

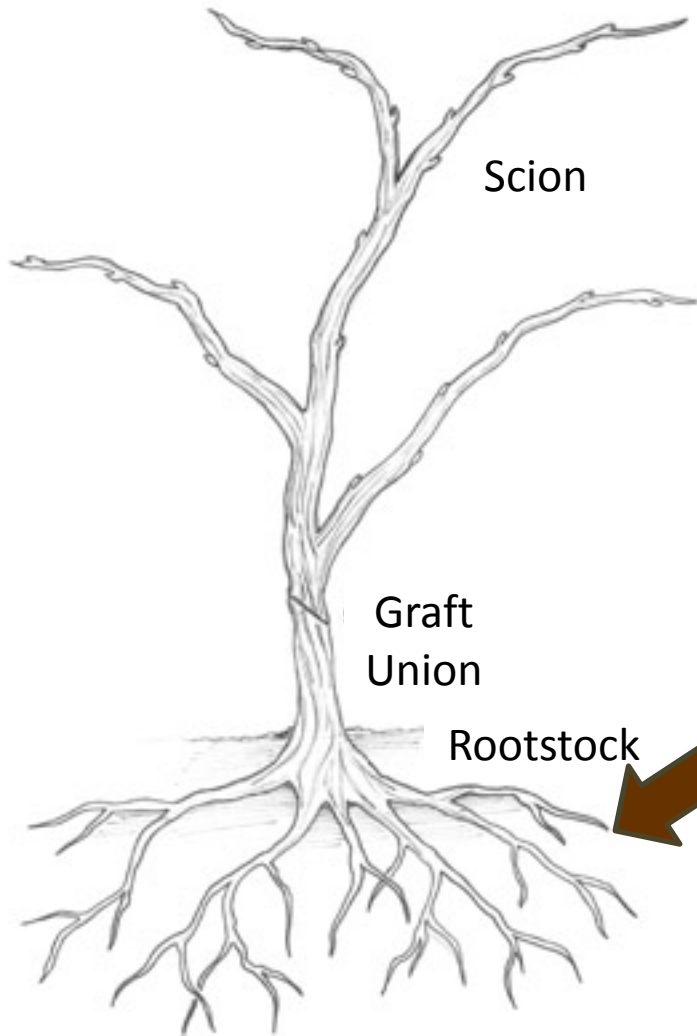
Grapevine Anatomy and Function

Dr. Jodi E. Creasap Gee

January 21, 2014

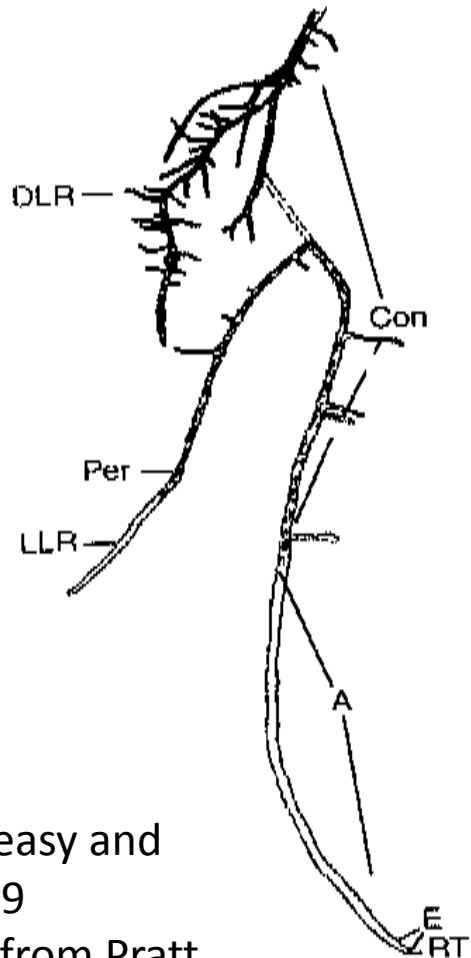
MSU Wine Grape Conference

Grapevine Anatomy



- Scion – above-graft part of vine; e.g, ‘Cabernet Sauvignon’ or ‘Riesling’
- Rootstock – root system for grafted vine
- Roots:
 - Nutrient and water absorption
 - No roots = no grapes!

Grapevine Roots



*Grapes, Creasy and
Creasy 2009
(Originally from Pratt
1974)*

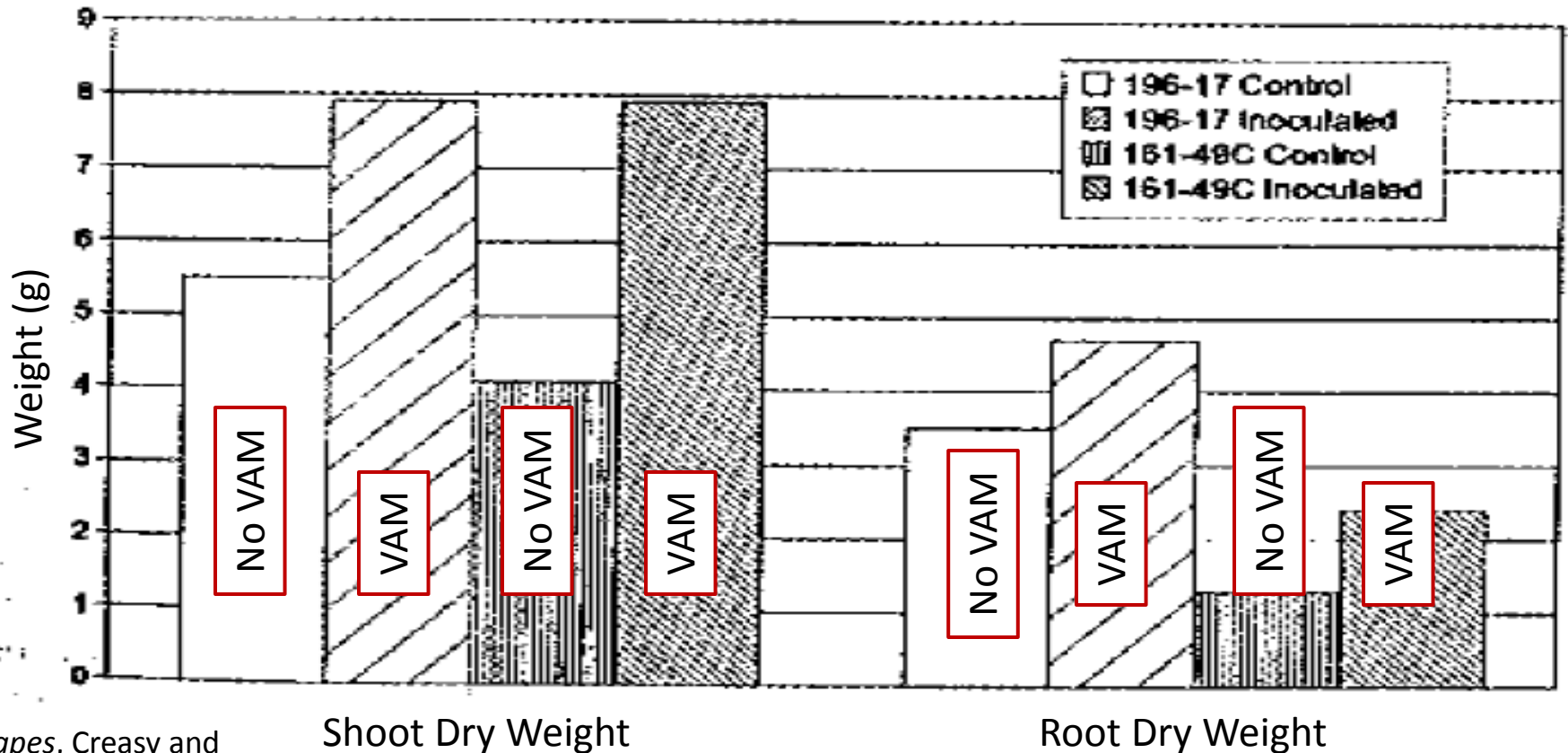
- Tap root
 - Main root
- Branches
- Root hairs
 - Increase surface area



Not a grape seed...

