Field Evaluation of Almond Rootstocks

Field Evaluation of Almond Rootstocks for Stanislaus County – Roger Duncan, UCCE Stanislaus County

Trial #1: Field Evaluation of Sixteen Rootstocks in an Unfumigated, Sandy Loam Replant Location

Trial specifics:

- Planted January, 2003
- 2nd generation orchard following nemaguard
- No pre-plant fumigation, fallowed one year
- Hanford sandy loam, pH ~ 6.8
- Flood irrigated with high quality district water

The Influence of Rootstock on Leaf Nutrient Levels
May 1, 2012

	N %	P %	K %	B ppm	Ca %	Zn ppm	Na ppm	Cl %
Nemaguard	3.5	0.22	1.9	48	1.8	21	102	0.05
Lovell	3.4	0.22	1.9	46	1.7	24	78	0.04
Guardian	3.3	0.21	1.9	46	1.7	21	112	0.05
Avimag	3.4	0.21	2.3	50	2.0	27	96	0.04
Empyrean 1	3.4	0.21	2.0	48	1.9	29	66	0.03
Hansen	3.3	0.23	2.2	50	2.4	32	82	0.03
Nickels	3.4	0.22	2.4	50	2.2	29	69	0.03
Cornerstone	3.3	0.22	2.4	46	2.2	27	106	0.03
Paramount	3.5	0.23	2.2	52	2.5	29	67	0.03
Viking	3.5	0.22	2.2	49	2.0	30	74	0.03
Atlas	3.5	0.22	2.3	54	1.8	25	95	0.04
Krymsk 86	3.3	0.20	1.8	53	1.9	25	72	0.05
Adesoto	3.2	0.20	1.6	47	2.0	22	82	0.03
Empyrean 2	3.3	0.20	1.4	46	2.2	30	81	0.11

General Conclusions After Eight Years

- In general, the peach x almond hybrid rootstocks are the most vigorous and plum rootstocks are the smallest while peach rootstocks are of intermediate size.
- Yield is directly related to tree size; the bigger the tree, the higher the yield.
- The exception: Atlas has consistently out-yielded Nemaguard, although the trees are of similar size.
- Smaller trees could be planted closer to increase yield, but it is doubtful that the plum rootstocks would ever produce yields similar to peach x almond hybrids at any spacing in this soil.
- P/A Hybrid rootstocks may perform better than Nemaguard in replant situations as long as ring nematode is not a problem.
- Hull split, and thus harvest, is delayed in the vigorous rootstocks and is earlier in the relatively weaker plum stocks

- In general, the peach x almond hybrid rootstocks had higher leaf calcium and the peach rootstocks the lowest.
- Empyrean 1, Paramount and Nickels had lowest sodium, but not Cornerstone (P/A hybrid)
- The plum rootstocks tended to have the lowest levels of potassium.
- Empyrean 2 (Penta) has significantly higher chloride levels.

Trial #2: Evaluation of plum & plum hybrid rootstocks on flood-irrigated, sandy soil infested with oak root fungus

cvs. Butte & Padre

Rootstocks Tested for Tolerance to Oak Root Fungus

- Empyrean 2
- Krymsk 86
- Hiawatha
- Ishrara
- Marianna 40
- Marianna 26-24
- Nemaguard
- Tera
- Viking

General Conclusions After Six Years

- Nemaguard & Viking are the largest trees.
- Krymsk 86, a peach x plum hybrid, is only slightly smaller than nemaguard with very little suckering.
- Marianna 40 is larger than Marianna 26-24, has higher yields and no suckers.
- Tetra and Hiawatha are too small and have too many suckers
- No symptoms of oak root fungus have shown as of yet in this trial.

Trial #3: Evaluation of Alternative Almond Rootstocks for the Westside of the North San Joaquin Valley

Roger Duncan & Brent Holtz

Trial specifics:

- Planted December 2011
- Planted in Westley area near Hwy 33 in Western Stanislaus County
- Soil type is Zacharias clay loam (pH 7.6) irrigated with blend of high pH ground water and district water tainted with significant levels of salt from tail water runoff.
- First generation almond orchard following decades of row crops, including melons and tomatoes (potential for Verticillium wilt).
- Trees were planted at a spacing of 16' x 20' (136 trees per acre)
- Test rootstocks include simple and complex hybrids of peach, almond, plum and apricot.
- Tree performance data, including tree size, yield, leaf nutrient analyses, disease incidence, etc. will be collected for several years, along with soil and water analyses.

1. Lovell	*P. persica*
2. Nemaguard	*P. persica*
3. Empyrean 1	*P. persica* x *P. davidiana*
4. Avimag	*P. persica* x *P. davidiana*
5. HBOK 50	Harrow blood x Okinawa peach
6. Hansen	*P. dulcis* x *P. persica*
7. Brights #5	*P. dulcis* x *P. persica*
8. BB 106	*P. dulcis* x *P. persica*
9. Paramount	*P. dulcis* x *P. persica*
10. Flordaguard x Alnem	*P. persica* x Israeli bitter almond
11. PAC9908-02	(*P. dulcis* x *P. persica*) x *P. persica*
12. HM2 +	Hansen (*P. dulcis* x *P. persica*) x Monegro (*P. dulcis*×*P. persica*)
13. Viking	P. persica (Nemaguard) x (P. dulcis [Jordanolo] x [P. blireiana = P. cerasifera x P. armeniaca)
14. Atlas	*P. persica* (Nemaguard) x (*P. dulcis* x *P. blierianna*)
15. Krymsk 86	*P. cerasifera* x *P. persica*
16. Rootpac R	almond x plum