Rootstocks for Prune Production

POMOLOGY 101

Richard Buchner, Jim Doyle and Steve Southwick

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What do 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
Phytophthora

Oak Root Fungus

Crown Gall

Bacterial Canker
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
What are the rootstock choices

- Myrobalan
- Myrobalan 29C
- Marianna 2624
- “M” Series – M40
- Peach – Lovell, Nemaguard and Halford
- Almond
- Apricot
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 vegetatively 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

- 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
ROOTSTOCK TRUNK CROSS SECTION AREA
TEHAMA LOCATION 1993

TCSA (CM^2)

MS  29CMAR M9 M16 M30 M38 M40 M58 M64 M65 M69 M75

ROOTSTOCK
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 3/20/07
- M40:
  - From the “M” series R/S plots
  - Bacterial Canker resistance??
  - Poorest survivorship at Monastery 3/20/07
- M58:
  - From the “M” series R/S plots
  - Smaller tree, increase fruit size
- Citation:
  - Compatibility issues, French & Moyer OK
  - Highly fruitful – overcropping
- Krymsk 86:
  - Russian R/S
  - Compatible with French
- Krymsk 1 & 2:
  - Russian R/S
- Own rooted French:
- Standards:
  - Myro 29C
  - Myro seedling
  - Peach (Lovell)
  - M2624
  - Atlas and Viking