EVALUATION OF NEW MARIANNA ROOTSTOCKS FOR FRENCH PRUNE

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Objectives:

1. To evaluate 10 new marianna rootstock selections with French prune scions for horticultural characteristics.

Procedures:

French prunes planted on 10 new selections of marianna 2616 together with marianna 2624, myrobalan seedling (MS) and 29C rootstocks were planted in replicated block designs in Tehama, Butte, Sutter and Merced counties in 1987. Trees were pruned by the grower's own individual methods, none of which were long pruned. Tree growth was measured by trunk circumference 30 cm above the soil surface. Root suckers were counted in the summer and winter. Leaf postassium (K) and other elements were assessed in 1990, 1991 and again in 1992. The yield of fruit per tree was determined by weighing the crop of fruit on each tree with an electronic weighing device laid on the bin-carrying forks behind prune harvesting receivers. Fresh fruit samples were collected into standard mesh sample bags from each tree as they entered bins. The samples were dried under commercial conditions at SunSweet Dryers in Winters and Gridley, CA and after equilibration of moisture were evaluated for fruit size characteristics and drying ratios.

Results and Discussion:

Commercial yields were obtained from the Tehama County experiment in 1992. Tree growth as measured by trunk cross sectional area (TCSA) in January 1992 was highest in rootstock selection M 30 when compared to the other rootstock treatments (Table 1). Yield efficiency (1991 fruit yield per tree/TCSA January 1992) was highest in rootstock M 58 followed in descending order by M 30, 75, 40 and 64 all of which had higher yield efficiencies than myrobalan seedling and myrobalan 29C (data not shown). Only M 58 and 30 had higher yield efficiencies than M 2624. Rootstock selection M 38 has not performed like other selections because of difficulty in establishing the rootstock in the field and within a year data collected from that rootstock treatment should become more meaningful.

Higher french prune dry fruit yields per tree in the Tehama county location were found on M 40, 58, 64, 69, and 75 than on myrobalan rootstocks in 1992 (Table 1 and Figure 1). Selections M 64, 75, and 40 had higher dry fruit yields per tree than M 2624 (Table 1). Drying ratios were not affected by rootstock excepting selection M 38 which are younger trees still getting established. Larger fruit size was found on selections M 2624, 30 and 40, but size appeared to increase as fruit dry weight per tree decreased (Table 1). A higher percentage of fruit in screen size 30 (largest fruit) were found to be produced with prunes growing on M 30 as compared to myrobalan seedling, M 38, 64 and 75 (Figure 2).

Both crown and root suckers were counted 21 January 1992. At the Tehama County location root suckers were not prevalent (Table 2) and no differences among rootstocks were noted. Crown suckers were highest in myrobalan seedling and next highest in myrobalan 29C. In the Sutter County location where suckering is more prevalent, no suckers were found on M 69 and 75. A small and equivalent number of suckers were found on M 30, 40, 65, myrobalan seedling and 29C. The most suckers were present on marianna 2624 (Table 2).

We have consistently focused our interest and activity on leaf potassium (K) levels because these rootstocks had previously been shown to increase leaf K under controlled evaluation conditions.

Leaf K levels were not different among rootstock selections M 9, 30, 38, 58, 64, and 69 at the Tehama location (Table 3). Selection M 30 had higher leaf K than myrobalan seedling, 29C and M 2624. Rootstock selections M 2624, 9, 30, 65, and 69 did not differ in leaf K at the Sutter County location. Rootstocks M 2624 and 30 had higher leaf K than myrobalan rootstocks under evaluation. At the Butte County location no rootstock had higher leaf K than another. Rootstock selection M 40 had higher leaf N levels than all selections at the Tehama County location and was among the highest in leaf N when compared to other rootstock selections growing at other locations.

Table 1. Effect of rootstock on French prune yield, drying ratio and fruit size in 1992.

