

# Field Evaluation of Almond Rootstocks

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## PROJECT SUMMARY

### Objectives:

This project evaluates the field performance of several rootstocks compared to long-time standards, Nemaguard and Lovell. It encompasses numerous trials planted in different almond growing locations in California. These locations present 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 (Butte & Stanislaus Counties).
- Evaluation of variety compatibility with rootstocks for almond, particularly compatibility with Nonpareil.
- Continue observation of alternative rootstocks in a sandy, unfumigated replant location (Stanislaus).

### 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 also enable plantings into areas with chemical soil challenges like high pH or 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 rootstock 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.
- The rootstocks least tolerant of chloride are Lovell, Krymsk 86, and Nemaguard.
- No tested rootstock appears highly tolerant to boron; most peach x almond hybrids and Viking accumulated significantly less hull boron than other rootstocks in two trials.
- Lovell, Krymsk 86, Atlas, Cadaman, and HBOK 50 accumulated 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 hosted high levels of ring nematodes while Krymsk 86 also had substantial numbers of root knot and root lesion nematodes.

**Project Cooperators and Personnel:** Joseph H. Connell, UCCE - Butte; David Doll, UCCE - Merced; Katherine Pope, UCCE – Yolo & Solano

### For More Details, Visit

- Poster location 48, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- 2015 - 2016 Annual Reports CD (15-HORT4-Duncan); or on the web (after January 2017) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- Related projects: 16-HORT10-Gradziel; 16-HORT16-Aradhya/Kluepfel (COC); 16-PATH7-Duncan/Baumgartner (COC); 16-PATH1-Browne (COC)