Unit E: Plant Propagation

Lesson 5: Propagating Plants by Grafting and Budding

Terms

- Bark grafts
- Budding
- Cleft grafting
- Patch budding
- Scion
- Stock
- T-budding
- Whip and tongue grafting

What Is Grafting and How Is It Used to Propagate Plants?

- ***Grafting*** is the process of connecting two plant parts (scion & a root) together in such a way that they will unite and continue to grow as one plant
- There are numerous uses for grafting:
  - To create new plants
  - To create dwarf plants
  - To increase hardiness
  - To increase disease resistance
  - To change the natural plant form

- A grafted plant consists of a ***scion*** - a short piece of stem with two or more buds, and the ***stock*** (understock or rootstock) - which is the lower portion (root or growing part) of the graft
- There must be contact of the cambium layer of the scion and the stock for successful growth to occur

- It is also essential that the graft does not dry out
  - This is prevented by wrapping the grafted area with a wax, grafting compound or rubber/polyethylene banding
- The scion and stock must also be compatible plants (of the same genus)
  - For example: apple to apple, orange to orange

Grafting Tools

Grafting Knife

Grafting Tape

Grafting Wax

What Are the Three Common Methods of Grafting?

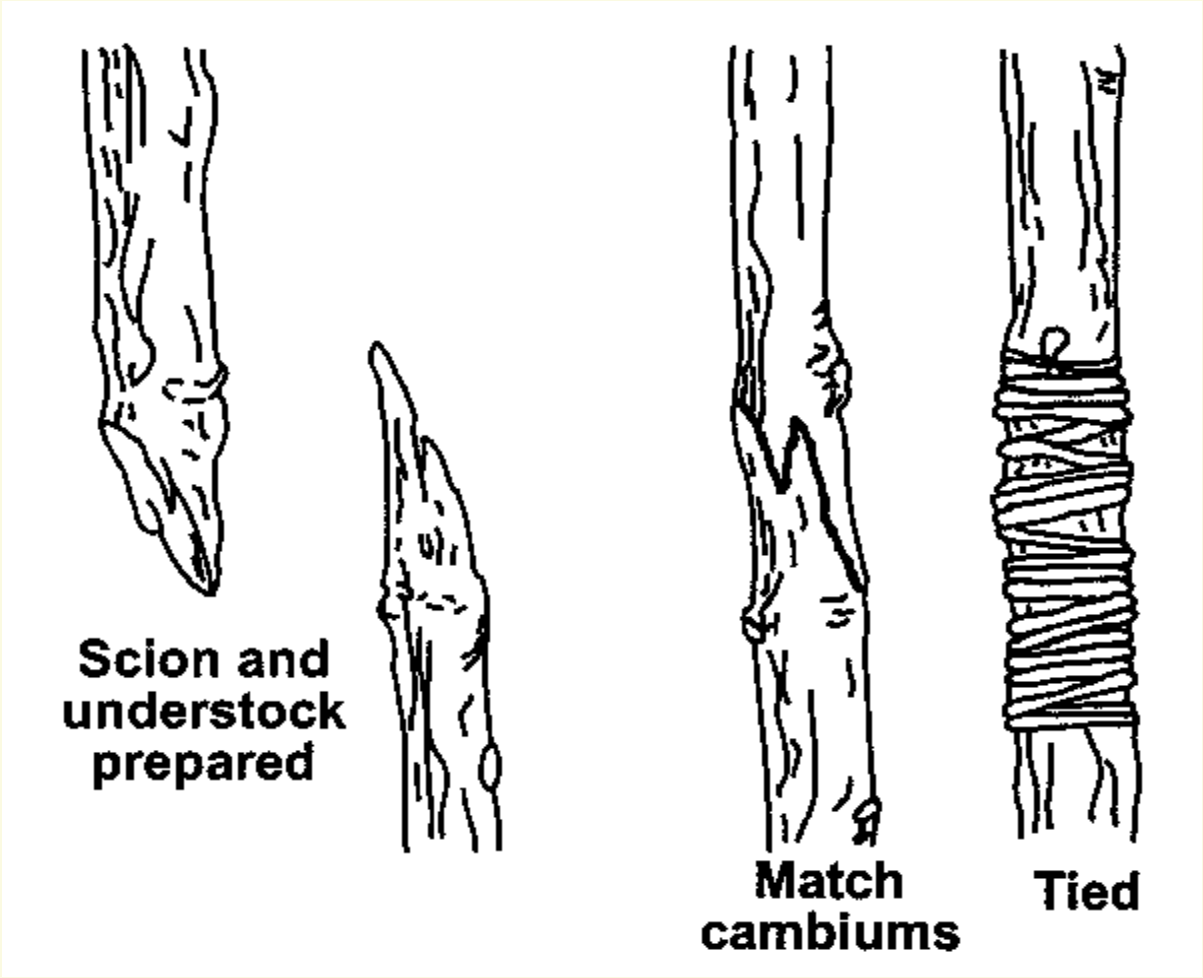
- The main reason for grafting is to asexually propagate plants that are difficult by other methods
  - It is often used in the production of orchard trees, shade trees and roses
- There are several grafting methods commonly used by propagators.

