

**California Cling Peach Advisory Board
Annual Report 2013**

Project Title: **IMPROVED ROOTSTOCKS FOR PEACH AND NECTARINE**

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The objective of this project is to develop genetically improved rootstocks for peach and nectarine that combine tree size control and resistance to important diseases and pests including nematodes. Thirty-nine rootstocks were planted with ‘O’Henry scions, in replicated trials, at the Kearney Agricultural Center (KAC) in 2003, through 2005. Thirteen more rootstock selections with ‘O’Henry’ scions were planted in the KAC trials in winter 2007 and 2008. The three final new selections identified at Davis in 2007 were planted in the KAC plot the winter of 2009. All of the rootstocks that were developed at Davis are root-knot nematode resistant and have the potential for tree size control.

The five rootstock selections previously identified as having size-controlling characteristics (HBOK 10, 27, 28, 32 and 50) performed well through 2010 with tree size ranging between 60 – 95 % of trees on Nemaguard (depending on the rootstock) and acceptable crop loads and fruit size (see previous reports). In 2011,2012 and 2013 these rootstocks continued to perform well but we did not take any quantitative data on their productivity in the O’Henry blocks because of the loss of funding when the California Tree Fruit Agreement was voted out.

Replicated plots of Loadel, Ross and Riegels clingstone peach scions on each of the two most promising size-controlling rootstocks at the time the planting was put in (HBOK 10 and 32) and Nemared were planted at KAC at a tree spacing of 7 x 18 ft. in December 2007. The trees were trained to a KAC-V system and have grown well but the trees on HBOK 32 and HBOK 10 are clearly less vigorous than trees on Nemared (Table 1). These trees produced their first significant crop in 2010. In 2011,2012 and 2013 we took yield data on these trees and determined the number and yield of fruit on each tree in the plot and separated the fruit in two size categories (above and below minimum size). The 2011 yield data indicates that trees on both HBOK 32 performed as well as or better (Ross) than trees on Nemared even though the trees were smaller (Table 2) (For reference, 50 kg/tree ~ 19 tons/acre at the spacing of this planting). Yields of Riegels trees on HBOK 10 were significantly less than trees on Nemared but not significantly different than trees on Nemared with the other two cultivars.

In 2013 differences in tree size continued to increase between trees on the size-controlling rootstocks and those on Nemared (Table 1). Mean yields of most trees in the cling peach plot were intermediate between the yields in 2011 and 2012 (Tables 1, 2 and 3). Trees on the size-controlling rootstocks were a little less than trees on the Nemared. However If tree spacing was adjusted to account for differences in tree size, orchard yields would likely be comparable or higher on the size-controlling rootstocks compared to trees on Nemared for the Loadel and Ross cultivars. On the other hand, Riegels did not perform as well on the size-controlling rootsotcks.

In 2011 mid-June leaf samples of O’Henry trees from the previous CTFA funded project and the Loadel, Ross and Riegels trees on each of the rootstocks from the 2007 cling peach planting were taken and analyzed for nitrogen, phosphorus, potassium, sulfur, boron, calcium, magnesium, zinc, manganese, iron and copper content

in 2011 (See report from last year). None of the leaf nutrient concentrations of trees on the experimental rootstocks were substantially different from trees on Nemaguard or Nemared.

The results of this project continue to be promising and four of the rootstocks (HBOK 27, HBOK 32, HBOK10, and HBOK 50) are commercially available as Controller™ 6 (HBOK 27) Controller™ 7 (HBOK 32), Controller™ 8 (HBOK 10) and Controller™ 9.5 (HBOK 50). These new rootstocks are completely compatible with peach, have root-knot nematode resistance and have a range of tree size-controlling characteristics.

Based on the results of this trial HBOK 32 (Controller™ 7) appears to be the best available rootstock of this series that has substantial size-controlling potential size reduction (20 – 40 %) (compared to trees on Nemaguard or Nemared). HBOK 27 (Controller™ 6) offers even greater size control potential and has consistently performed well with O’Henry peach but has not been tested with cling peaches.

In 2013 we took yield, fruit size and tree size data in the remaining rootstock selections in the ‘O’Henry’ part of the 2007 plot. One rootstock selection (FL x KV-2) appears to stand out in terms of producing high yields of large sized fruit on small trees. We believe that this rootstock may also be lower chill than the other recently selected rootstocks from this project and we will be continuing to evaluate this in subsequent years.

Table 1. Mean trunk cross-sectional area of three cling peach cultivars on the three rootstocks in the KAC trial at the end of 2013.

Cultivar	Rootstock	Mean TSA	SE
Loadel	Nemared	100.7	3.70
	HBOK 32	82.3	2.54
	HBOK10	67.8	5.00
Ross	Nemared	171.7	4.04
	HBOK 32	95.9	3.41
	HBOK10	89.1	5.49
Riegels	Nemared	116.5	6.69
	HBOK 32	67.6	4.80
	HBOK10	59.5	4.60

Table 2. Mean fruit yield, fruit number and fruit weight of acceptable sized fruit and undersize fruit per tree of three cultivars and rootstocks in 2011.

