David Doll, UCCE – Merced County; Katherine Pope, UCCE – Yolo & Solano Counties

For More Details, Visit

- Poster location 95 & 96, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2018) at Almonds.com/ResearchDatabase
- 2016 - 2017 Annual Reports (16-HORT4-Duncan) on the web at Almonds.com/ResearchDatabase
- Related Projects: 17-AIR9-Doll; 17-HORT26-Sandhu