Rootstock	TCSA[z] (cm^2)	Yield Efficiency (kg/cm^2)	Dry Yield Tree 1992 (kg)	Drying Ratio	Count/ lb
MS	102 de	0.29 f	23 de[y]	2.6 b	50.1 bc
M29C	106 cde	0.31 ef	20 e	2.6 b	46.4 bcd
M2624	119 b	0.37 cde	25 cde	2.6 b	43.4 d
M9	98 e	0.35 def	26 bcde	2.6 b	47.5 bcd
M16	112 bcd	0.32 ef	25 cde	2.6 b	49.0 bc
M30	138 a	0.46 b	30 abcd	2.4 b	45.5 cd
M38	38 g		6 f	3.5 a	54.7 a
M40	113 bcd	0.43 bc	33 ab	2.5 b	45.9 cd
M58	67 f	0.59 a	31 abc	2.7 b	47.0 bc
M64	116 bc	0.41 bcd	34 a	2.7 b	49.0 bc
M65	117 b	0.31 ef	26 bcde	2.6 b	46.8 bcd
M69	119 b	0.28 f	28 abcd	2.6 b	50.0 bc
M75	104 de	0.43 bc	33 a	2.7 b	50.8 ab

[z]Measured 21 January 1992.
[y]DMRT @ 5%.
Harvested 8-24-92.

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Table 2. Effect of rootstock on French prune suckering at Vina 6-29-92.

Rootstock	Tehama (Vina)			Sutter
	Crown Suckers/tree	Root Suckers/tree	Total Suckers/tree	Total Suckers/tree
MS	4.9 a	0.1	5.0 a	0.33 b
M29C	3.2 b	0.1	3.3 b	0.40 b
M2624	0.1 c	0.2	0.3 c	5.20 a
M9	0.0 c	0.0	0.0 c	2.40 ab
M16	0.0 c	0.0	0.0 c	2.75 ab
M30	0.0 c	0.0	0.0 c	1.33 b
M38	1.5 c	0.2	1.7 c	
M40	0.2 c	0.0	0.2 c	0.80 b
M58	0.0 c	0.0	0.0 c	
M64	0.1 c	0.0	0.1 c	
M65	0.2 c	0.0	0.2 c	0.40 b
M69	0.3 c	0.1	0.4 c	0.0 b
M75	0.0 c	0.1 NS	0.1 c	0.0 b

[z]DMRT @ 5%.

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Table 3. Effect of rootstock on French prune leaf K and N levels.

Rootstock	Orchard Location					
	Tehama		Sutter		Butte	
	N%[z]	K%	N%	K%	N%	K%
MS	2.52 bcde	2.59 cd	2.41 cd	2.19 bc		
M29C	2.44 e	2.48 def	2.56 abc	2.16 bc		
M2624	2.55 bcde	2.60 cd	2.40 d	2.59 a	2.61 bc	2.77
M9	2.48 cde	2.89 abc	2.54 abcd	2.23 abc	2.59 c	2.59
M16	2.60 bc	2.22 f	2.45 cd	2.10 bc		
M30	2.59 bcd	3.14 a	2.62 ab	2.60 a	2.75 a	3.10
M38	2.53 bcde	2.98 ab				
M40	2.72 a	2.25 def	2.64 a	1.97 c	2.72 ab	2.77
M58	2.60 bc	2.92 abc				
M64	2.61 b	2.93 ab				
M65	2.47 de	2.55 de	2.48 bcd	2.35 abc	2.63 abc	2.76
M69	2.56 bcd	2.91 abc	2.45 cd	2.41 ab	2.62 bc	2.90
M75	2.52 bcde	2.73 bcd	2.65 a	2.17 bc	2.73 ab	2.82 NS

[z]Sampled 6-29-92. Percent dry weight basis.