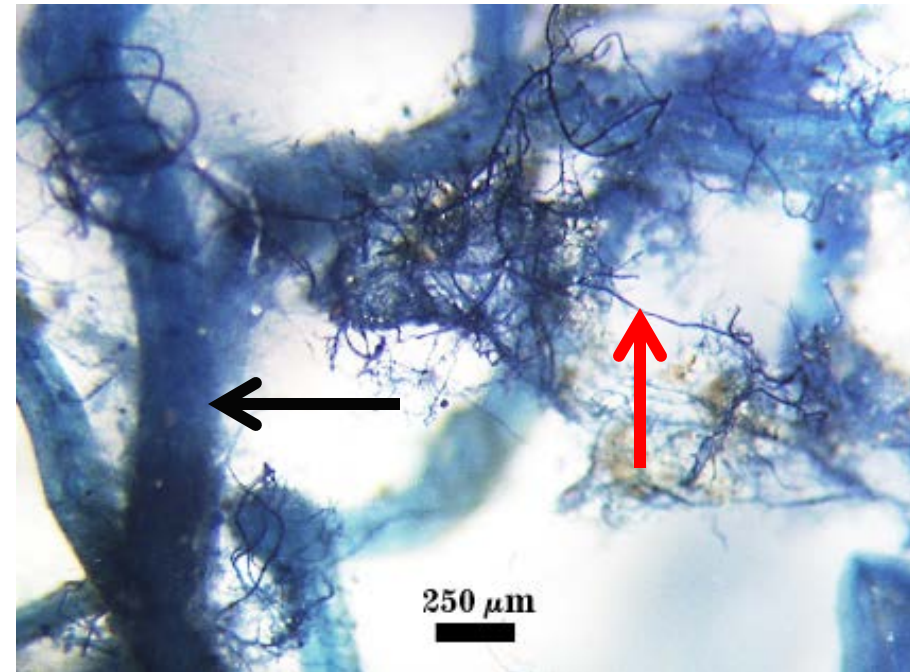
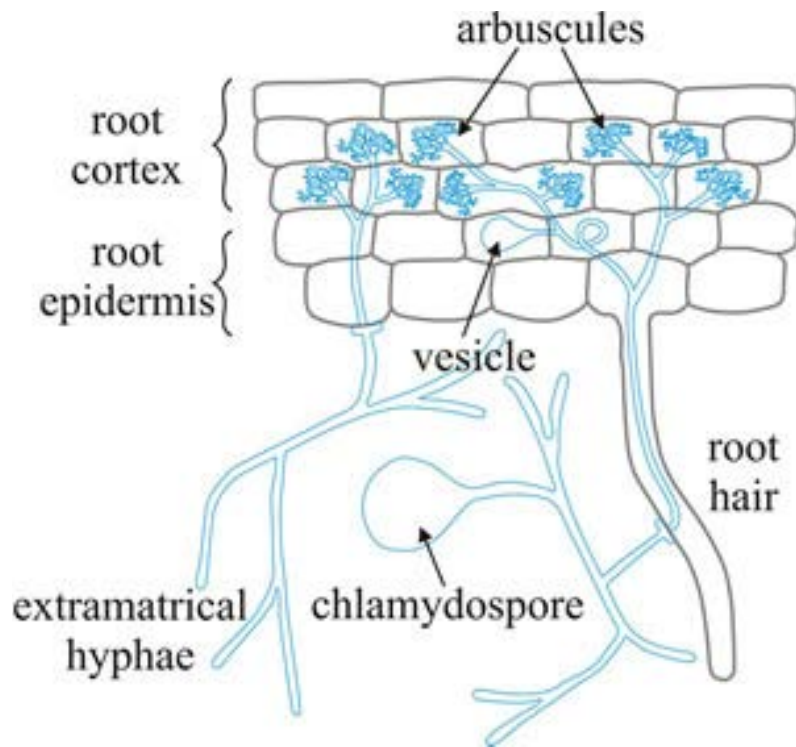
Grapevine Roots