Whip and Tongue Grafting

- ***Whip and tongue grafting*** is commonly used to propagate fruit trees especially apple and pear
- The root of a young seedling tree is used for the rootstock
- The scion is a dormant twig containing three or four buds
  - It is about the diameter of a pencil

- The stock and scion are cut at a slant angle
- The whip or tongue is made by making a single cut one centimeter deep into the sloping cut
  - Both the scion and the rootstock have a tongue cut
- Insert the scion tongue cut in the rootstock cut
- Line up the cambium layers and bind with graft tape
- Seal with wax or grafting compound to prevent moisture loss

Whip and Tongue Graft



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Whip and Tongue Grafting Example

Make a slanting cut on both rootstock and scion

Cut the tongue 1/3 of the way from the tip on the rootstock

Cut the tongue 1/3 of the way from the tip on the scion

The tongues will overlap by 1/3 to jam the graft together.

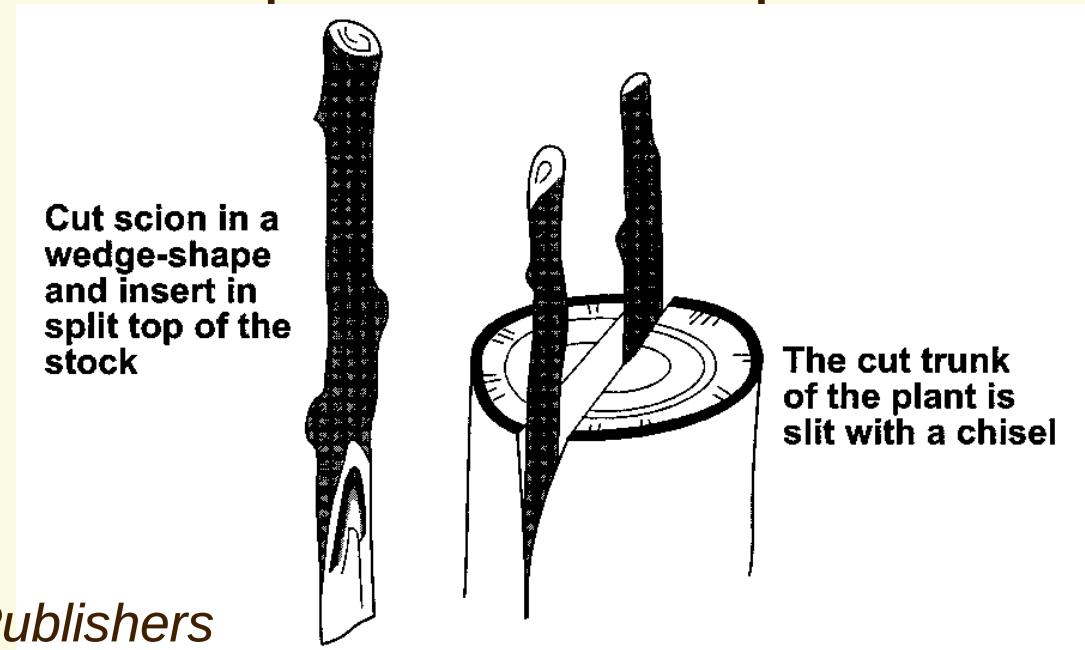
