

## Field Evaluation of Almond Rootstocks

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### PROJECT SUMMARY

#### Objectives:

This project evaluates the field performance of several alternative rootstocks. 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 low pH sandy soil (Merced County) and in high pH, loamy clay soil (west side, Stanislaus County).
- Evaluate alternative rootstocks under high boron conditions (Yolo County).
- Continue evaluation of alternative rootstocks for tolerance to Armillaria and crown rot (Butte & Stanislaus counties).
- Continue evaluation of variety compatibility with rootstocks for almond, particularly compatibility with Nonpareil.
- Continue evaluation of alternative rootstocks in a sandy, unfumigated replant location (Stanislaus County).

#### 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 sodium and chloride tolerance of most peach x almond hybrids, Emphyrean 1 and Emphyrean 101. Viking appears to have moderate-high sodium and chloride tolerance.
- Atlas, Krymsk 86 and Emphyrean 2 (a.k.a. Penta) are sensitive to salt, similar to Nemaguard and Lovell.
- While no tested rootstock appears highly tolerant to boron, most peach x almond hybrids and Viking accumulated less hull boron than other rootstocks.
- Atlas appears to be tolerant to Verticillium wilt disease while Lovell and Hansen appear highly susceptible.
- Krymsk 86 has superior anchorage compared to Lovell & Ishtara.
- While no rootstocks appear tolerant to drought, Krymsk 86 and RootPac R reached higher levels of water stress compared to other rootstocks.

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

#### For More Details, Visit

- Poster location 59, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- 2014-2015 Annual Reports CD (14-HORT4-Duncan); or on the web (after January 2016) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- Related projects: 15-HORT10-Gradziel; 15-HORT16-Aradhya/Kluepfel; 15-PATH7-Duncan/Baumgartner; 15-PATH1-Browne