Cultivar	Rootstock	Acceptable Size Fruit						Undersize Fruit					
		Weight per tree kg/tree	SE	Fruit per Tree	SE	Mean Fruit Weight (g/fruit)	SE	Weight per tree kg/tree	SE	Fruit per Tree	SE	Mean Fruit Weight (g/fruit)	SE
Loadel	Nemared	38.8	2.86	170	11.04	171.0	1.18	1.28	0.20	4	1.37	90.9	2.95
Loadel	HBOK 10	35.1	2.80	135	18.61	159.5	3.42	2.34	0.48	18	5.20	89.3	4.27
Loadel	HBOK 32	40.6	1.24	173	8.89	160.8	2.30	1.7	0.34	4	1.45	89.5	1.94
Ross	Nemared	46.3	1.69	274	14.19	201.8	2.50	1.13	0.20	13	4.17	97.9	2.34
Ross	HBOK 10	46.0	1.73	253	11.72	188.0	4.30	1.97	0.49	11	2.39	97.2	1.81
Ross	HBOK 32	53.3	2.17	341	13.86	177.5	3.30	1.7	0.29	22	0.66	94.0	2.17
Rigels	Nemared	42.6	2.15	240	9.60	174.1	5.84	0.39	0.11	4	1.22	79.2	5.99
Rigels	HBOK 10	32.8	2.53	197	12.70	161.4	7.04	1.08	0.37	11	3.75	79.3	5.71
Rigels	HBOK 32	38.4	2.77	238	16.38	158.6	3.90	1.1	0.28	11	2.84	88.6	5.80

Table 3. Mean fruit yield, fruit number and fruit weight of acceptable sized fruit and undersize fruit per tree of three cultivars and rootstocks in 2012.

Cultivar	Rootstock	Acceptable Size Fruit						Undersize Fruit					
		Weight per tree (kg/tree)	SE	Fruit per Tree	SE	Mean Fruit Weight (g/fruit)	SE	Weight per tree (kg/tree)	SE	Fruit per Tree	SE	Mean Fruit Weight (g/fruit)	SE
Loadel	Nemared	28.8	1.56	196	13.32	151.3	4.23	1.30	0.19	12	1.90	105.0	1.51
Loadel	HBOK 10	29.1	3.87	176	23.61	166.7	3.09	1.44	0.24	15	2.53	102.1	3.66
Loadel	HBOK 32	27.1	1.68	178	10.79	153.5	3.73	1.76	0.31	18	3.24	101.4	3.09
Ross	Nemared	41.7	1.48	210	8.98	200.7	3.40	0.74	0.11	9	1.12	79.3	3.47
Ross	HBOK 10	30.0	3.12	149	17.01	209.3	5.58	0.73	0.26	9	2.89	73.5	4.80
Ross	HBOK 32	41.8	2.15	224	14.22	191.7	4.81	0.77	0.14	10	1.96	78.8	3.68
Riegels	Nemared	48.4	2.68	299	15.35	161.7	2.97	1.34	0.46	15	4.71	103.9	1.74
Riegels	HBOK 10	30.0	2.85	213	18.12	139.6	6.26	4.38	1.22	47	13.13	94.6	3.74
Riegels	HBOK 32	34.6	2.20	241	14.93	143.6	2.67	3.71	0.98	36	9.90	105.7	3.95

Table 4. Mean fruit yield, fruit number and fruit weight of acceptable sized fruit and undersize fruit per tree of three cultivars and rootstocks in 2013.

Cultivar	Rootstock	Acceptable Size Fruit						Undersize Fruit					
		Weight per tree (kg/tree)	SE	Fruit per Tree	SE	Mean Fruit Weight (g/fruit)	SE	Weight per tree (kg/tree)	SE	Fruit per Tree	SE	Mean Fruit Weight (g/fruit)	SE
Loadel	Nemared	32.3	0.91	216	7.95	150.7	3.68	6.40	0.77	69	7.79	137.8	8.88
Loadel	HBOK 10	23.1	1.93	172	14.95	139.1	3.30	7.10	0.68	85	7.70	128.0	12.08
Loadel	HBOK 32	31.0	1.32	217	11.29	148.5	4.43	5.75	0.72	68	8.86	141.0	9.48
Ross	Nemared	50.7	2.11	303	15.65	166.8	3.71	2.74	0.46	30	5.07	91.3	1.89
Ross	HBOK 10	44.3	2.66	295	17.06	151.0	2.51	6.40	1.10	72	12.60	89.6	2.43
Ross	HBOK 32	46.0	1.69	316	14.45	145.3	3.65	6.26	1.28	70	14.03	89.2	1.37
Riegels	Nemared	49.5	3.10	353	17.90	140.0	4.61	3.17	0.88	34	9.16	92.3	1.44
Riegels	HBOK 10	31.0	2.82	230	19.32	130.8	3.35	5.73	1.47	64	17.06	89.6	3.26
Riegels	HBOK 32	34.8	3.25	259	23.51	132.2	2.61	6.64	1.55	77	18.92	89.1	1.61