Slip the rootstock and scion together

Wrap with grafting tape

Cleft Grafting

- ***Cleft grafting*** is often used to join a smaller scion to a larger stock
  - It is usually done in late winter
- The branch or tree is cut straight across
- With a knife or grafting tool, a split or slit is made in the cut end of the limb or rootstock
- Next a scion piece 7- 12 cm long with one or two buds is cut and the end sharpened into a thin wedge

- Slide the wedge into the split end of the rootstock, matching the cambium layers of the scion and the rootstock
- Cover the graft with tape and seal to prevent moisture loss



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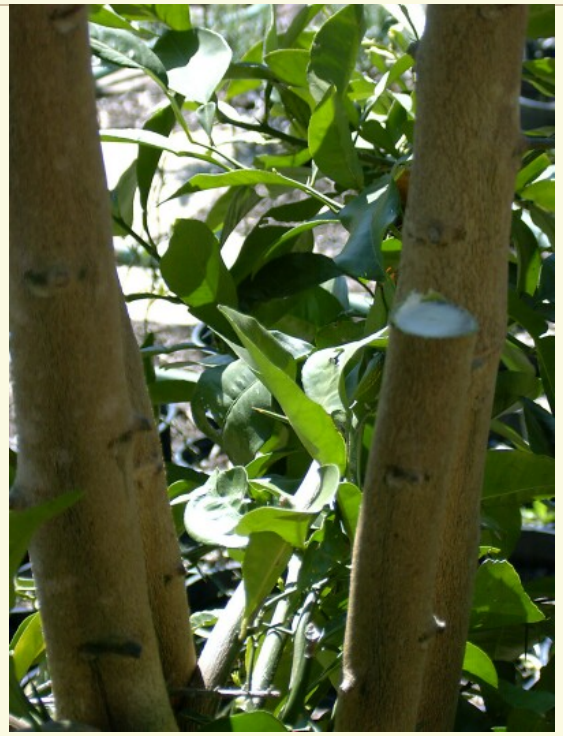
Cleft Grafting Example



Cut off the limb

Insert the budwood

Wrap with aluminum foil to keep the heat off

Cut a hole in the tip of a poly bag and carefully slip over the budwood. Tie with a twisty, cut a small hole in the poly bag to drain any rain water. Wait for 3 weeks and then remove coverings

