Rootstocks for Prune Production

POMOLOGY 101

Richard Buchner, Jim Doyle and Steve Southwick

TEHAMA COUNTY PRUNE DAY 2/6/09

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

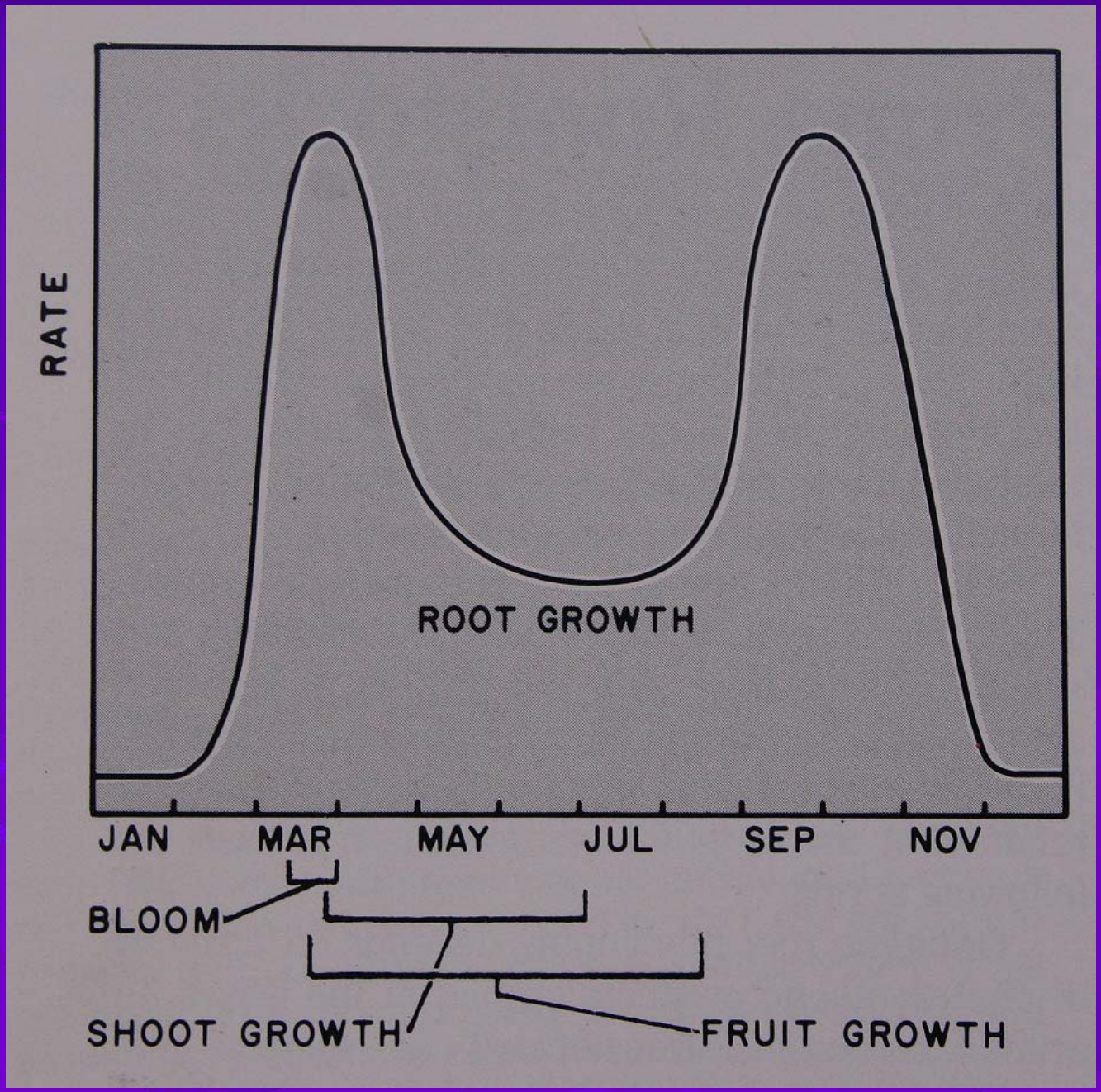

Oak Root Fungus


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


RATE
ROOT GROWTH
JAN
MAR
MAY
JUL
SEP
NOV
BLOOM
SHOOT GROWTH
FRUIT 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

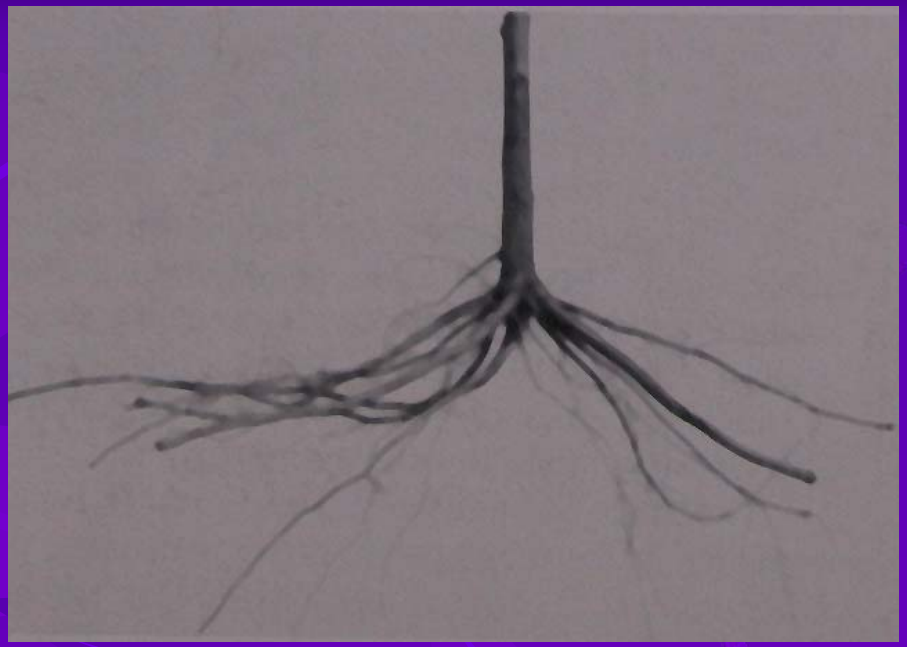
Myrobalan 29C
"Myro 29C"