VAM – Vesicular-Arbuscular Mycorrhizae



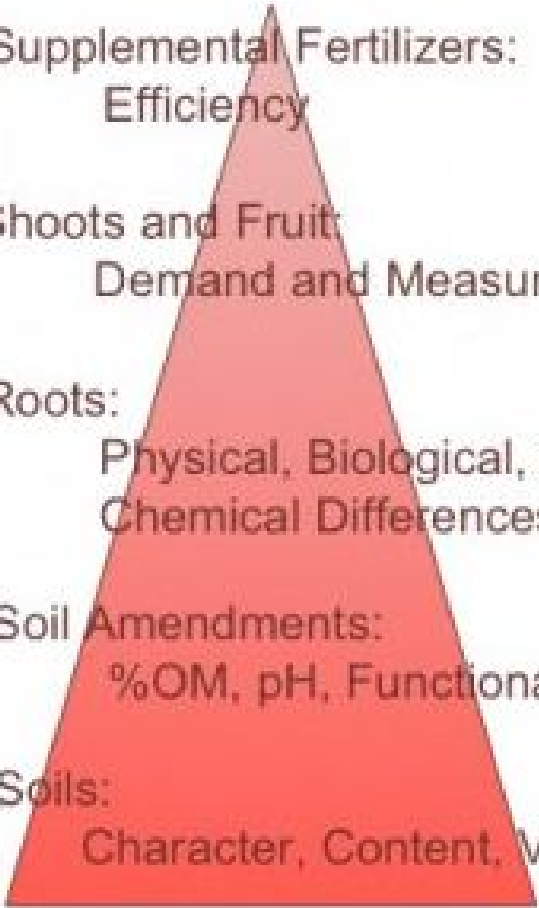
Grapevine Roots

VAM – Vesicular-Arbuscular Mycorrhizae

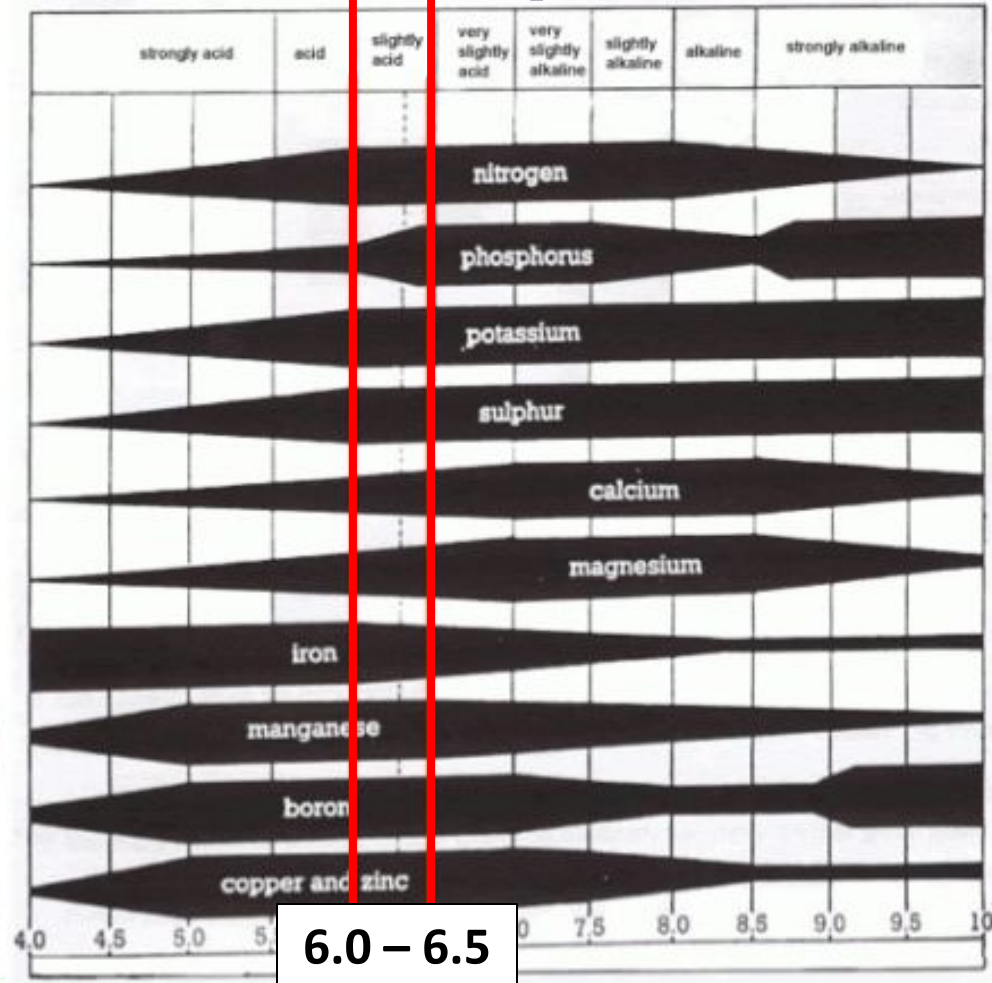


Soils & Root Nutrition

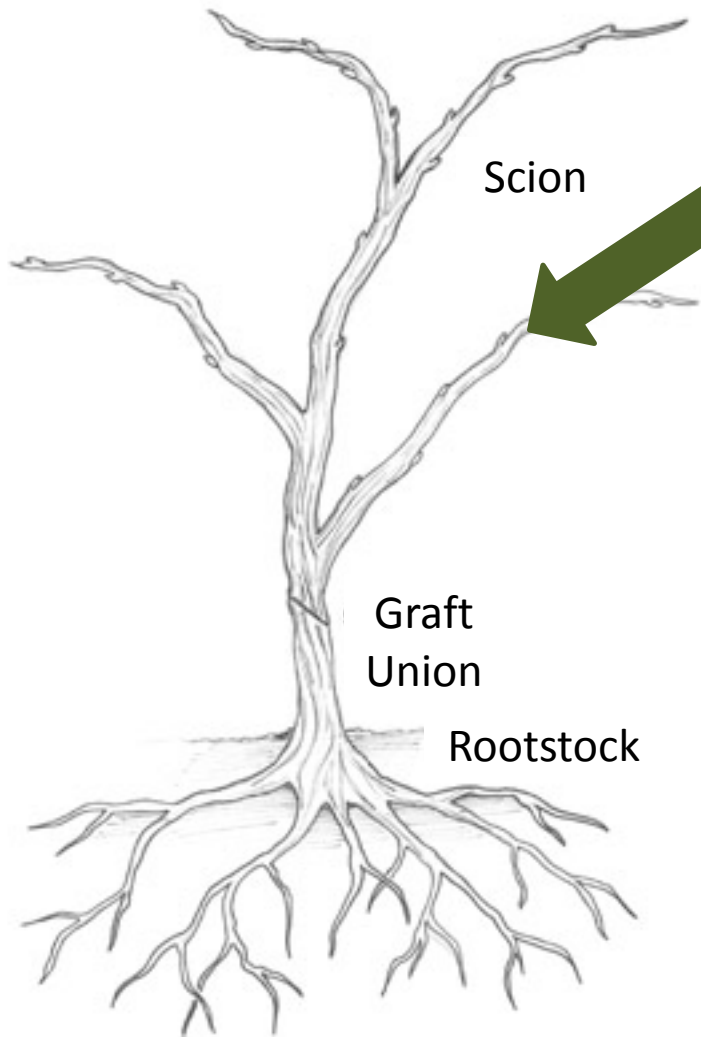
Nutrition Pyramid for Grapevines

- 
- 5) Supplemental Fertilizers:
Efficiency
 - 4) Shoots and Fruit
Demand and Measurement
 - 3) Roots:
Physical, Biological, and
Chemical Differences
 - 2) Soil Amendments:
%OM, pH, Functional Depth
 - 1) Soils:
Character, Content, Variation