Cleft graft starting to force about a month later

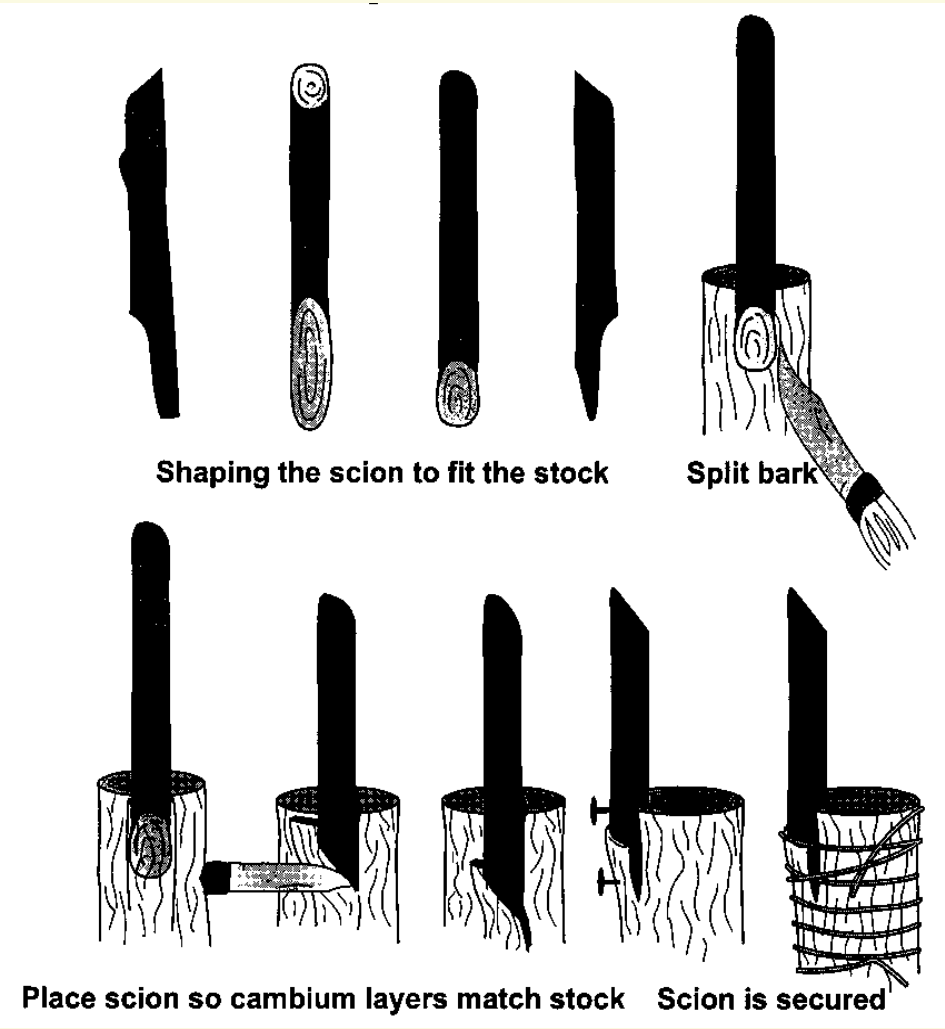
About 3 months later.

Bark Grafts

- Bark grafts are similar to cleft grafts in that they join smaller scion wood to larger rootstock
  - It is done in early spring when the bark easily separates from the wood along the cambium layer
- Bark grafting is used to propagate fruit, ornamental and shade trees

- Cut the top 1 to 5 cm diameter rootstock tree
- On one side of the cut, make a 5 cm long cut down through the bark of the rootstock
- Select a scion and shape the bottom end to be slanted on one side to a sharp point
- Pull the bark from the rootstock slightly along the slit cut and slide the sharpened part of the scion in the rootstock
- Drive one or two small nails through the bark on each side of the slit or wrap with twine to hold the graft tight and seal

Bark Grafting



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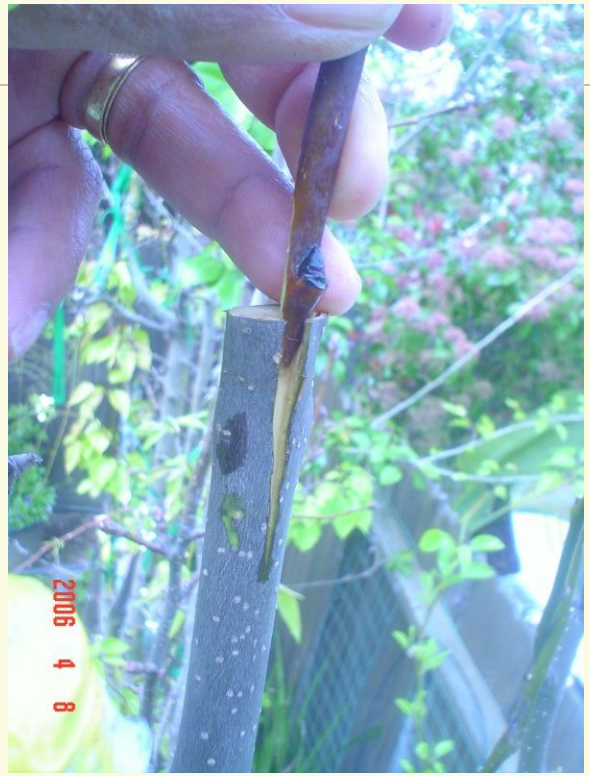
Bark Grafting Example

