

FIELD EVALUATION OF PRUNE ROOTSTOCKS 2013

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PROBLEM AND ITS SIGNIFICANCE

The California Prune Industry has historically utilized five rootstocks, Myrobalan seedling, Myro 29C, Marianna 2624, Lovell Peach and some M40. The last statewide organized prune rootstock effort was the “M” series rootstock plots planted in 1987 (Vina Monastery 3/20/87). Since the conclusion of that experiment many more potential rootstocks for prune have been identified. HBOK 50, Krymsk1, Krymsk 86, Citation, Rootpac-R, Viking, Atlas and others.

Three rootstock experiments have been planted in Northern California. One at Wolfskill, planted 1/19/11, a second in Yuba County planted 6/3/11 and a third in Butte County planted 4/28/11. All trees were nursery grafted to the ‘Improved French’ variety. Rootstock and scion measurements have been taken to characterize growth and initial observations recorded.

OBJECTIVES

- 1) Evaluate 29 rootstocks for use in California Prune production.
- 2) Evaluate tree growth and development, trunk circumference, light interception and suckering.

PLANS AND PROCEDURES

Butte County Location

The Butte County location was planted 4/28/11. The wet winter delayed soil preparation resulting in the late planting date. The Butte County soil survey lists the soil as Farwell Clay Adobe alternating with a lighter textured soil described as Nord Loam. Test trees followed almonds on Lovell peach rootstock with no soil treatments prior to planting. Lesion nematodes were isolated from soil samples. The layout is a randomized complete block design with 14 treatments and 5 replicates. There are 6 trees per plot in the original design. Trees were headed at 40 inches on 5/10/2011 and the test planting is drip irrigated. The HBOK 50 rootstock came as potted trees and were delivered 5/4/11 and planted by 5/10/11. Instructions were to remove trees from the pots, do not disturb the root ball, cover with 2 inches of soil and irrigate carefully to keep the small root ball moist. The HBOK 50 were small bush like trees and did not have sufficient trunk growth to head the first year and were left alone. Viking and Atlas were not available in 2011 and were added to the experiment in 2012 and are consequently one year younger. Viking and Atlas were propagated by Dave Wilson nursery, HBOK 50 from Duarte nursery and the remaining trees were propagated by Fowler nursery. Tree mortality was high

during the 2011 season. Missing tree locations were site fumigated with 0.5 pound of chloropicrin on 11/15/11 and replanted 2/10/12. Viking and Atlas were also planted 2/10/12. Many of the Rootpac-R trees did not survive the initial planting and replacement trees were not available. On 2/10/12 the few remaining Rootpac-R were extracted at Butte and replanted in the Yuba plot. The goal was to have one complete set of Rootpac-R at one location. Both the Butte and Yuba locations have mixed tree ages because of the high initial tree mortality. Different age trees are kept separate in the data analysis.

Measurements taken so far include rootstock circumference measured 6/2/11 just above the soil line and scion circumference measured 12 inches above the graft union. Scion measurements were made at the Butte location on 11/22/13.

Yuba County Location

The Yuba County location was planted 6/3/11. The wet winter delayed soil preparation and subsequently delayed planting. Similar to Butte, the plot is a randomized complete block design with 15 treatments and 5 replicates. There are 6 trees per plot in the original design. Rootstocks are the same as the Butte plot with the exception of Rootpac-R which was transplanted from Butte to Yuba. Tree mortality was high during the first season in the ground. Replants in 2012 replaced missing trees. The Yuba experiment is complete and trees are growing well. Scion measurements were made December 2013.

Wolfskill Experimental Orchard

A satellite experiment of prune rootstocks was planted at the UC Wolfskill Experimental Orchard in Winters, California. The plot contains 16 experimental rootstocks and 3 standard or reference rootstocks nursery budded to 'Improved French'. This experiment provides a first look at possible rootstocks that have previously not been tried with prune or have had very little field testing. The experiment is planted with 5-10 trees of each rootstock and is non-replicated without statistical analysis. The goal was to get a first look at how these rootstocks performed with 'Improved French' scions and identify any defects before commercial planting. The standard rootstocks planted for comparison are Marianna 2624 (M2624), Lovell, and Myro 29C. 'Improved French' on its own root differs from the others in that trees were grown in the nursery for two years. Although own rooted, trees do have a graft union because 'Improved French' was budded on top.