Soil pH



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Grapevine Anatomy

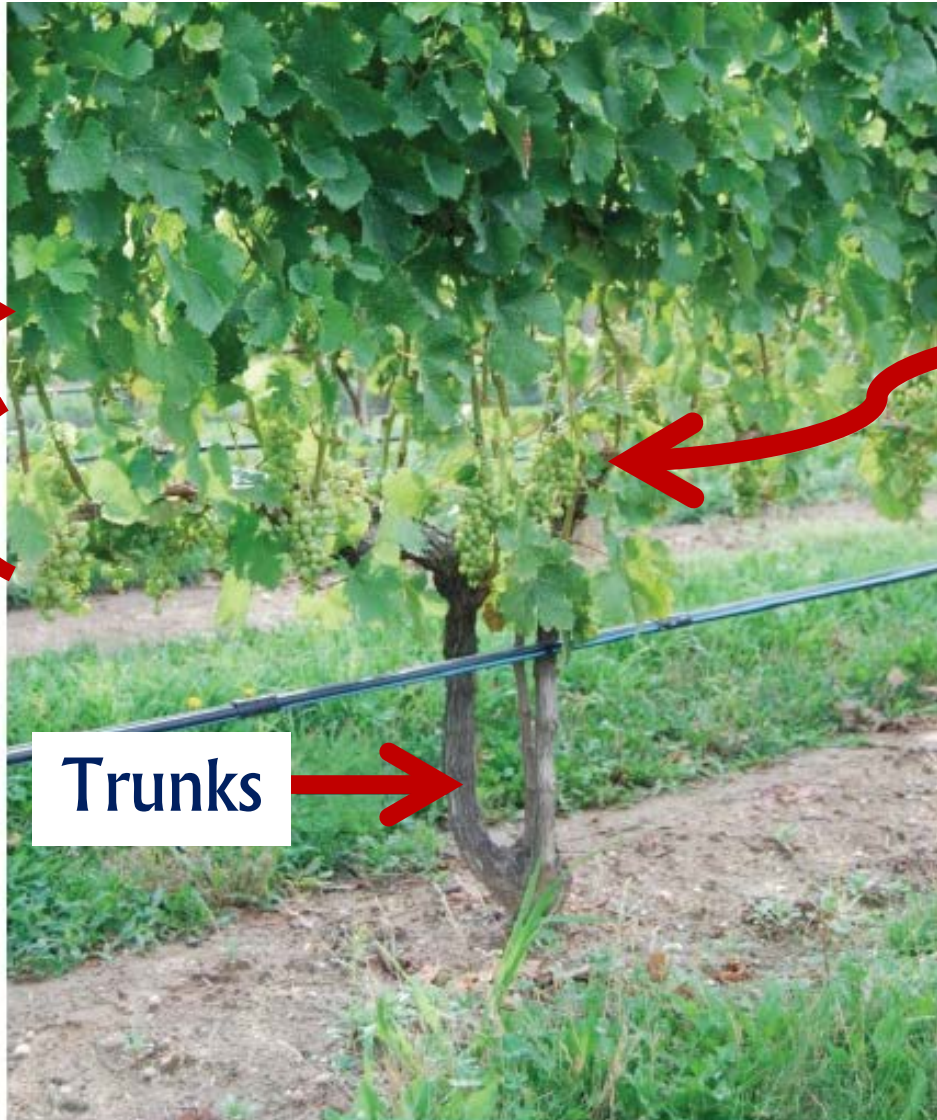
Shoots →

Fruiting
Zone

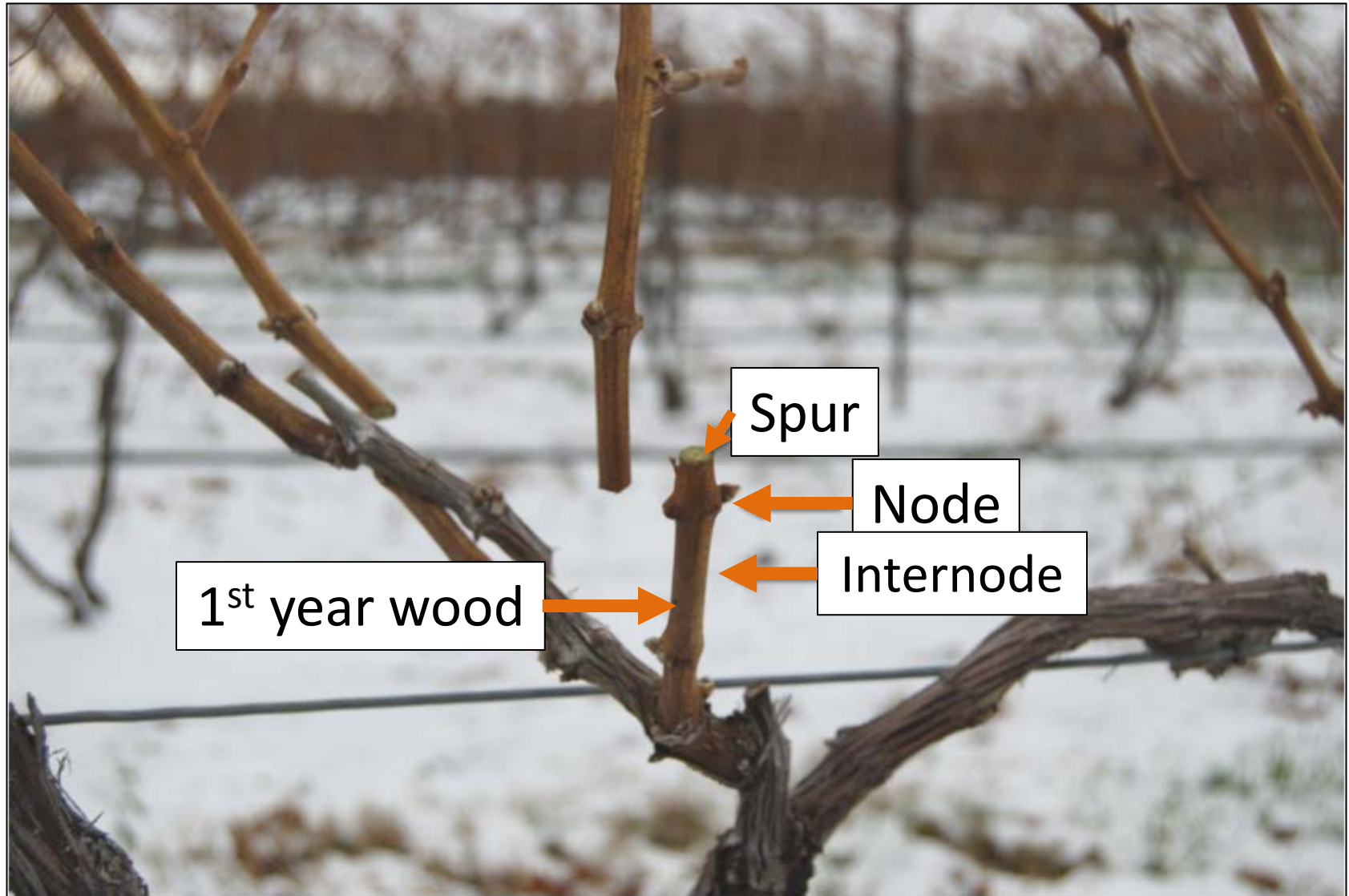
Trunks →

Cordon/
Arm

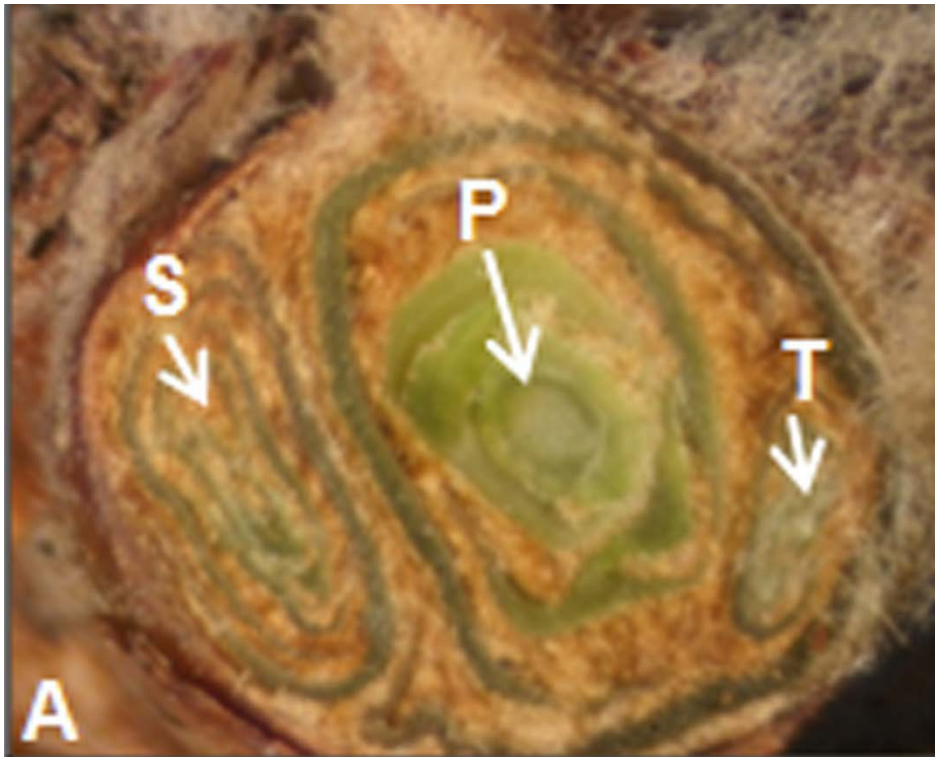
Vegetative
Growth
vs.
Reproductive
Growth