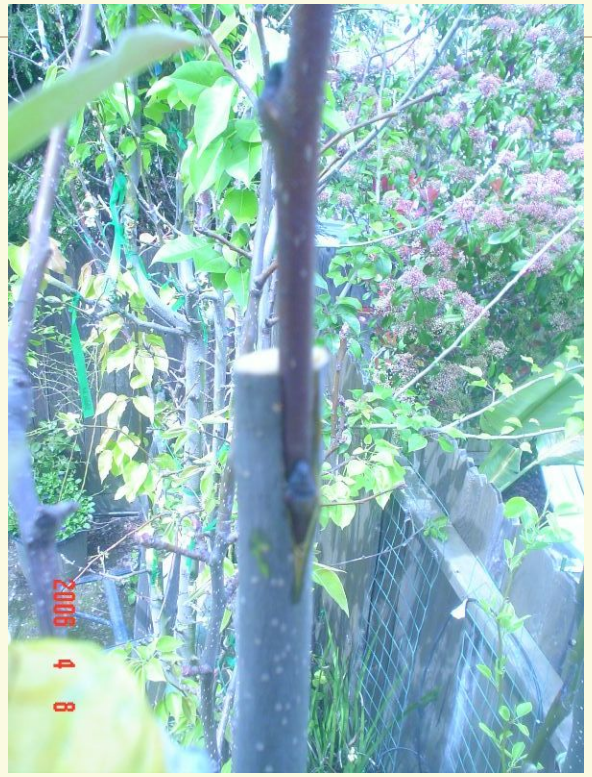
Make a vertical incision cut longer than the splice you made on the scion wood.

Now lift or open both flaps of the bark using the bread knife.

Here's the well prepared destination branch, ready for scion wood insertion.



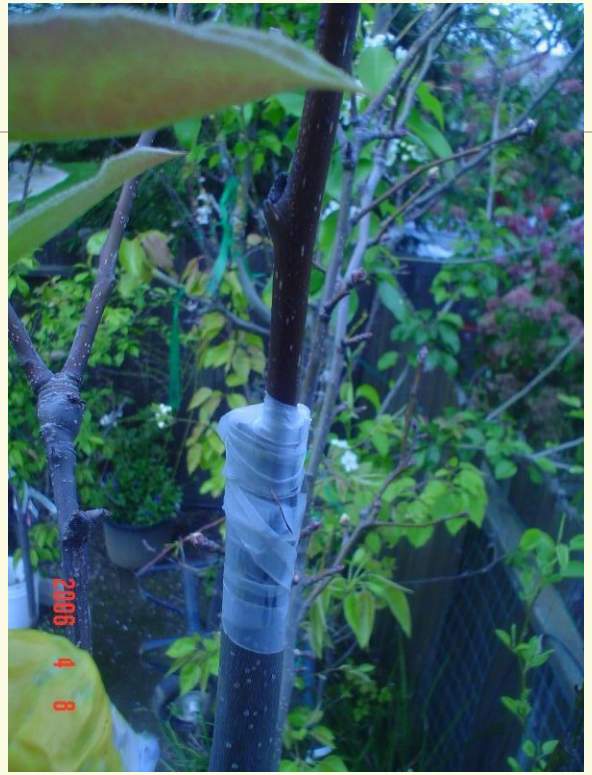
Start inserting the previously prepared scion wood, insert it just under the flap and press it against the bark while pushing downward.