- 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



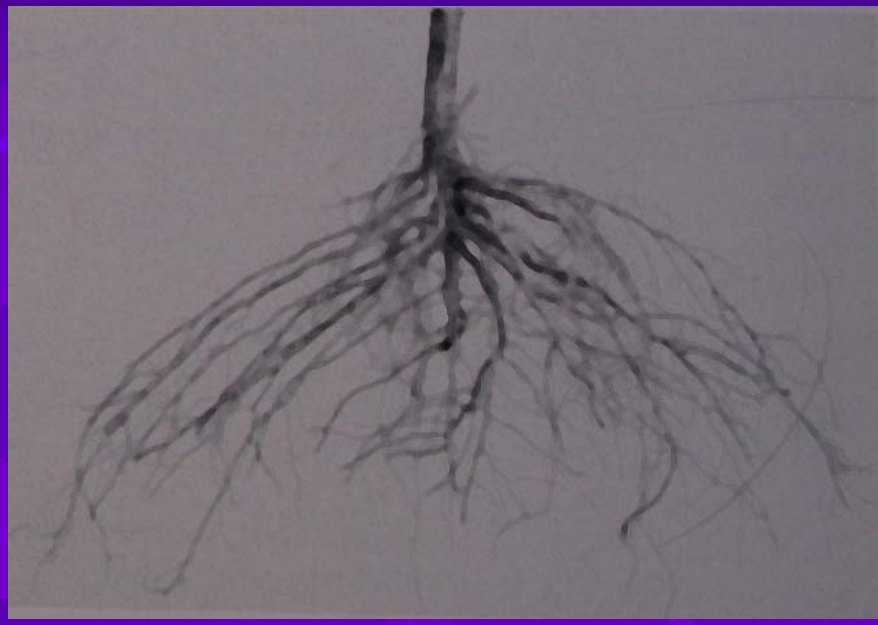
- Released about 1940 by W.L. Howard of UC Davis
- Propagated vegetatively from hardwood cuttings
- Resistance to root knot nematode and moderate resistance to oak root fungus
- Not affected by brown line
- Imparts high susceptibility to bacterial canker
- Shallow rooted and produces excessive rootstock 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 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



