

ROOTSTOCK EVALUATION FOR CALIFORNIA PRUNE PRODUCTION

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PROBLEM AND ITS SIGNIFICANCE

The California Prune Industry has primarily utilized four rootstocks, Myrobalan seedling, Myro 29C, Marianna 2624 and Lovell Peach. "M40" is being planted, but not in large numbers and is currently not a mainstay rootstock for the industry. The last statewide organized prune rootstock effort was the "M" series rootstock experiments planted in 1987 (Vina Monastery 3/20/87). Material included M2624, M29C and Myro seedling as standards with ten "M" series selections. All rootstocks were grafted to French prune. After measuring yield and fruit size, no clearly superior rootstock selection was identified. However, "M30", "M40" and possibly "M58" looked interesting. M40 imparted possible resistance to bacterial canker, M30 imparted very good tree survivorship and M58 produced a smaller tree with larger fruit. By 2009 many more potential rootstocks have been identified and need evaluation under California conditions. Current issues with established rootstock choices include bacterial canker sensitivity, excessive suckering, oak root fungus susceptibility, brown line susceptibility, and poor anchorage. Blow over is a particular problem on heavier textured soils, and has contributed to short pruning and delayed grower return on investment. Potential rootstock attributes for commercial Prune production include:

- 1) Anchorage
- 2) Rootstocks that impart resistance to Bacterial Canker
- 3) Nematode resistance (ring, root knot and lesion)
- 4) Compatibility and early production
- 5) Tree size, smaller trees may be desirable if planted closer together
- 6) Resistance to soil borne diseases (crown/root rot, Oak root fungus and crown gall)
- 7) Low or no suckering.
- 8) Good performance in a replant situation

OBJECTIVES

- 1) Evaluate rootstocks potentially valuable for California Prune production.

- 2) Plant two relatively large replicated experiments and one non-replicated observation experiment in 2011.

PLANS AND PROCEDURES

Two locations are proposed, one location in Butte County selecting a “good soil” site and a second, “more marginal site” (not yet selected) in the Sutter/Yuba area. Each plot will have the same “core” rootstocks to allow direct statistical comparison but could have additional entries of interest to local growers and advisors. A non replicated “satellite” plot will be established at the Wolfskill UC orchard which will allow screening of the less tested rootstocks.

Treatment size is 6 trees “in row “ allowing enough trees to evaluate even if one or two trees are lost to mortality. Any replants would use the same rootstock as the commercial block so cooperators would not lose production due to missing trees. Experimental design is a Randomized Complete Block with 15 treatments and 5 replicates (75 plots x 6 trees/plot = 450 trees, assuming 150/trees/Ac = 3.0 acres). The scion will be Improved French as the industry standard and farmed by cooperators using conventional tree practices and tree spacing compatible with orchard layout. Long pruning will be used for tree training and early production. Long pruning as a training technique will favor initial evaluation of anchorage by counting “blow overs”. The non-replicated satellite experiment at the UC Wolfskill site will host 17 rootstocks with Improved French on top. Five trees of each rootstock will be evaluated. These rootstocks are interesting but are not adequately proven to be tested under commercial conditions. This will allow a quick screening without a large investment in resources. Any promising rootstocks can be elevated to commercial field experiments.

Entries for the replicated grower plots are : Myro seedling, Myro 29C, Marianna 2624, Lovell peach, M40, M30, M58, HBOK50, Penta (Empyrean 2), Citation, Krymsk86 (Kuban 86), Krymsk 1, Miropac, Viking and Atlas.

Entries for the satellite evaluation are : HBOCK10, HBOCK32, HBOK27, Krymsk2, WRM#2 (Doyle selection from a red leaf myrobalan type tree), Tetra (Empyrean 3), Adara (*P.cerasifera* from Spain), Imperial California (Plum R/S Italian Origin), Fortuna (Plum /peach hybrid), Krymsk 99 (Plum /peach hybrid), Speaker (Plum/peach hybrid), Adesoto (Empyrean 101 or *P.insititia*), Julior (*P insititia* X *P domestica*), Controller 9 or p30-135 (*P.salicina* X *P perscia*), Ishtara and own rooted.

Data collection will depend upon the opportunities presented. Not all data needs to be taken on all trees for all years. Data collection may include but not limited to:

- 1) Tree growth and development including trunk circumference, light interception and suckering.
- 2) Yield, cropping potential, nutrition and early bearing.
- 3) Sugar, flesh pressure, harvest dates and bloom date.
- 4) Dry grade samples, quality and size distribution.
- 5) Disease and insect susceptibility.
- 6) Nematode samples for resistance/tolerance evaluation
- 7) Tree anchorage

DISCUSSION

- 1) Myrobalan Seedling, Myro 29C, Marianna 2624 and Lovell Peach are the control trees used for comparison. Experimentally, all four need to be included for legitimate comparisons to the new rootstocks. These rootstocks represent low risk to cooperators as all are typically used for prune production. Lovell may be problematic in heavier soils where crown and root rot is a threat. Lovell is sensitive to crown gall which can be a problem.
- 2) M30, M40 and M58 are candidates from the "M" series rootstock experiment. M30 and M40 have been commercially planted in California orchards and may not show additional promise. M58 may not fill its space resulting in possible per acre yield reduction depending upon tree spacing.
- 3) HBOK 50, and Penta (*P. domestica* from Italy). HBOK 50 is thought to be root knot nematode resistant with some ring and lesion nematode tolerance/resistance.
- 4) Citation is of interest for Improved French. Citation has compatibility issues with other varieties such as Sutter.
- 5) Krymsk 86 looks promising for anchorage based upon experience with other fruit and nut species. Krymsk 86 may not work for prune but is a viable candidate for evaluation. Krymsk 1 is used in Europe and may work well for California.
- 6) Viking and Atlas have possible bacterial canker resistance. They may be less desirable particularly if sensitive to rot and crown rot.

- 7) Own rooted French might be a possibility and is worth a look in the non replicated evaluation. First experience suggests it is difficult to propagate and not commercially viable for that reason.
- 8) Experience with Penta suggests a very small tree which may not be suited for sandy loam soils and Penta might be incompatible based on almond experience. Penta, Atlas, Krymsk 86 and Viking supported reduced populations of ring and lesion nematode (Duncan 2008).
- 9) Tetra produced an unacceptability weak almond tree and was sensitive to oak root fungus making it questionable for prune production (Connell 2008).
- 10) Little information is published on the remaining rootstock entries. We should be in a position to gain valuable experience with a large number of rootstocks.

SUMMARY

This project is in the development phase. Trees have been ordered and should be available for planting spring 2011. Initial growth measurements and first year observations will be available in the fall of 2011. Monies allocated so far (\$5,517- award number PN 08-22 09 CPB 2) are being used to purchase trees, support preliminary field work and planning. Additional proposals will include monetary requests to support planting, field work and data collection.