WHAT IS PLANT PROPAGATION?

• The multiplication of plants by both sexual and asexual methods

• An art and a science
  • Art: knowledge of mechanical, environmental, and chemical manipulations as well as technical skills with practice
  • Science: knowledge of plant growth, development and morphology
The process of placing a shoot system of one cultivar or species on the root system of another

Terminology:
- **Scion**: the shoot on a grafted plant
- **Stock**: also termed rootstock, the root system of a grafted plant
- **Cambium**: growth cells located just below the bark
- **Graftwood**: healthy scion piece with viable buds
- **Slip**: bark separates easily and cleanly from wood
- **Callus**: Wound tissue

**GRAFTING OR BUDDING**

**Grafting** – the scion contains more than one bud

**Budding** – the scion consists of a single bud

**GRAFTING VS. BUDDING**
WHY MUST WE GRAFT?

- What do you get if you plant a seed?
  - A seedling with unknown genetics
- Grapes do not come true from seed
  - Cross pollination
  - Genetic variation
- Must graft to obtain desired cultivar
- Takes too long to wait and see
- Change from one cultivar to another quickly

TYPES OF GRAFTS

<table>
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<th>Grapevine Grafting Techniques</th>
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• May be some issue with species and or cultivars in their ability to graft compatibly

GRAFT COMPATIBILITY

• Cambium
  • A single layer of cells just below the bark
  • Lead to formation of the graft union
• Stock and scion
• Subject to drying
• Increased area increases success

THE MAIN REQUIREMENT: Viable Cambium Contact
• Collect while dormant
• Last season's growth
• Pieces 9/16 to 3/8" dia. 12” long (4-5 nodes)
• Straight, round, lignified
• Internode length 2.5”
• Wrap in moist not wet medium
• Label by cultivar
• Enclose in plastic bag
• Store in refrigerator
• Not dry, not frozen

SCION WOOD COLLECTION

• Current cultivar is not economical or not appropriate for the site
• Current vines are healthy and vigorous
• Current vines not infected with crown gall or virus, resist phylloxera
• Current vines relatively young

CANDIDATES FOR GRAFTING
GREENHOUSE VS FIELD GRAFTING

**Pros (Greenhouse):**
- Greenhouse is handy to care for
- Can apply more grafts faster

**Cons:**
- Must carefully regulate environment
- Must move from GH to field

WHIP GRAFTING

- Use 1 or 2 yr old vines, up to 3/8 inch diameter
- Try to match scion size with rootstock size
- Can be done in field or greenhouse situations
1) Cut the scion at an angle about 1 to 2 inches long
2) Cut the rootstock at an angle of same length
3) Match cambiums
4) Cut tongue in both scion and rootstock
5) Wrap the graft and seal

WHIP GRAFTING PROCESS

- Easy and requires little skill
- Bark must be “slipping” to work
- Timing can vary with cultivar
- Scion must be dormant

BARK GRAFT
1) Select the vine and cut off top
2) Prepare the scion
3) Make pattern cuts on rootstock
4) Insert scion and secure
5) Cover and seal

BARK GRAFT PROCESS

- Simple method, little skill
- For larger diameter vines
- Scion must be dormant
- (Notch graft is a variation on the Cleft)

CLEFT GRAFT
CLEFT GRAFT PROCESS

1) Cut top off (1/2 hour or so before grafting)
2) Split the rootstock with a blade or chisel
3) Hold split open, prepare scions
4) Place scions in split, one on each side to fit with cambium
5) Tape together and use grafting compound to seal

BUDDING

- Chip bud
- T-budding (Shield) is commonly used in fruit species
T-BUDDING

- Take mature, dormant bud from budwood that is healthy and vigorous
- Clip the leaf blade off, leaving petiole intact which acts as a handle
- Cut off the bud with a small sliver of wood

T-BUDDING PROCESS

- Make a vertical cut in the rootstock to separate the bark from the cambium
- Cross the “T” with a perpendicular cut at the top or bottom
T-BUDDING PROCESS

- Carefully peel back the bark to expose the pocket for the bud shield
- Slip in the bud shield, trim off top of shield
- Wrap tightly with grafting tape
- After healing and growth, cut off portion above the budded area

THE FINISHED PRODUCT

- About 14-21 days
  - Buds pushed
  - Eventually thin to one
- Training program begins
GRAFT AFTER CARE

- Remove competing branches after graft pushes bud
- Remove tape, foil etc in late summer
- Remove all branches below graft

My Grape Program Activities
Applied Research and Extension

Eric T. Stafne
Assistant Extension Professor
Mississippi State University
Project Director, eXtension Grape Community of Practice
APPLIED RESEARCH

- Two vineyards
  - Blanc du Bois, Villard Blanc, Miss Blanc
  - Fruit removal study, crop forcing, pruning, etc.
- Observational vines

EXTENSION EFFORTS

- Fruit and Nut Crop Extension Specialist for Mississippi
  - Blog: msfruitextension.wordpress.com
  - Twitter: www.twitter.com/EStafne (@EStafne)

- Larger scale – National Grape Community of Practice
  - eViticulture.org
  - www.extension.org/grapes
THE DOWNSIDE OF VITICULTURE ONLINE

- Anyone can post anything
- No accountability
- Difficult to know who is an expert
- What information do you trust?
- Personal experience – valuable, but…

WHAT IS eXtension?

- An interactive learning environment delivering the best, most researched knowledge from the smartest land-grant university minds across America
- Connects knowledge consumers (you) with knowledge providers (us)
WHAT DOES eXtension OFFER?

• Credible expertise
• Reliable information based upon sound research
• Customized answers to your specific needs
• Dynamic, relevant and timely content

HOW IS eXtension DIFFERENT?

• University content providers gather and produce new educational and informational resources
• Available to anyone at any time from any Internet connection
• eXtension helps solve real-life problems in real time
• The eXtension system enables content to be readily updated as needed, a feature that is a significant advantage over traditional extension publications
THE GRAPE COMMUNITY OF PRACTICE

• The Grape Community of Practice (GCoP) strives to meet the educational needs of the grape industry as a whole
  • industry partners,
  • extension employees
  • consumers
• Providing science-based information and learning opportunities through eXtension

CREATION OF THE GRAPE COMMUNITY OF PRACTICE

• Awarded SCRI grant in 2009

• Proposal large in scope, involved multiple institutions, multiple disciplines
  ▪ Dollars from Missouri Wine and Grape Board
  ▪ Defined as “core proposal” by NGWI
  ▪ Letters of support from National Grape Cooperative, state grape grower associations, etc.
GCoP COLLABORATION

- Increased collaboration among viticulturists on a national and international scale

- Prior to the GCoP, interaction of viticulture specialists usually occurred on a state or regional basis

- Members learn from each other, encouraging collaboration on publications that strengthen the work

- Many articles translated into Spanish to reach broader audience

PUBLIC LAUNCH

- Site went public on December 27, 2010
  - Soft launch

- Official launch on January 27, 2011
  - Unified Grape and Wine Symposium in Sacramento, CA
ACCOMPLISHMENTS (TO DATE)

• Published 700+ articles

• 100+ in Spanish

• Social media: Twitter @eViticulture Facebook www.facebook.com/eViticulture

www.eXtension.org/grapes
eViticulture.org

MY CONTACT INFORMATION

• Eric T. Stafne
• Email: estafne@ext.msstate.edu
• Phone: 601-403-8939
• Blog: msfruitextension.wordpress.com
• Twitter: @EStafne