Vine Anatomy



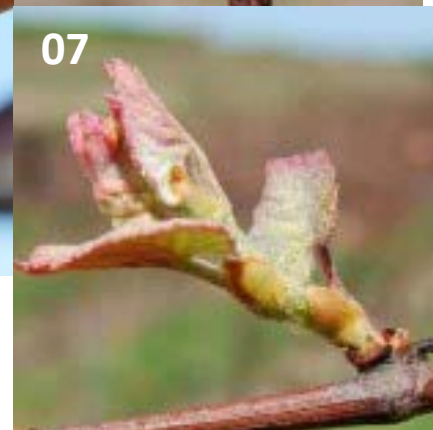
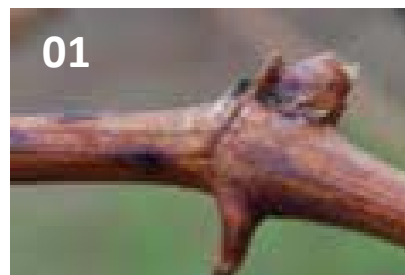
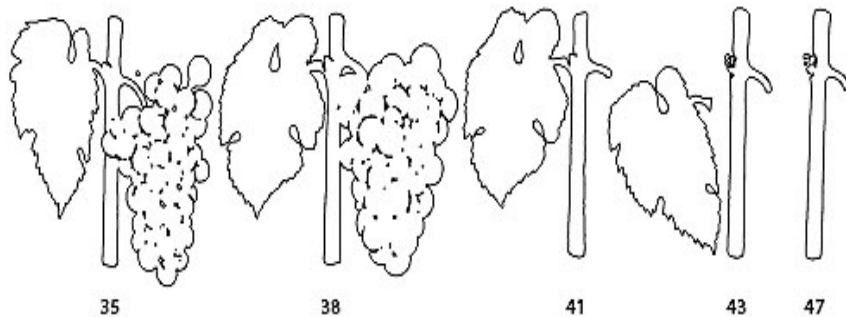
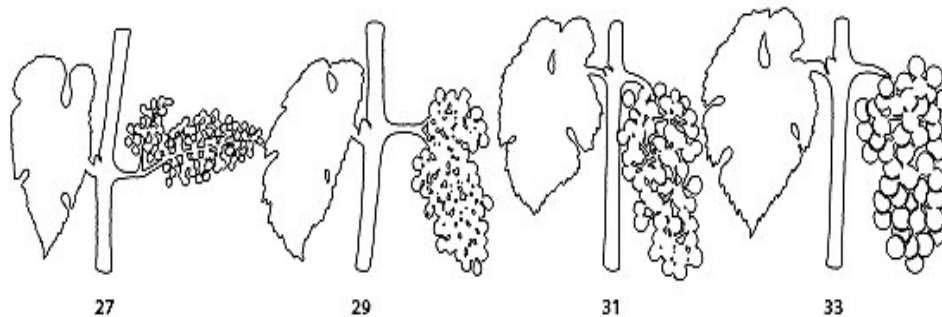
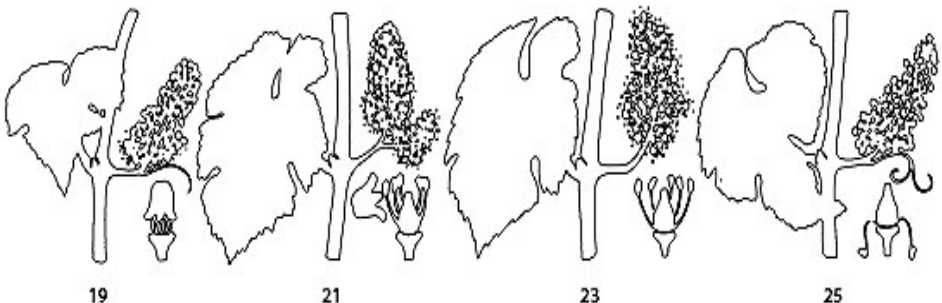
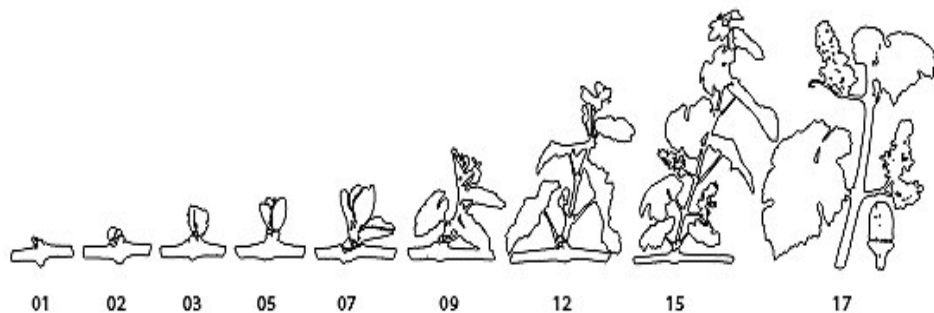
Bud Anatomy



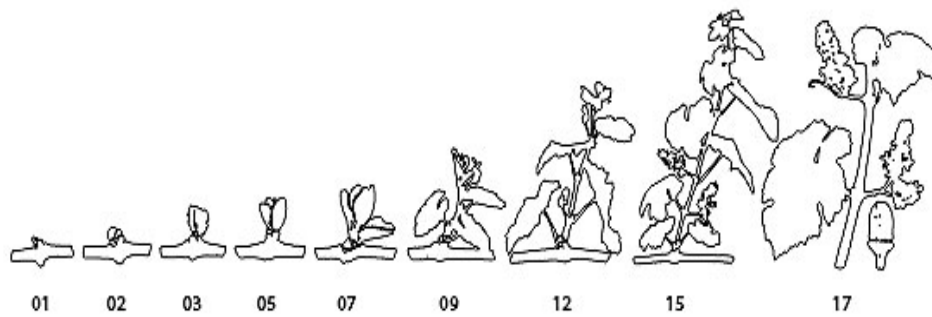
- Primary bud – largest bud in center; full crop potential
- Secondary bud – 2nd smallest bud to one side; ~2/3 crop potential
- Tertiary bud – smallest bud tucked in side opposite 2^o bud; usually no crop potential