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Prune Rootstocks

Fruit Yield per Tree

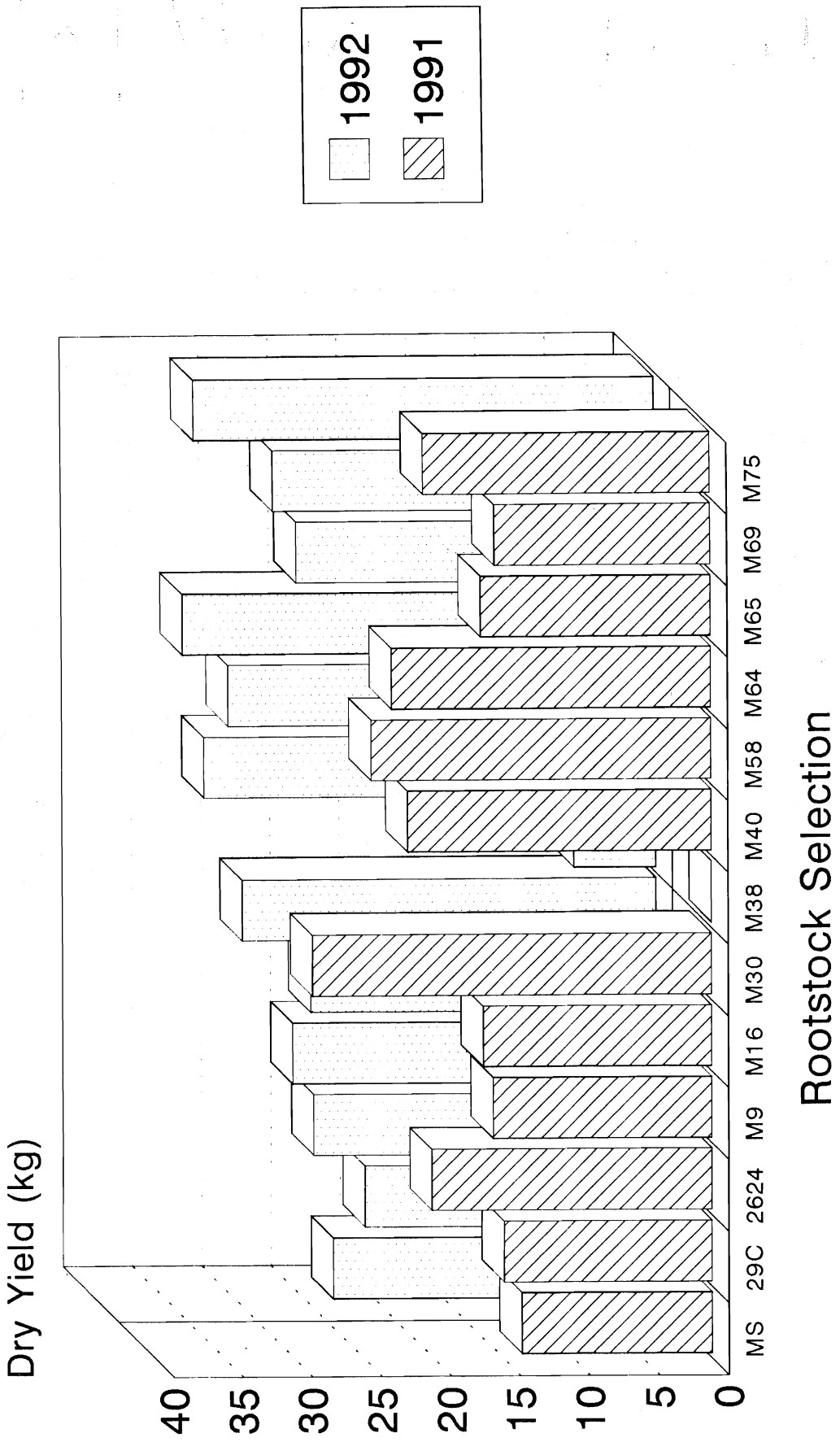