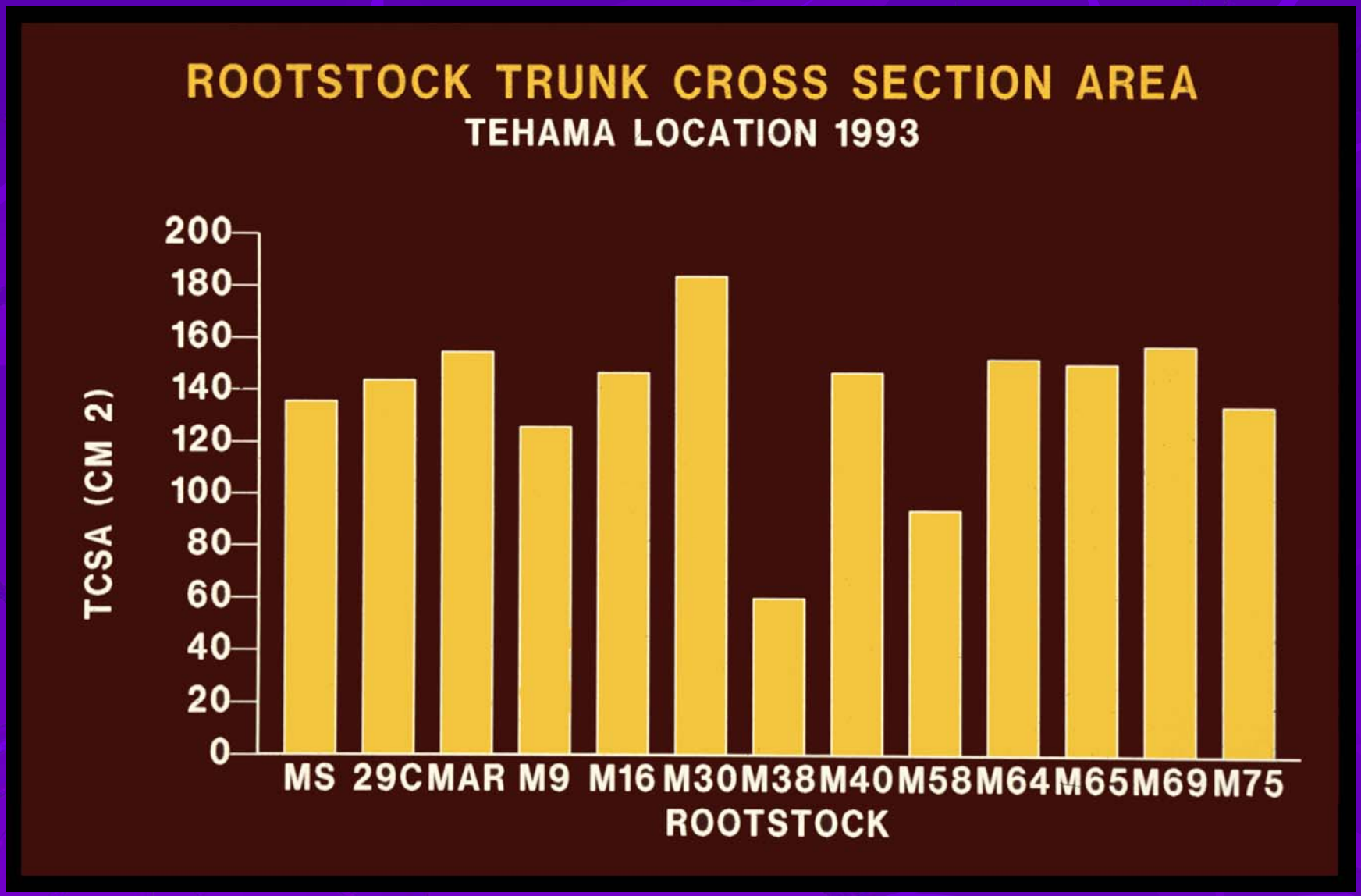
- Propagated from seeds
- Consider where Bacterial Canker is a problem
- Sensitive to crown rot, crown gall and oak root fungus
- Generally susceptible to nematodes
- Vigorous rootstock – excessive fruit set

Almond or Apricot

- 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)
200
180
160
140
120
100
80
60
40
20
0
MS
29C
MAR
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:
  - 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