Bud/Shoot Development

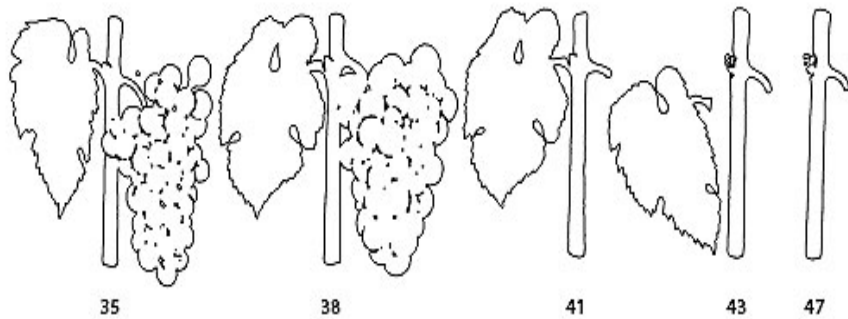
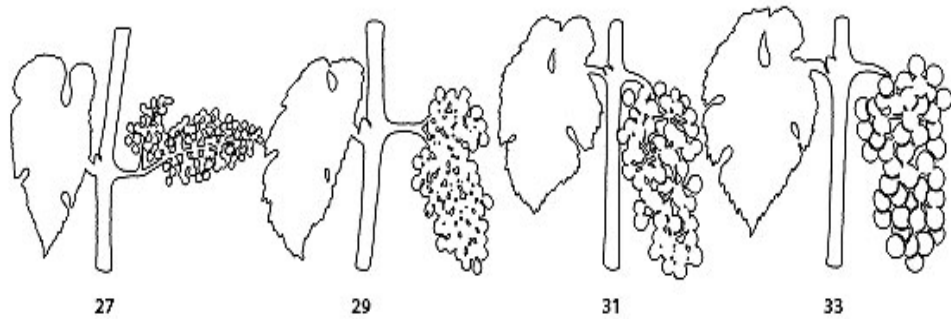
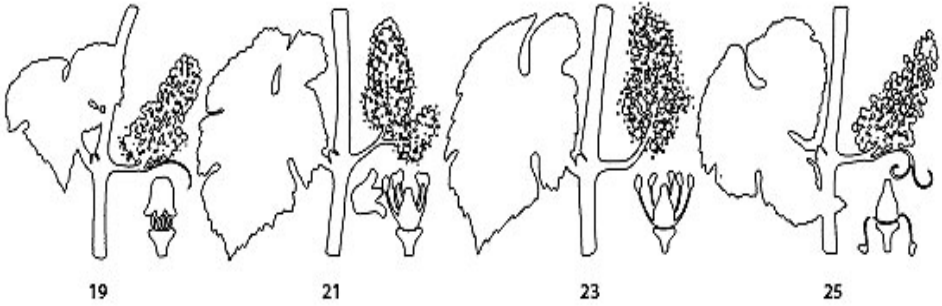
Eichhorn-Lorenz Phenological Stages



