

PRUNE CULTIVAR EVALUATION AND DEVELOPMENT

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SUMMARY

Initial importation of several new prune cultivars from France has been completed and 10 trees of each cultivar are now in place in a test block at the Kearney Agricultural Center (KAC), Parlier, California. Post-entry quarantine restrictions will be lifted during 1987, barring virus problems, and establishment of additional test sites is anticipated. First year growth in the block has been good with growth habit differences already apparent.

Fifteen hundred seedlings of 16 different parentages have been field-planted at KAC and will be used in studying techniques for shortening the unproductive juvenile period of P. domestica seedlings. Selected hybridizations will be made in 1987 to attempt to alter juvenility through genetic means.

Establishment of a gene pool for P. domestica continued during 1986 and the estimated number of cultivars in the program at the end of 1987 will be 100. These last acquisitions will complete the initial phase of the germplasm acquisition program. Hybridization directed toward spread of fruit maturity will occur in 1987, as much as the bloom density on the young parent trees allows. Six hundred seeds from 1986 hybridizations and selected open-pollinated parents will be planted in 1987 and added to the seedling evaluation block. Processing equipment for evaluation of the new cultivars from France and U.C. selections is being obtained and will be functional by early 1987.

OBJECTIVES

1. Evaluate recently developed prune cultivars from France for adaptation to California growing conditions and for potential utilization within the California prune industry.
2. Investigate horticultural means for efficient handling of prune seedlings to minimize the juvenile period.
3. Develop a prune variety improvement program involving traditional horticultural methods to develop cultivars with:
 - a. earlier/later fruit maturity dates than French prune,
 - b. decreased fruit drying ratio, and
 - c. improved levels of orchard production and dried product quality.

PROCEDURE

1. Nine new prune cultivars from France were established in a 1.25 acre site at the Kearney Agricultural Center (KAC), Parlier, California, in February of 1986. Trees for this planting were developed from budwood imported from France through the USDA Plant Germplasm Quarantine Center at Beltsville, Maryland, and grown under quarantine at the Fowler Nursery, Newcastle, California, during 1985.

These trees will remain under quarantine at KAC until mid-June of 1987 when, depending upon the results of virus testing, the post-entry quarantine restrictions will be lifted. Virus testing during 1986 determined that one clone of the nine, the "Quetsche Blanche de Letricourt", was virus-infected. All trees of this cultivar have been pulled in the KAC test plot and the plant material destroyed. Further propagation of the remaining eight cultivars is anticipated in the spring of 1988 upon completion of the quarantine period. New trees will be available for further testing in the prune-growing counties of Northern California in 1989.

First year growth of the eight imported cultivars in the KAC plot has been good. Differences in tree form and vigor are already apparent, and some formal evaluation of these characteristics could possibly be made next season. Only a small amount of fruit will be produced in second leaf (1987) so evaluation of fruit characteristics will probably not begin until 1988.

2. Fifteen hundred prune seedlings of various parentages were planted in the spring of 1986 and are presently growing in a 2.0 acre block at KAC. Most of these seedlings are of Moyer, Imperial, Burton or French parentage and were field-planted from containers in the early summer of 1986. A central leader training system will be employed to obtain rapid vertical growth of these seedlings under optimum fertilization and irrigation regimes. These techniques have been successful in shortening the juvenile period of other hard-to-fruit species.

Results from this planting will determine the type of training system that will be used on future seedling progeny developed in this program. A number of hybrid crosses to be made this coming 1987 season will also attempt to incorporate precocity into the breeding population to be used in this program. It appears that selection of precocious bearing genotypes as parents has potential for genetically altering the long juvenile period in P. domestica.

3. Establishment of a gene pool for P. domestica continued in 1986. Six cultivars were added to the twenty-two already established at KAC. The six were obtained from the U.S. Plant Introduction Station at Glenn Dale, Maryland, through their Prunus scionwood distribution program. Provisions for other acquisitions will continue this winter (1986-87) and it is anticipated that over 50 additional cultivars will be acquired by the spring of 1987. These new acquisitions will bring the total number of cultivars and selections in the hybridization program at KAC to well over 100, and will complete the initial acquisition phase of the program.

The group of 22 P. domestica cultivars established in the spring of 1985 as well as the 33 selections from a previous cultivar development program based at Davis have grown well and should produce a small amount of fruit in 1987. This group of cultivars and selections will be utilized in making 1987 hybrids, as much as the bloom density on the young trees allows.

A small amount of seed was obtained this 1986 season from controlled hybridizations and from selected open-pollinated parents. Currently just

under 600 seeds are in storage for spring planting in 1987. Hybridization has been minimal up to this point in the program because of the lack of availability of established trees of suitable parents. This situation should rapidly improve with the completion of the basic cultivar acquisition phase of the program. Hybridization conditions this 1986 season were particularly difficult because of unfavorable weather conditions.

Five acres have been allocated to this program at KAC for evaluation of prune seedlings and advanced selections. An additional 1.25 acres are being utilized in the evaluation of the new prune cultivars from France. A low volume (fanjet) irrigation system has been installed on the five acre parcel to permit optimal conditions for seedling growth.

We are currently obtaining the necessary processing equipment for evaluation of the new cultivars from France and new selections from the prune hybridization program. This includes small equipment (blender, grinder, moisture meter, etc.) as well as an experimental drier and hand-pitting apparatus. It is anticipated that this equipment will be functional by early 1987.

RESULTS AND CONCLUSIONS

1. The following number of trees of each cultivar from France are currently growing at the Kearney Agricultural Center (KAC), Parlier, California.

Lorida	44
Primacotes	14
Tardicotes	12
2733	3
303	10
642	10
652	10
812 (Double Robe)	9

Up to ten trees of each cultivar are planted in a randomized evaluation block that also contains ten trees of Improved French from California for comparison. The remaining trees of each imported cultivar are being grown in a selection block. We have received permission from the plant quarantine officials to increase the number of cultivars 2733 and 812 to 10 trees each within this evaluation block.

2. Seedling inventory as of November, 1986, is 1,503 seedlings of 16 differing parentages. Growth of the population has been variable, with some families exhibiting superior vigor. Sensitivity to heat injury has also been observed in certain families, leading to the observation that both seedling vigor and heat sensitivity are strongly influenced by genetics.
3. Inventory of additional Prunus domestica cultivars established at KAC is as follows:

BLUFRE	KABARDINSKAJA
BURTON	MOYER
CALIFORNIA BLUE	OBIL'NAJA
EARLY ITALIAN	POCEGACA
EARLY TRAGEDY	PULPUVEDA
EMPRESS	RUTH GUSTETTER
FRENCH	STANDARD
FRIEDMAN FRENCH	STANLEY
GERRANS EARLY FRENCH	STARK BLUE RIBBON
GRAND DUKE	SUEDAH
H-BANEASA	SUGAR
HUNGARIAN	TRAGEDY
IMPERIAL	UC 11, 15-27
IMPROVED FRENCH	YELLOW EGG
ITALIAN	

Thirty-three selections from the previous prune cultivar improvement program at U.C. Davis are also established in the KAC collection. All but three of these selections appeared to be sensitive to the hot summer environmental conditions of the Southern San Joaquin Valley. Further evaluations will be made in 1987.