The Wolfskill site was previously planted to peaches, which were removed in 2008 and the field left fallow for 3 years with annual winter wheat. The Yolo county soil survey describes the soil as Yolo Loam. Soil was sampled at four locations within the field, at approximately 18 inches deep, bulking the samples into one for nematode evaluation (8/29/11). One liter of soil contained, 50 Lesion (*Pratylenchus sp.*), 50 Pin (*Pratylenchus sp.*), and 30 Dagger (*Xiphinema americanum*). There were not enough nematodes to identify the species of either Lesion or Pin nematodes.

The majority of the trees were planted on January 19, 2011. The bare-rooted trees were planted directly after transportation from the nurseries sawdust box. Two rootstocks, HBOK 32 and HBOK 10, were potted trees planted on April 25, 2011. At the time of planting, trees were headed at 36 inches. Trees that had not reached heading height were left alone and allowed to grow through 2011 then headed at 36 inches height in following dormant season. Scion measurements were made December 2013.

RESULTS AND DISCUSSION

At all three locations trees are growing well and we have not observed anything unusual after two years of growth. Figure 1 shows the scion circumference for the 14 rootstocks in the Butte experiment. Rootpack R was eliminated due to poor survival following planting. HBOK 50 is the smallest of the group because it was planted as a potted tree and needed one additional year to grow a headable trunk. Interestingly, HBOK 50 has the largest trunk cross sectional area (TCSA) in the Yuba experiment (Figure 2). Again, all the Yuba trees are growing well with Krymsk 1 (13.67 cm²), 58 (14.00 cm²) and Citation (15.55 cm²) having the smallest TCSA. Future evaluation will include statistical analysis to indicate significant differences in the Butte and Yuba experiments. At the Wolfskill site there is a much greater size gradient (Figure 3). HBOK 10 has the smallest TCSA at 13.70 cm² compared to Emperyeon 1 at 65.69 cm². Overall, it is too soon to make accurate conclusions but trees are growing well and will provide good reliable information in the future.

		Average
1	Myrobalan	15.42
2	Myro 29C	20.18
3	Marianna 2624	15.40
4	Lovell	17.12
5	M 40	16.14
6	M 30	18.17
7	M 58	14.98
8	HBOK 50	11.74
9	Emperyeon #2	14.95
10	Citation	14.27
11	Krymsk #86	15.00
12	Krymsk #1	15.40
13	Rootpack R	–
14	Viking	17.06
15	Atlas	18.08

Figure 1. Scion circumference (cm) measured 11/22/13 Butte County location.

Rootstock	Missing Trees	XC area cm²	SE
Krymsk 1	1	13.67	0.46
M58	1	14.00	0.54
Citation	6	15.55	0.72
Lovell	0	17.34	0.49
M40	0	17.74	0.52
Myro Seedling	1	18.07	0.64
Viking	0	18.17	0.43
M2624	1	18.97	0.51
Atlas	0	19.17	0.44
M30	4	19.46	1.10
M29C	0	19.68	0.72
Krymsk 86	1	20.01	0.66
Rootpac-R	0	20.56	0.60
HBOK 50	18	21.58	1.51

Figure 2. Yuba County Prune rootstock trunk cross sectional areas measured December, 2013.

Rootstock	XC area cm²	SE	No. of Trees	No. of trees planted in 2012
HBOK 10	13.70	1.82	5	
Imperial CA	20.67	2.84	8	1
HBOK 32	20.94	3.07	5	
HBOK 27	23.89	3.39	8	
Emperyeen 3	24.24	3.11	5	2
Krymsk 2	26.21	2.82	6	
Own root	27.39	2.82	5	
Speaker	30.25	2.18	6	2
Controller 9	30.50	3.58	10	
Ishtara	31.63	3.59	5	
Krymsk 99	31.91	2.95	9	1
M2624	36.06	5.14	5	
Puente	41.17	5.46	6	
Lovell	42.32	1.38	5	
Myro 29C	45.37	2.59	10	
WRM 2	58.46	3.07	4	1
Fortuna	59.53	3.18	5	
Emperyeen 1	65.69	4.82	6	1

Figure 3. Wolfskill prune rootstock experiment trunk cross sectional areas measured December, 2013.