Field Evaluation of Almond Rootstocks for the Westside of the North San Joaquin Valley

Roger Duncan, UCCE Stanislaus County; Brent Holtz, UCCE San Joaquin; Grower cooperator, Lee Del Don, Westley

Rootstocks and their Genetic Background

- **Lovell** peach (P. persica)
- **Nemaguard** peach (P. persica)
- **Empyrean 1** peach hybrid (P. persica x P. davidiana)
- **HBOK 50** peach hybrid (Harrow blood x Okinawa)
- **Hansen** Peach x almond hybrid (P. dulcis x P. persica)
- **Brights 5** P x A hybrid (P. dulcis x P. persica)
- **BB 06** P x A hybrid (P. dulcis x P. persica)
- **Paramount** P x A hybrid (P. dulcis x P. persica)
- **Flordaguard x Alnem** (peach x bitter almond)
- **PAC9908-02** (P x A hybrid) x (peach)
- **Hansen x Monegro 2** (P x A) x (P x A)
- **Viking** (hybrid of peach, almond, plum & apricot)
- **Atlas** (hybrid of peach, almond, plum & apricot)
- **Krymsk 86** (plum x peach)
- **Rootpac R** (almond x plum)

Soil & Water Chemistry	
Soil	Water
pH 7.4 – 7.8	EC: 1.86
EC 2.96 dS/m	Adjusted SAR: 8.80
Na 12.1 meq / l	Chloride: 8.90 meq / l
Cl 14.1 meq / l	Boron: 0.84 mg / l
Boron 0.5 ppm	

Trial specifics:

- Planted December 2011
- Near Westley CA near Hwy 33 in Western Stanislaus County
- Zacharias clay loam with irrigated with blended surface and ground water marginally high in chloride, boron and sodium

Rootstock Influence on Leaf Sodium & Chloride Concentration (July) and Hull Boron (Harvest)

	Leaf Chloride (%)	Leaf Sodium (%)	Hull Boron (ppm)
Krymsk 86	0.89 a	0.03 ab	152 bc
Lovell	0.72 b	0.05 ab	180 a
Nemaguard	0.57 c	0.04 ab	153 bc
PAC 9908-02	0.45 d	0.04 ab	108 e
Atlas	0.42 de	0.05 ab	158 ab
Cadaman	0.38 def	0.02 b	170 ab
Empyrean 1	0.33 ef	0.05 ab	133 cd
HBOK 50	0.31 ef	0.06 a	158 ab
Viking	0.30 f	0.05 ab	109 e
F x A	0.19 g	0.03 ab	104 e
BB 106	0.19 g	0.02 b	102 e
GF 677	0.18 g	0.05 ab	120 de
Brights 5	0.18 g	0.04 ab	106 e
Rootpac R	0.17 g	0.04 ab	132 cd
HM2	0.16 g	0.05 ab	116 de
Hansen	0.15 g	0.03 ab	126 de
Critical Level	**0.30**	**0.25**	**300**

Trunk Circumference, Yield and Yield Efficiency

	Trunk Circum.	2017 Yield	Cum Yield (4th – 6th)	Yield Efficiency (Yield / CSA)
BB 106	57.5 c	4209 a	8327 a	0.50 bc
Flordaguard x Alnem	60.9 a*	4112 ab	8311 ab	0.45 cd
Empyrean 1	59.3 abc	3775 abc	7974 ab	0.45 cd
Brights 5	52.0 def	3604 bcde	7863 ab	0.58 a
HM2	58.4 abc	3686 bcd	7789 ab	0.45 cd
Hansen	58.3 bc	3881 abc	7690 bc	0.45 cd
PAC9908-02	60.3 ab	3537 cdef	7554 bc	0.41 d
Rootpac R	58.1 bc	3192 defgh	7111 cd	0.42 cd
Atlas	52.8 de	3104 efgh	7049 cd	0.50 bc
Viking	51.9 def	3085 efgh	6463 de	0.48 bcd
GF 677	51.6 ef	3239 defg	6385 de	0.48 bcd
HBOK 50	54.4 d	3026 fgh	6141 de	0.41 d
Nemaguard	52.7 def	2965 gh	6031 de	0.43 cd
Krymsk 86	48.6 g	2846 gh	5862 ef	0.49 bc
Lovell	50.2 fg	2696 h	5289 f	0.42 cd

Results and Conclusions:

- All peach x almond hybrid rootstocks and Rootpac R had significantly lower leaf chloride levels
- Viking and Empyrean 1 showed moderate chloride tolerance while Krymsk 86 and Lovell appear highly susceptible.
- Lovell, Atlas, Cadaman, and HBOK 50 had the highest hull boron while many rootstocks showed significantly lower hull boron
- Hansen x Monegro (HM2) has unacceptably poor anchorage
- The anchorage of several rootstocks including Cadaman, HBOK 50 and Empyrean 1 may by questionable in windy areas
- BB 106, F x A, Empyrean 1, Brights 5 and HM2 have the highest cumulative yields so far
- Brights 5 appears to have significantly higher yield efficiency due to its high yield on a smaller tree
- Despite the heavy soil, most peach x almond hybrids are performing very well so far in this trial

	Trunk Lean (degrees)	% of Trees > 15⁰ Lean
Krymsk 86	5 a*	0
PAC 9908-02	5 a	6.7
Viking	6 a	6.7
Hansen	6 a	0
Flordaguard x A	8 ab	6.7
Nemaguard	8 ab	16.7
Rootpac R	9 abc	20.0
Brights 5	9 abc	13.3
Lovell	9 abc	33.3
Atlas	10 bcd	20.0
GF 677	11 bcd	24.1
BB106	14 bcd	20.0
Empyrean 1	15 cde	40.0
HBOK 50	16 cde	40.0
Cadaman	17 de	25.0
Hansen x Monegro	21 e	66.7

Measuring tree anchorage with a protractor. A lean of 15⁰ or more is excessive