Bud/Shoot Development

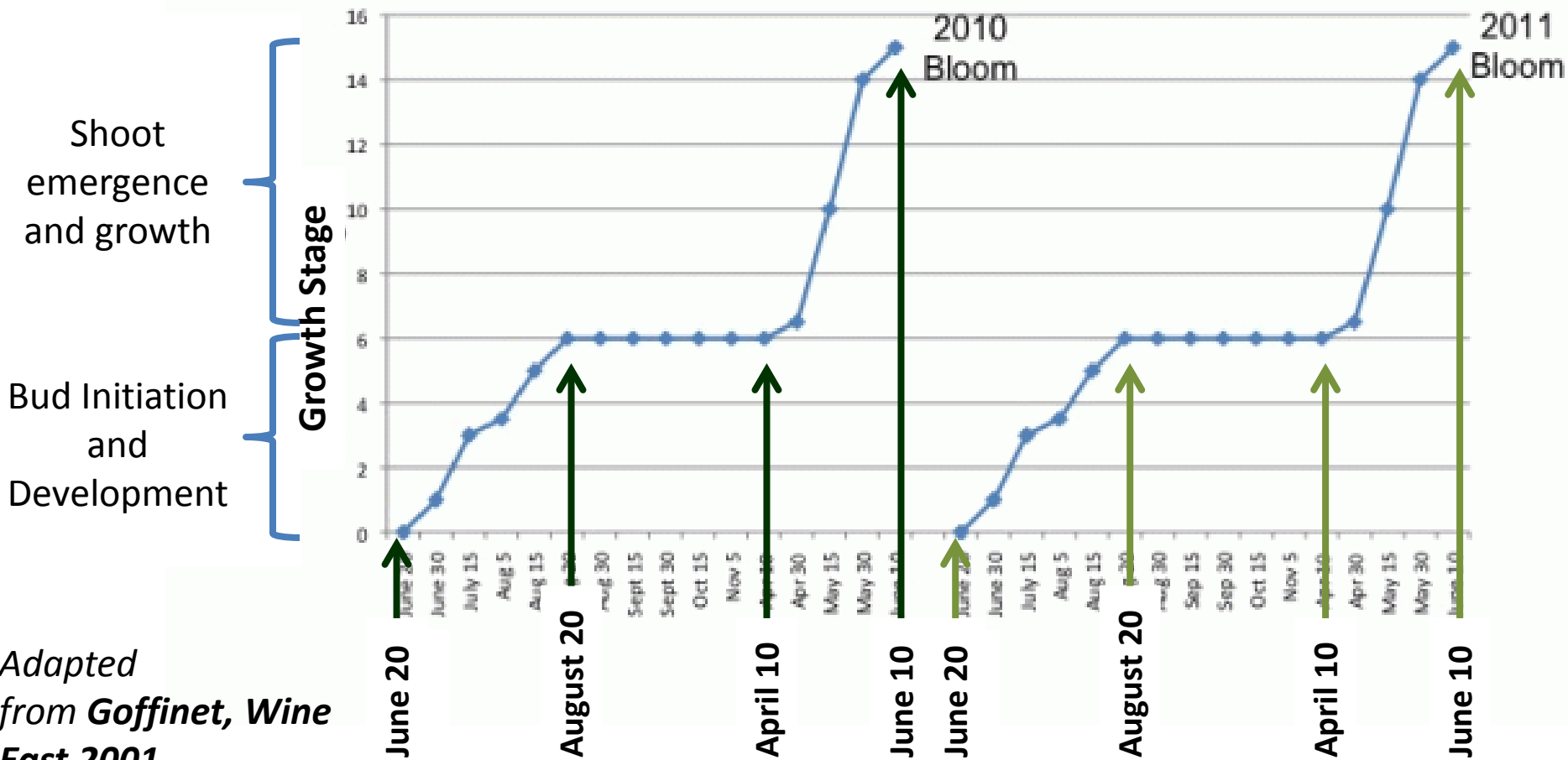


Eichhorn-Lorenz Phenological Stages



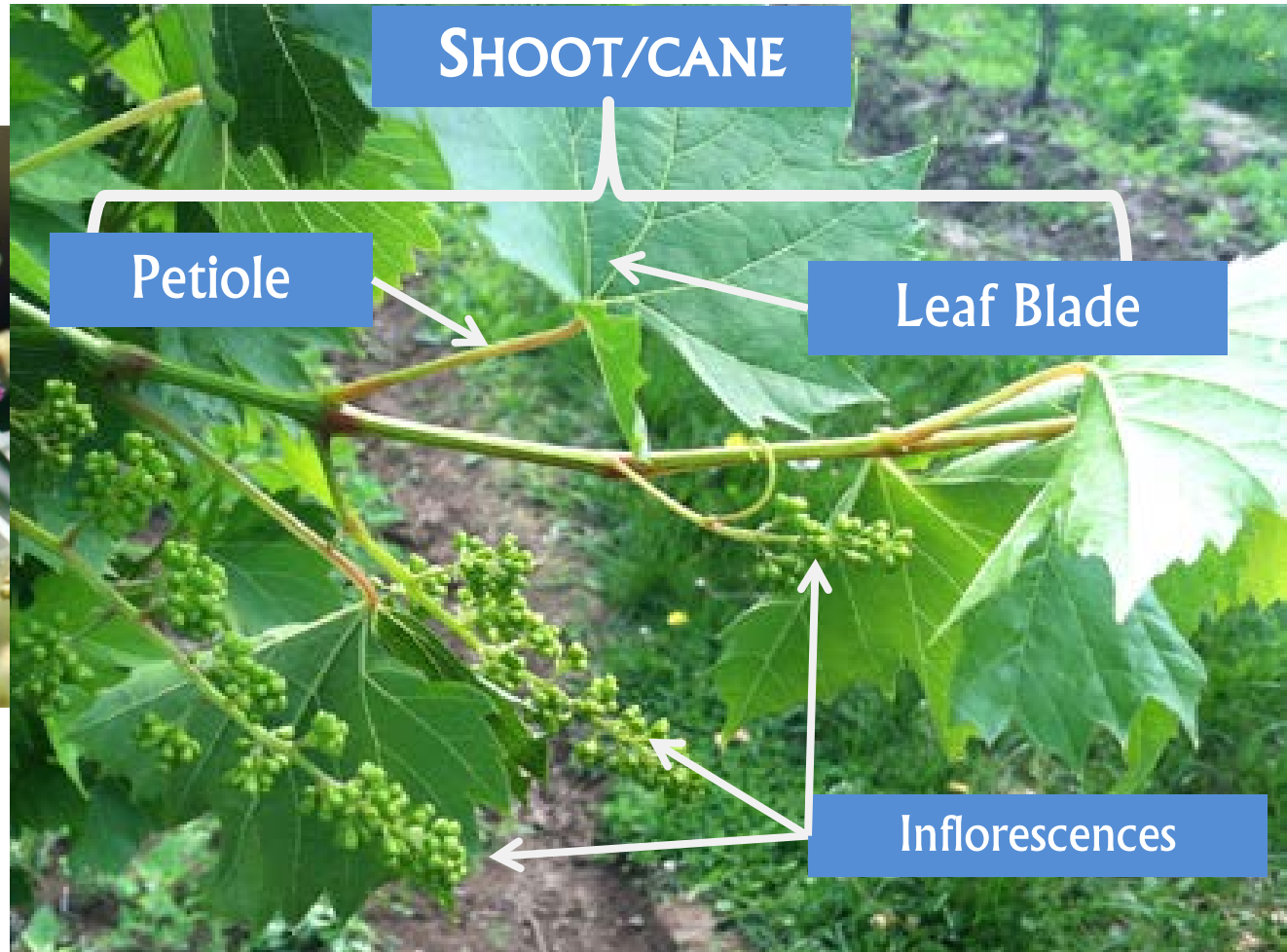
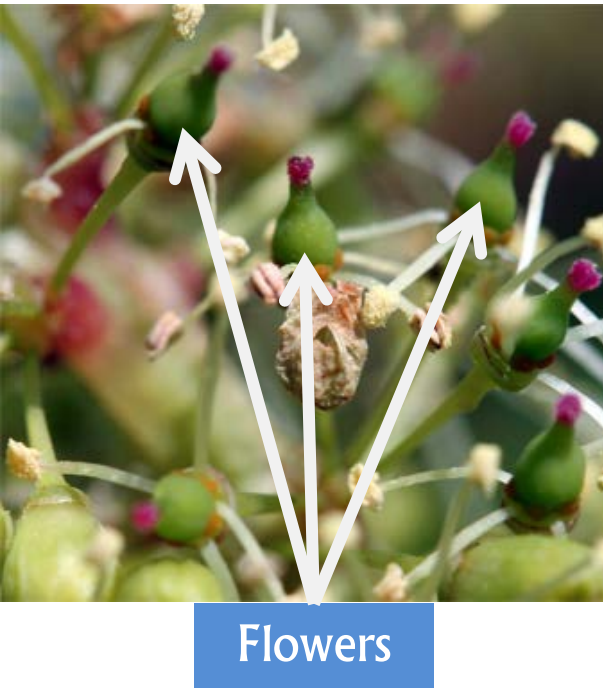
Bud Development and Sunlight Interception