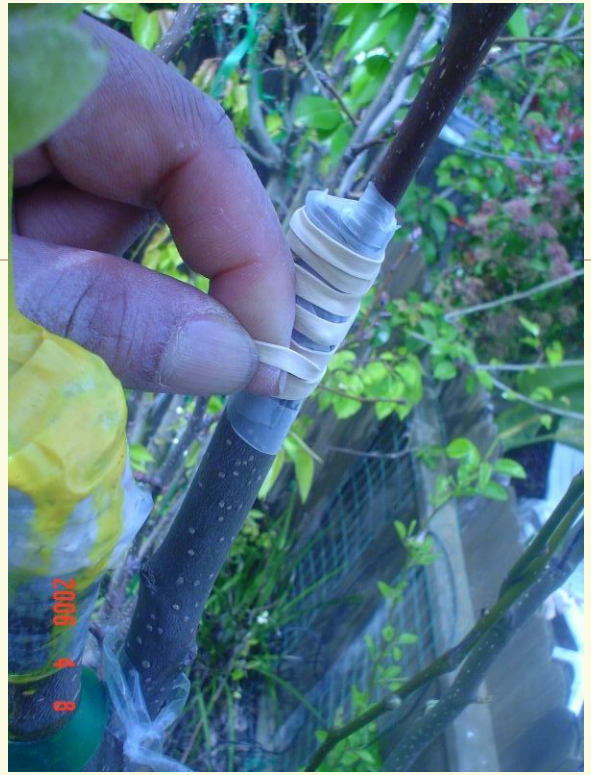
It is important that the part of the scion wood that is inserted should remain under the bark flaps.

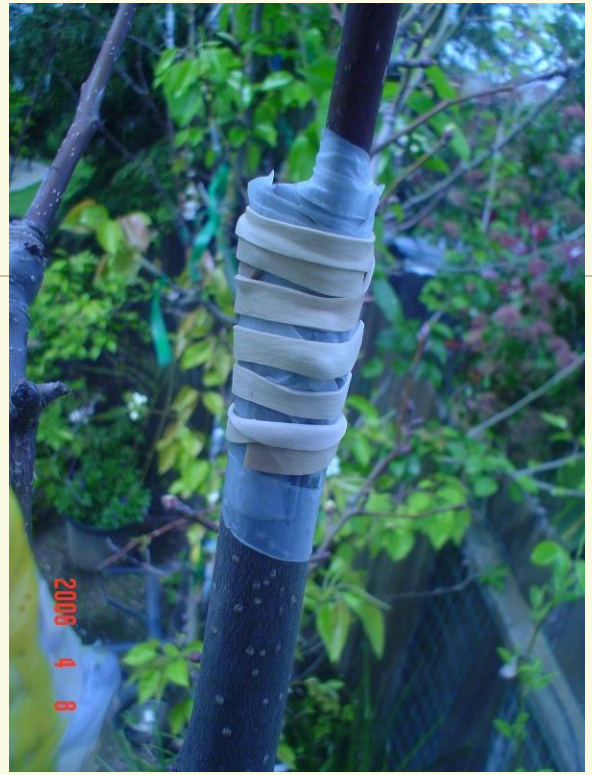
Stop sliding down the scion wood when the upper end or edge of the splice is at level with the cut of the branch.

Now cut off 30 cm of grafting tape



Then wrap the union. Always start from the lower end going upwards when wrapping with grafting tape.
Make sure the unused portion of vertical incision is covered, sometimes we can make the vertical incision
much longer than needed, so make sure they are covered to prevent contamination





We need really good reinforcements, something that is stretchable and will also deteriorate with time. The cheapest and easiest one to tie is a rubber band. When wrapping the rubber band, stretch it to 50% to 100% more than its original length and do not exceed this stretching recommendation, otherwise it is not good for the plant. When wrapping the rubber band, always start from the top going, spiraling down.

Next use about a 60 cm strand of grafting tape this time to wrap at least 3 layers of grafting tape to protect our rubber band from UV damage and also to wrap the scion wood to preserve moisture. When wrapping with a tape, it should always be spiraling upwards, the reason is that it will not trap water.

