2016 FIELD EVALUATION OF PRUNE ROOTSTOCKS AT WOLFSKILL

Katherine Pope, Richard Buchner, Franz Niederholzer, Ted DeJong and Sarah Castro

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.

Three trials were planted in 2011 - two replicated experiments and one non-replicated observation experiment. Maintenance for the replicated trials is paid for by grower trial hosts. The non-replicated trial is at Wolfskill and requires funding for on-going management.

OBJECTIVES

Evaluate promising rootstocks potentially valuable for California Prune production.

PLANS AND PROCEDURES

A satellite experiment of prune rootstocks was planted at the UC Wolfskill experimental orchard in Winters, California. The plot contains 15 experimental rootstocks and 3 standard rootstocks (Marianna 2624, Lovell, and Myro 29C) nursery budded to 'Improved French' (Table 1). This experiment provides an initial evaluation of possible rootstocks that have previously not been tried with prune or have had very little field testing.

The experiment is planted with at least 5 trees of each rootstock and is non-replicated, which limits 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. 'Improved French' on its own root differs from the others in that trees were grown in the nursery for two years. Own rooted trees do have a graft union because 'Improved French' was budded on top. Trees were planted 17 feet across the row and 14 feet down the row, which would result in approximately 183 trees per acre.

The Wolfskill site was previously planted to peaches, 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. Nematode samples were taken at four locations within the field at approximately an 18 inch depth, and combined 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. Bare-root trees were planted directly after transportation from the nurseries sawdust box. 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 in the following dormant season.
Fruit set in 2016 was too low to justify harvest. An estimate was made of the number of fruit on each tree on August 19th. Trunk circumference was measured on December 20th at 12" above the soil line. Anchorage as measured by angle of tree lean (not pushed) was also measured on that date.

RESULTS AND DISCUSSION

Because this trial is not replicated, mean separation, also referred to as ANOVA, has not been conducted. Though we cannot say statically how rootstocks differ or rank, we can make initial observations. Averages given are for five trees.

At Wolfskill, fruit set varied widely by rootstock, ranging from 32 to 157 fruit per tree on average (Figure 1, Table 2). Controller 7 and Lovell had the lowest fruit set. Krymsk 99, Myro 29C and Empyrean 1 had the highest fruit set. Bloom timing data for 2016 was collected but lost. Based on previous years of data and memory of observations, there were differences in bloom timing, and it is a reasonable to hypothesize that the difference in set was driven by differences in bloom timing and thus bloom conditions.

Tree vigor, as measured by trunk circumference, ranged widely among rootstocks (Figure 2, Table 2). Note that size of trunk is also given in Table 2 as Trunk Cross-Sectional Area (TCSA), for comparison with the Yuba and Tehama trials. Krymsk 2 produces the smallest trees so far, with an average circumference on 10.7" at 12" above the soil line. Fortuna, WRM 2 and Empyrean 1 have produced the largest trees, with circumferences of 18.7", 19.4" and 20.9", respectively. A number of rootstocks are similar in size to M2624. Lovell and Controller 9 have so far produced similarly sized trees. Myro 29C and Puente have produced similarly sized trees.

Anchorage, as measured by degrees of tree lean, did not vary widely among rootstocks, with two exceptions (Figure 2, Table 2). Generally, degrees of lean (without pushing) averaged between 0-7°. The two exceptions were Fortuna, which averaged 10°, and Krymsk 99, which averaged 23°. Degrees of lean have been overlayed on top of the trunk circumference data to show which trees may be small because of poor root structure, making them poor candidates as size controlling rootstocks.

Table 1. Rootstock name and pedigree.

Rootstock	Species/ Hybrid Pedigree
Controller 7 (HBOK 32)	Harrow Blood x Okinawa
Controller 8 (HBOK 10)	Harrow Blood x Okinawa
Controller 9 (P30-135)	P. salicina x P. persica
Empyrean 3 (Tetra)	P. domestica
Empyrean 1 (Barrier)	Peach x Chinese wild peach
Fortuna	P. cerasifera x P. persica
HBOK 27	Harrow Blood x Okinawa
Imperial California	Plum R/S Italian Origin
Ishtara (Ferciana)	Peach/Plum hybrid
Krymsk 2	P. incanus x P. tomentosa
Krymsk 99	Plum/Peach hybrid
Lovell	Peach seedling
M2624	Marianna 2624
Myro 29C	Myrobalan
Own Rooted French	Own Rooted
Puente (Adara)	P. cerasifera
Speaker (Spicer)	Plum/Peach hybrid
WRM 2	Red leaf myroblan type

Table 2. Fruit set, trunk circumference, trunk cross-sectional area and anchorage for 18 rootstocks. Numbers are average of five trees (except Puente, which has four trees).

