Rootstocks for Prune Production

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Abstract

Growing prune trees from seed does not produce a tree genetically identical to its parent. Prune seeds are derived from open pollinated flowers so seeds are progeny of parent trees and are not genetically identical. In fruit and nut production, the industry needs every tree producing the same variety. Clonal propagation of fruitwood is one option. However it is much more common to graft the desired variety on a rootstock of choice. This allows a clonal choice for the prune variety and a rootstock choice to manage orchard site problems such as soil type and structure, nematodes and/or diseases. Because prune orchard life may be 25 to 40 years, it is important to anticipate rootstock responses to the soil type where it will be planted and different soil-borne diseases and pests which may be present. Certain rootstocks respond differently than others to soil, disease, and pest problems; selection of the most suitable stock for the proposed site can have a major influence on long-term performance of an orchard. Similarly, with spot or localized replanting, causes of original tree loss should be taken into account in selecting replacement stocks. The plum rootstocks, Myrobalan (*Prunus cerasifera*), Myrobalan 29C (*Prunus cerasifera* cuttings), Marianna 2624 (*Prunus cerasifera x Prunus munsoniana*) are most commonly used in California prune orchards. Other prunus species such as peach, almond and apricot are rootstocks used for special situations. The M40 Marianna plum stock is a relatively new release that may in time replace Marianna 2624.

Advantages/disadvantages for each rootstock are discussed.

What Roots Do:

Anchor trees to the soil

Absorb water and provide mineral elements to the tree

Store carbohydrates and synthesize materials

Determine scion growth and performance

Tolerance to soil types and conditions

Resistance to soil borne diseases

Must be graft compatible

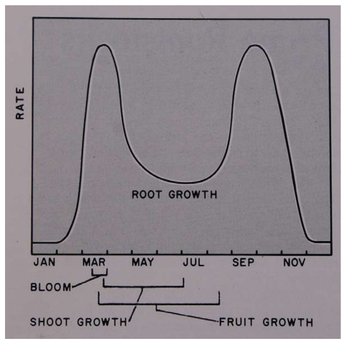
Root Structure is a branching system

Main Roots

Lateral Roots

Root hairs

- Main uptake structures
- Need aeration
- Low oxygen and high carbon dioxide reduce or stop root growth
- Low soil moisture will stop root growth
- Low soil temperature will stop root growth



Myrobalan Seedling "Myro" (*Prunus cerasifera*)

Thought to be native to the Caucasus Mountains of southwestern Asia

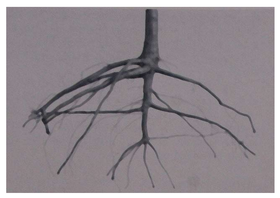
Propagated from seed - genetically different

Variability in susceptibility to nematodes, bacterial canker and oak root fungus

Provide better anchorage

Produce few root suckers

More tolerant of boron and saline soils



Myrobalan 29C "Myro 29C"

Originated at Marysville as a vigorous Myro seedling from seed imported from France by Marion Gregory

Selected in 1915 and released to growers in 1920 by the Gregory Brothers Nursery

Resistant to root knot nematode, mildly resistant to oak root fungus and crown gall

Susceptible to bacterial canker

Poor anchorage

The Original Marianna

Thought to be a naturally occurring hybrid between *P.cerasifera* and *P.munsonianna*

Discovered by Charles Fitze at Marianna, Polk County, Texas

Introduced by nurseryman Charles Eley at Smith Point, Texas

Introduced into California about 1893

Relatively easy to propagate from cuttings

Marianna 2624

Released about 1940 by W.L. Howard of UC Davis

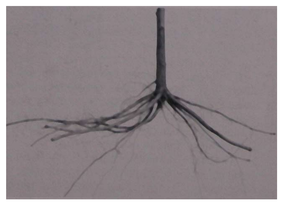
Propagated vegetatively from hardwood cuttings

Resistance to root knot nematode and moderate resistance to oak root fungus

Not affected by brown line

Imparts high susceptibility to bacterial canker

Shallow rooted and produces excessive rootstock suckers



M40 Marianna

Originated from a seedling population identified as "Tennessee" Marianna

Tennessee Marianna seed planted at UC Kearney field station in 1970

Ten advanced selections were identified by 1977

M40 released in 2000 by Hesse, Fenton and Doyle

Propagated vegatatively from hardwood cuttings

Similar to M2624 but is more deeply rooted and produces fewer rootstock suckers

Possibly resistant to bacterial canker

Peach Lovell, Nemaguard, Halford

Propagated from seeds

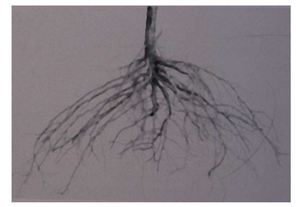
Consider where Bacterial Canker is a problem

Sensitive to crown rot, crown gall and oak root fungus

Generally susceptible to nematodes

Vigorous rootstock – excessive fruit set

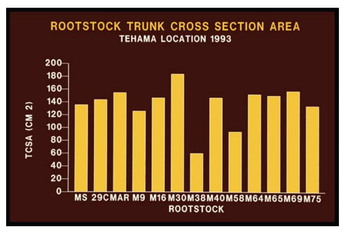
Almond or Apricot rootstock show no clear advantages over plum or peach



"M" Series Rootstock Plots

Evaluation of ten new Marianna rootstocks for French prune

Trees planted in 1987 in Tehama, Butte, Sutter and Merced counties



In Summary

After measuring yield and fruit size, no clearly superior rootstock selection emerges.

Future Rootstock Research

Objectives

- Anchorage
- Nutrition
- Cropping/Fruit Size
- Disease resistance
- Tree size/canopy architecture
- Nematode
- Suckering

What are the Possibilities

M30:
From the "M" series R/S plots; Best survivorship at Monastery 3/20/87

M40:
From the "M" series R/S plots; Bacterial Canker resistance??; Poorest survivorship at Monastery 3/20/87

M58:
From the "M" series R/S plots; Smaller tree, increase fruit size

Citation:
Compatability issues, French & Moyer OK; Highly fruitful – overcropping

Krympsk 86:
Russian R/S; Compatible with French

Krympsk 1 & 2:
Russian R/S

Own rooted French: Standards:
Myro 29C; Myro seedling; Peach (Lovell); M2624; Atlas and Viking

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