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

Keyes, CA. Cooperators: Christine & Peter Bacon, Eric Gemperle

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 initially, microsprinkler irrigated with well water for last three years

General Conclusions After Eleven 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 per acre 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, per acre 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

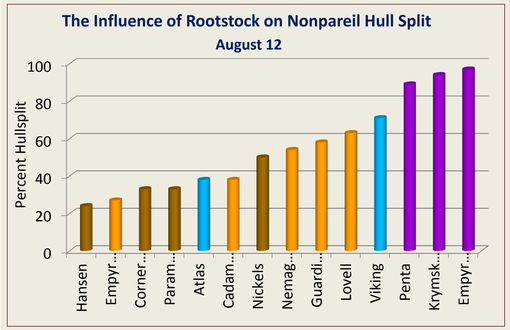
- Empyrean 1, Hansen, Cornerstone, GF 677 (aka Paramount), and Adesoto had low sodium and chloride levels in August-sampled leaves.
- Nemaguard, Lovell, Guardian, Atlas and Krymsk 86 had toxic levels of sodium and showed signs of leaf burn in August.

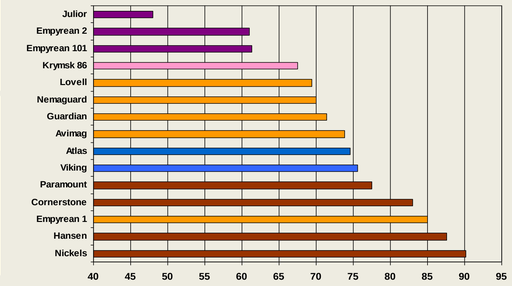
List of Rootstocks in Trial

Rootstock	Parentage
Nemaguard	Peach (*Prunus persica x P. davidiana)*
Lovell	Peach: chance seedling selected in 1882
Guardian SC-17	Peach
Avimag (a.k.a. Cadaman)	Peach
Empyrean #1 (a.k.a. Barrier 1)	Peach
Hansen 536	Peach x almond
Nickels	Peach x almond
Cornerstone	Peach x almond
Paramount (a.k.a. GF 677)	Peach x almond
Empyrean #2 (a.k.a. Penta)	Plum - *P. Domestica* (European plum)
Empyrean 101 (a.k.a. Adesoto)	Plum - *P. Insititia (damson plum)*
Julior	Plum - *P. insititia* x *P. domestica*
Krymsk 86 (a.k.a. Kuban 86)	Peach x Myrobalan plum
Atlas	Peach x almond x plum x apricot
Viking	Peach x almond x plum x apricot

Relative Salt Tolerance of 15 Almond Rootstocks

	% Sodium	% Chloride
Nemaguard	0.99	0.51
Lovell	0.70	0.50
Guardian	0.76	0.41
Cadaman	0.38	0.25
Empyrean 1	0.09	0.07
Hansen	0.09	0.07
Nickels	0.28	0.15
GF 677	0.04	0.05
Cornerstone	0.04	0.05
Viking	0.29	0.21
Atlas	0.94	0.29
Krymsk 86	0.60	0.32
Penta	0.30	0.41
Julior	0.35	0.16
Empyrean 101	0.06	0.04





Current Year (11th Leaf) and Cumulative Yield

	Nonpareil		Carmel	
	2013	Cumulative	2013	Cumulative
Paramount	--		5552 a	22,627
Nickels	6706 a	21,425	5158 ab	23,902
Cornerstone	5786 b	20,246	--	--
Hansen	5420 bc	20,533	4544 abc	21,959
Empyrean 1	5295 bcd	19,489	--	--
Cadaman	5069 bcde	17,128	4376 bc	19,162
Atlas	4759 cde	17,187	5167 ab	21,307
Viking	4615 de	16,038	4379 bc	17,733
Lovell	4591 de	15,512	3576 c	15,062
Nemaguard	4381 ef	15,265	3575 c	15,479
Guardian	3851 f	15,124	3723 c	16,114
Krymsk 86	3653 fg	10,839	--	--
Empyrean 101	3085 gh	9,113	--	--
Empyrean 2	2975 h	8,157	2370*	--
Julior	--	--	1422*	--

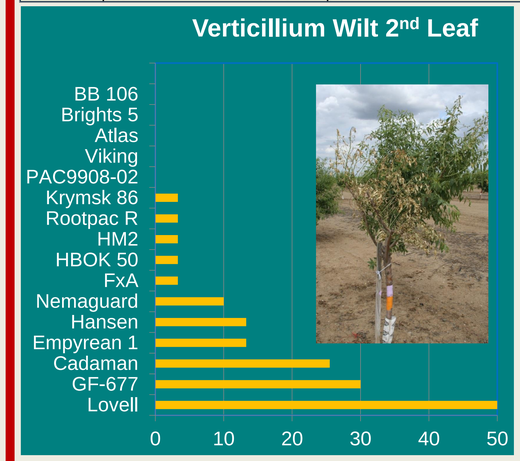
Trial #2: Evaluation of Alternative Almond Rootstocks for the Westside of the North San Joaquin Valley

Roger Duncan & Brent Holtz. Cooperator: Lee Del Don

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).
- 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



Trunk Circumference (cm)

PAC9908-02	17.7 a
Hansen	17.2 ab
Empyrean 1 (Barrier 1)	16.9 ab
BB 106	16.9 abc
Rootpac R	16.6 bcd
F x A (Flordaguard x Alnem)	16.6 bcd
HM2 (Hansen x Monegro)	16.5 bcd
Paramount (GF-677)	16.1 cde
Viking	15.8 def
Atlas	15.6 efg
Lovell	15.3 efg
Nemaguard	15.1 fg
Brights #5*	14.9 g
Krymsk 86	14.0 h
Avimag (Cadaman)*	13.4 hi
HBOK 50*	12.8 i