Rootstock	Fruit Set (# of fruit/tree)	Trunk Circumference (inches, 12" above soil line)	Trunk Cross-Sectional Area(TCSA) (cm, 12" above soil line)	Anchorage (Degrees of Lean from Upright)
Krymsk 2	122	10.7	58.9	4
Controller 8 (HBOK 10)	99	13.2	89.8	6
HBOK 27	85	13.5	93.1	5
Speaker	86	13.5	93.1	6
Controller 7 (HBOK 32)	43	13.9	99.7	7
Ishtara	120	14.1	102.0	3
Krymsk 99	156	14.1	102.0	23
Empyrean 3	124	14.3	104.3	1
Imperial California	76	14.3	105.4	5
M2624	89	14.6	110.1	2
Own Root	118	14.8	112.5	6
Lovell	32	15.7	126.1	2
Controller 9	99	16.0	131.2	4
Myro 29C	157	16.9	147.1	1
Puente	96	17.3	154.1	4
Fortuna	145	18.7	180.3	10

WRM 2	116	19.4	194.2	4
Empyrean 1	156	20.9	223.5	4

Figure 1. Fruit set (average number of fruit per tree) estimated on August 19th, 2016.

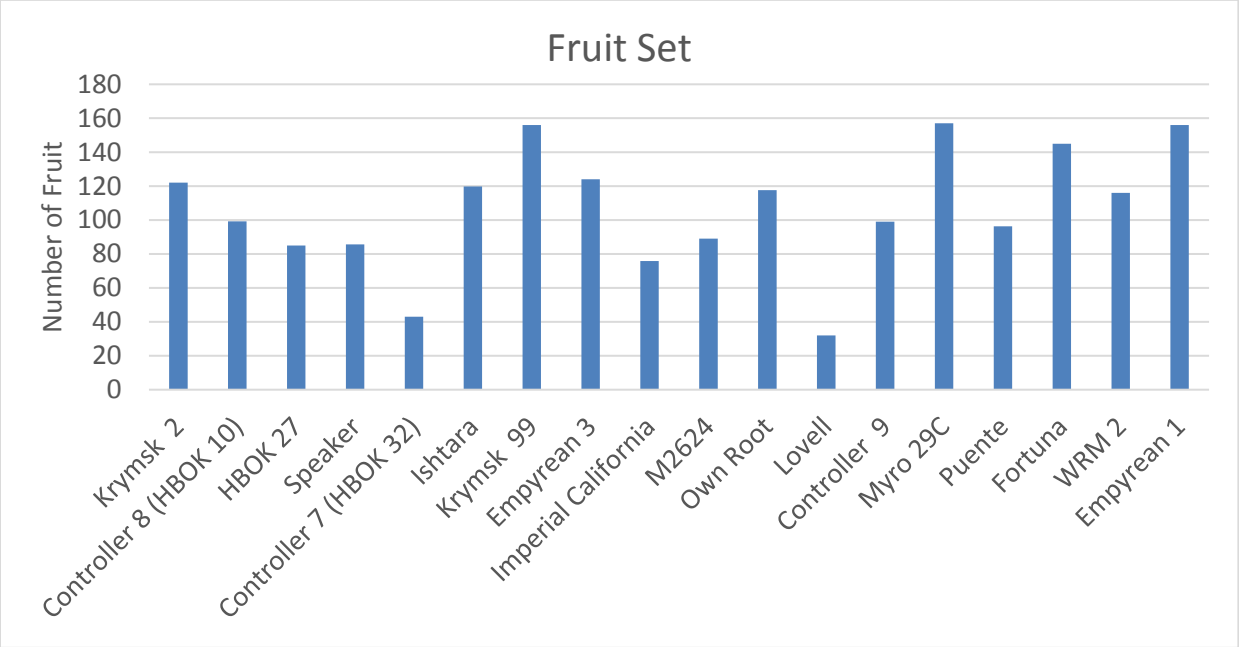

Figure 2. Trunk circumference and degrees of tree leaning measured December 20th, 2016.