Fig. 1

Prune Rootstocks

Screen Size Distribution 1992

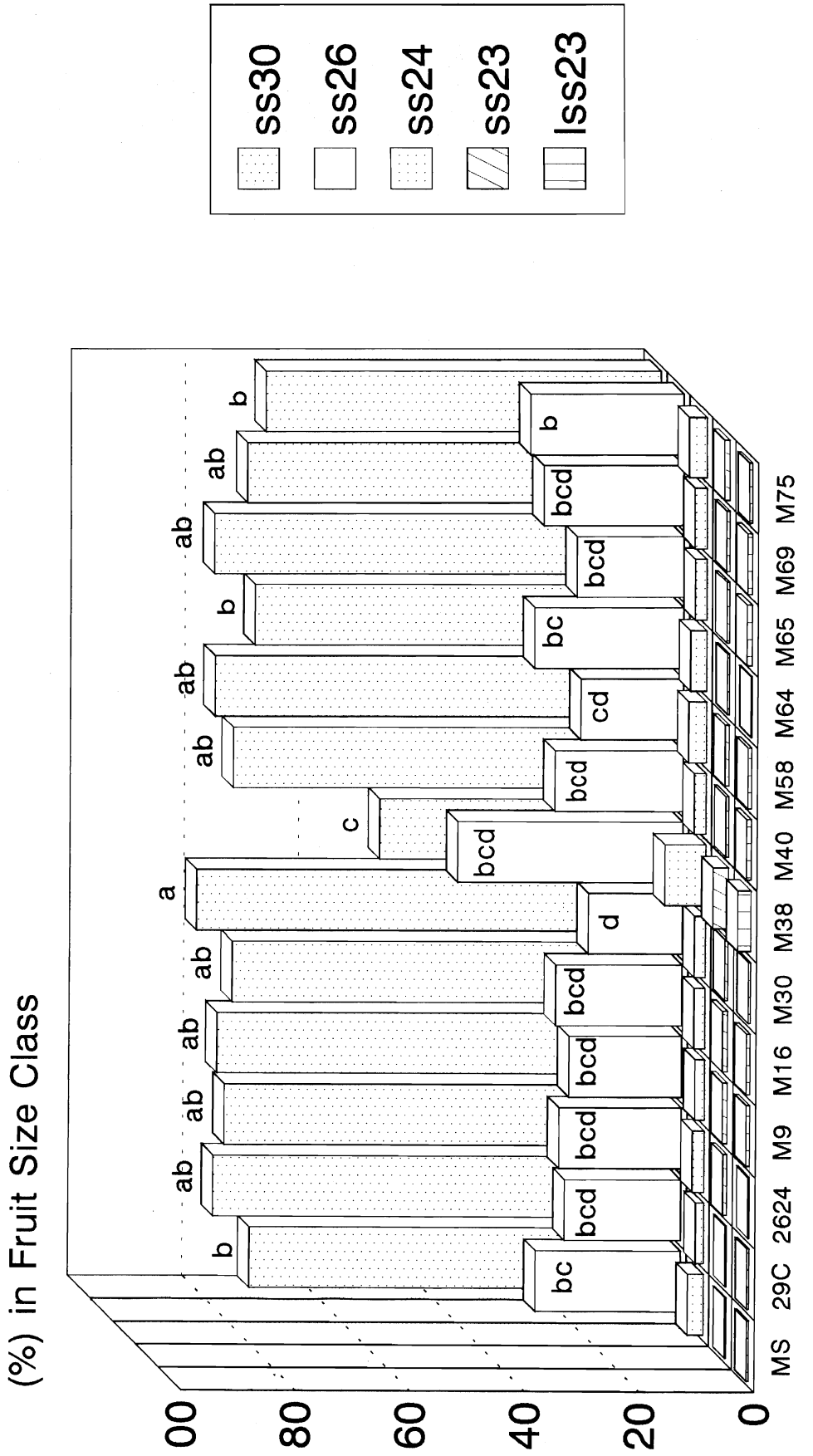

Fig. 2