

Grafting and Budding Fruit Trees

Dr. Jeff Williamson, Professor
Horticultural Sciences Department
University of Florida



Introduction

Definition – Grafting is the joining together of two separate structures or organs, usually from different genotypes, so that they function as a single plant. Budding is a specific type of grafting where a single bud is inserted into a rootstock.

Introduction

- Scion – The portion of a grafted plant which consists of the upper trunk, branches, leaves, and reproductive structures.
- Rootstock – the portion of a grafted plant which consists of the lower trunk and roots.

Introduction

Most fruit trees are propagated by one of several asexual procedures collectively known as grafting and/or budding.



Reasons for Grafting

Some fruit species are difficult to root. This was especially true before the advent of mist beds and synthetic plant hormones.



Reasons for Grafting

Grafting (and budding) can result in plants which possess beneficial characteristics of both the scion and the rootstock.



Grafting and budding enable use of rootstocks

- Rootstocks can impart many beneficial characteristics to a grafted or budded plant.



Beneficial Effects of Rootstocks

- Increased cold hardiness
 - Trifoliate orange and sour orange are more cold hardy than rough lemon and carrizo rootstocks.
 - Lovell peach is more cold hardy than most other peach rootstocks.

Beneficial Effects of Rootstocks

Tolerance to adverse soil conditions
Adverse soil pH
Drought and flooding
Salinity
Nematodes and other soil-born pests
Soil-born diseases

Beneficial Effects of Rootstocks

- Yield and fruit quality
 - Tree size control = higher pre acre yields
 - Rootstock effects on tree architecture can improve fruit quality.
 - Increased precocity
 - Post harvest fruit quality

Beneficial Effects of Rootstocks

- Tree size control can reduce labor requirements for various cultural practices
 - Pruning
 - Harvesting
 - Hand thinning of fruit

Other reasons to graft fruit trees

- Repair damaged tree – inarching
- Change existing cultivar – topworking
- Grow more than one cultivar on a single plant

Factors for Success

- Condition of plant material
 - Proper stage of growth and development
 - Healthy, disease free plant material
 - Fresh budwood
 - Rootstock plants should be in non-stressed condition.

Selecting Budwood

- Budwood should be at the proper stage of maturity
- For Citrus, wood from the second or third growth flush back from the terminal and about the diameter of a pencil is suitable (center stick).



Collecting Budwood

- Collect budwood from healthy, non-stressed plants the morning of budding.
- Some procedures require dormant budwood. This wood should be collected before growth begins in the spring and stored under refrigeration.
- Budwood should be labeled and tied in bundles.

Tools

- The required tools will depend on the procedure.
- Common tools are – hand pruners, sharpening stone, very sharp knife, budding tape, budding rubbers, and labels.

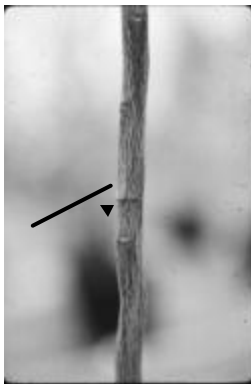


Shield Bud

- The shield bud, also known as the T-bud, is commonly used for propagation of many fruit trees.
- This procedure is done during the growing season when bark on the rootstock is “slipping”.
- A modification of shield bud is the inverted T-bud which is commonly used on citrus.

Inverted T-Bud

- Vertical cut through the bark but not deep into the wood beneath.
- Horizontal cut that intersects the first cut.



Inverted T-Bud

- A bud is removed from the bud stick by making a shallow cut just into the wood and passing under the bud.
- The cut surface must be smooth.



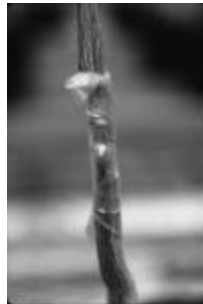
Inverted T-Bud

- The bark is gently separated from the wood where the two cuts intersect.
- The bud is slipped completely under the bark.



Inverted T-Bud

- The bud is tied firmly in place with budding tape.
- Tying prevents moisture loss and holds the bud firmly against the rootstock.



Inverted T-Bud

- Plants should be well watered and placed in semi-shade.
- Remove the budding tape after 18 to 21 days.



Hanging Chip Bud

- The hanging chip bud is a modification of the chip bud.
- The hanging chip bud is essentially an inverted chip bud.
- It is commonly used in Citrus when the bark is not slipping.

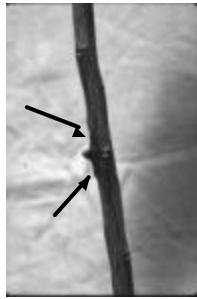
Hanging Chip Bud

- The bud is cut in a manner similar to the T-bud, but slightly deeper into the wood.



Hanging Chip Bud

- A similar cut is made on the rootstock and the bud is positioned on the rootstock so that cambium layers from both are in contact.
- The bud is wrapped firmly with budding tape.



Forcing the Scion Bud

- Apical dominance inhibits growth of inserted scion buds.
- Altering apical dominance and allowing growth of scion buds is known as bud forcing.
- Forcing is done soon after buds are unwrapped

Bud Forcing

- There are several procedures used to force scion bud growth.
 - Cutting off (shown)
 - Lopping
 - Bending

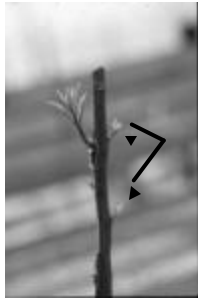


Aftercare

- After forcing, transpiration rates are reduced, especially with the cutting off method.
- Irrigation should be adjusted accordingly to prevent over-watering.

Aftercare

- Rootstock sprouts will develop after forcing along with the scion. They should be removed as soon as they appear to prevent competition with the scion bud.



Summary

- Goals and objectives of grafting and budding fruit trees.
- Benefits of rootstocks.
- Importance of proper tools and plant materials.
- Technical aspects of two simple and commonly used budding procedures.