Annual Cluster and Floral Development in Concord*

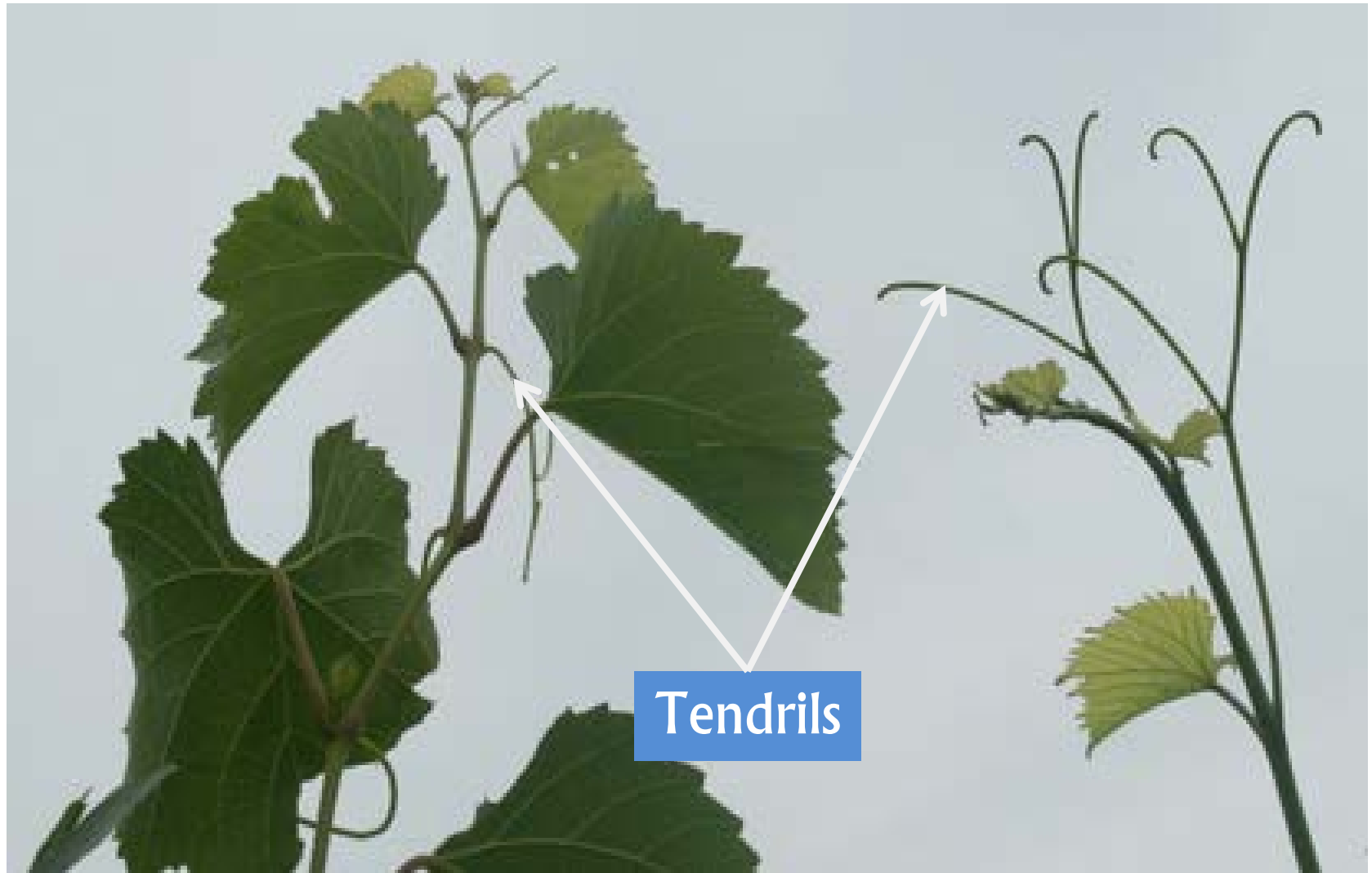


Adapted from Goffinet, Wine East 2001

Shoot Anatomy



Shoot Anatomy



Grapevine Function



Photosynthesis

Carbohydrate
production for roots
and fruit

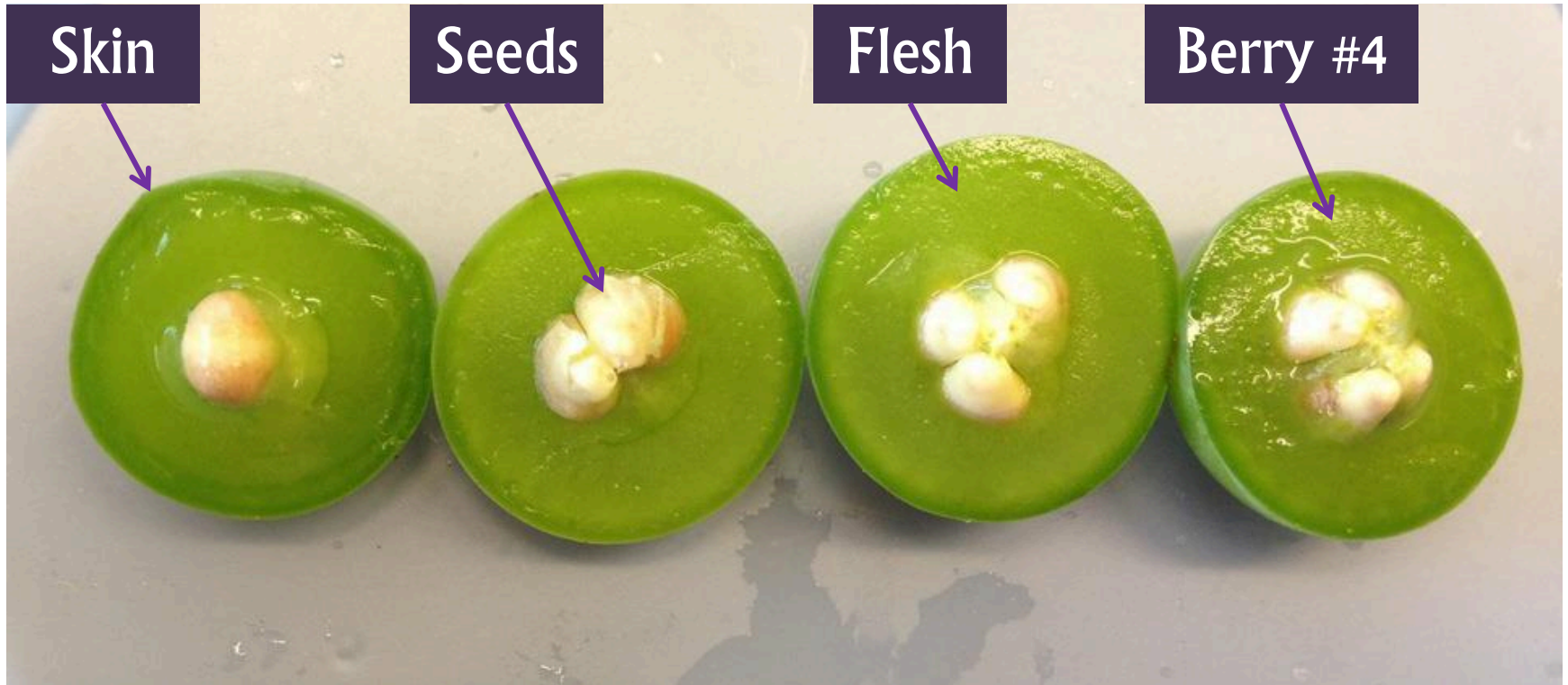
Fruit Production

Sugar accumulation
and seed ripening

Water and nutrient transport

- 1) Carbohydrates to roots
- 2) Water, nutrients, PGRs to shoots

Berry Anatomy



Berry Anatomy

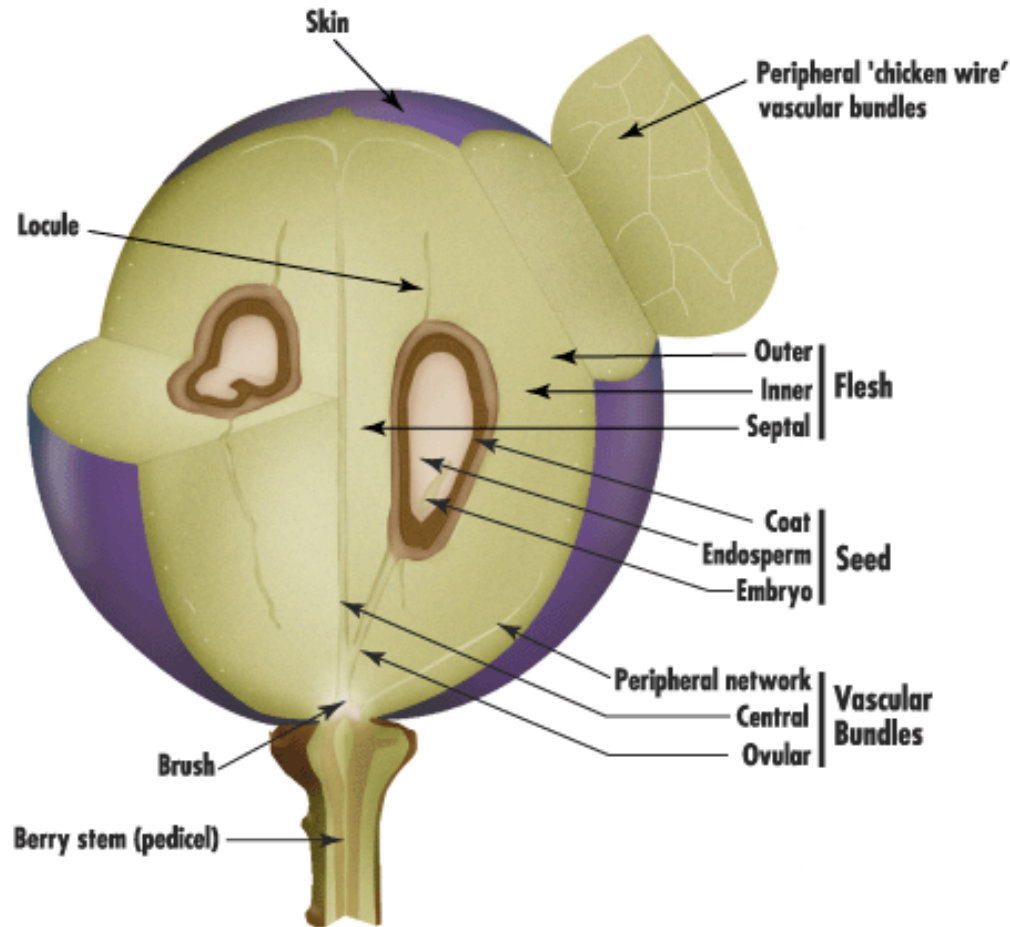


Figure 1: Structure of a ripe grape berry partially sectioned on the long and central axis to show internal parts. Illustration by Jordan Koutroumanidis, Winetitles.

Self Quiz



#12. What's missing?

Thank You!

