

FIELD EVALUATION OF PRUNE ROOTSTOCKS 2012

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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 6/2/11, 11/22/11, 3/5/12 and 11/26/12. Rootstocks in the Butte planting are listed in Figure 1. The Butte plot is completely planted and tree growth is very good.

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 not available for 2012.

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. Wolfskill rootstocks are listed in figure 2. 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.

RESULTS AND DISCUSSION

At all three locations, trees that failed in 2011 have been replaced and grew well in 2012. Scion growth measurements are shown in Figure 1 for Butte and Figure 2 for Wolfskill. At the Butte location, HBOK 50 demonstrated the least growth in scion circumference with a 3.49 cm increase between 5/5/12 and 11/26/12 (Figure 1). The HBOK 50 were potted trees that were small and bush like at planting compared to conventional bare root for the other rootstocks. Trees with ‘Improved French’ on HBOK 50 may need additional time to “catch up”

Figure 2 shows the scion circumference measurements at the Wolfskill location for 2011 and 2012. These measurements do not include trees that were planted in 2012. Four rootstocks; Empyrean 1, Fortuna, WRM2 and Empyrean 3 have on average larger circumferences compared to the commercial reference rootstocks; M2624, Lovell and Myro 29C.

At Wolfskill, rootstock suckers were seen on one tree of both Fortuna and Speaker. Three fruit were set on one Krmysk 2 which may signify early cropping on this rootstock. 2013 fruit set will be recorded.

High winds in December 2012 provided an opportunity to evaluate anchorage at the Wolfskill location. Twelve trees (Figure 3) were leaning and six of those were severely leaning. Of the six severely leaning, four were Krymsk 99.

Butte Prune Rootstock Experiment

Rootstocks	Number of Replicates (#trees)	Scion Average Circumference	Circumference Change
		(cm) 3/5/12 / 11/26/12	(cm) 3/5/12 / 11/26/12
Myrobalan	4 (18)	5.44 / 10.94	5.50
Myro 29C	4 (21)	7.75 / 14.26	6.51
M2624	5 (25)	5.33 / 10.45	5.12
Lovell	1 (3)	5.40 / 11.33	5.93
M40	4 (18)	5.67 / 11.14	5.47
M30	4 (16)	6.13 / 12.02	5.89
M58	4 (17)	5.16 / 9.68	4.52
HBOK 50	5 (28)	4.93 / 8.42	3.49
Empyrean 2	4 (15)	4.69 / 10.44	5.75
Citation	5 (20)	4.88 / 8.73	3.85

Krymsk 86	4 (17)	5.49 / 9.74	4.25
Krymsk 1	4 (23)	5.68 / 10.61	4.93
Rootpac-R	To Yuba	–	–
Viking	5(29)	3.30 / 9/97	6.67
Atlas	5(30)	4.81 / 11.19	6.38

Figure 1. Butte County rootstock experiment grafted to Improved French. Rootstocks are listed on the left followed by the number of replicates from the initial planting and the number of total trees measured. Average scion circumference in centimeters (cm) is listed for 3/5/12 and 11/26/12 and final column shows the change in scion growth over the measurement interval. Rootpac-R trees were transplanted to the Yuba location. Viking and Atlas are one year younger planted 2/10/12.

Wolfskill Prune Rootstock Experiment

Rootstocks	Number of trees averaged	Average Scion Circumference (cm) Sept 2011	Average Scion Circumference (cm) Oct 2012	Scion Circumference Change (cm)
M2624	5	8.0	14.4	6.4
Lovell	5	8.8	15.4	6.6
Myro 29C	5	8.5	15.9	7.4
Empyrean 1 (Barrier)	5	9.5	20.5	11.0
Fortuna	5	8.9	18.8	9.9
WRM 2	4	8.9	17.7	8.8
Empyrean 3 (tetra)	3	6.3	16.4	10.1
Puente	6	7.3	15.1	7.8
Krymsk 99	7	7.6	13.7	6.1
Speaker	4	7.6	13.0	5.4
Ishtara	5	6.7	13.0	6.3
Krymsk 2	6	6.8	12.2	5.4
Controller 9	10	5.9	11.8	5.9
Own root	5	6.1	11.5	5.4
HBOK 27	8	5.1	10.7	5.6
Imperial California	6	4.9	10.3	5.4
HBOK 32	5	4.1	9.4	5.3
HBOK 10	5	3.4	7.1	3.7

Figure 2. Average scion circumference in centimeters (cm) in September 2011 and October 2012 for the non-replicated prune rootstock experiment planted at Wolfskill. The number of trees averaged represents the number of trees measured for each rootstock.

Leaning Tree Evaluation – Wolfskill Location

Rootstock	Number of 1 year old leaning	Number of 2 year old leaning	Total planted
HBOK 27		2	8
HBOK 32		1	5
Krymsk 99	2	3	9
Own root		1	5

Puente	1		7
Speaker	1		6
WRM 2		1	5

Figure 3. Visual evaluation of the number of leaning trees at the Wolfskill location following high winds in December 2012.