Continue sealing the scionwood with grafting tape, but leave some opening for the bud to grow.

What Is Budding and How Is It Used to Propagate Plants?

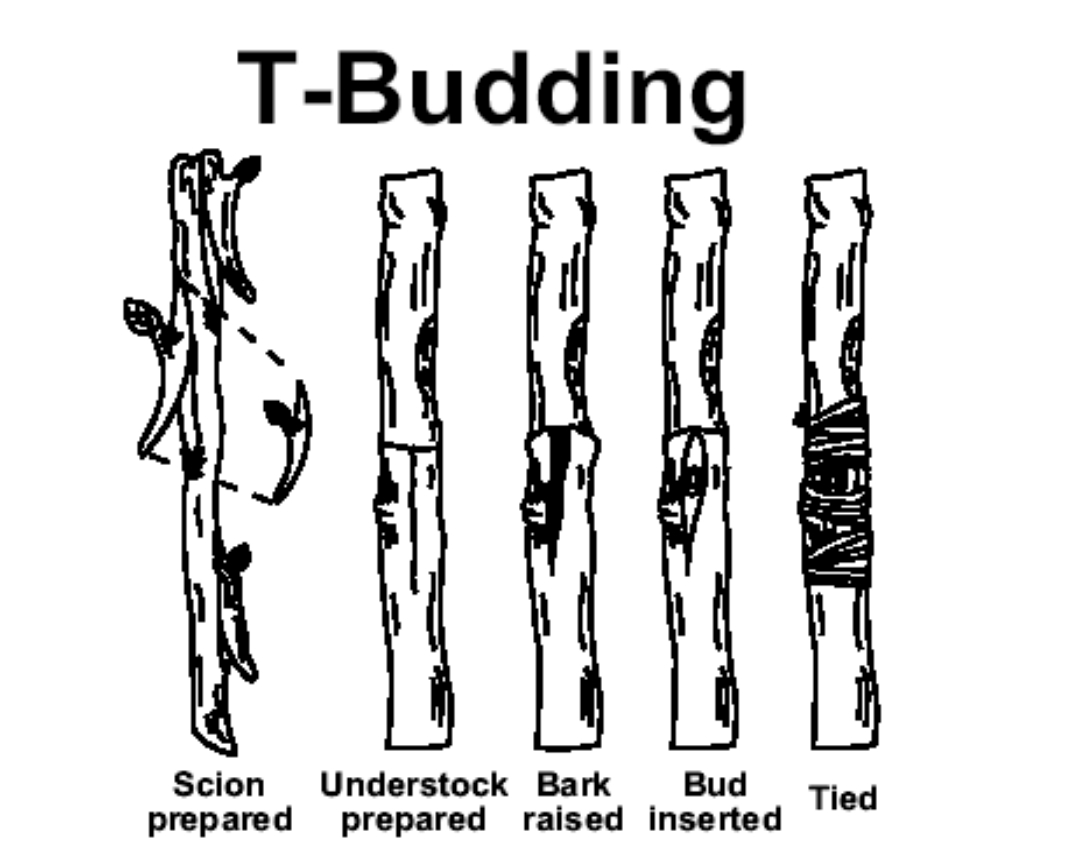
- ***Budding*** is similar to grafting except that the scion is reduced to a single bud with a small portion of bark or wood attached
  - The single bud scion is joined with the rootstock to form a new plant
  - It is done in the spring or fall when the bark separates easily from the wood
  - It is faster, easier and more economical than grafting
  - No wax is needed & cambium does not need to be aligned; less scion is needed
  - Examples: Roses, fruit trees

T-Budding

- ***T-budding*** involves taking buds from one plant and inserting them under the bark of the rootstock
- Cut a T shape through the bark of the rootstock tree
- Open the flaps of the side of the T
- Collect a bud from a budwood stick by inserting the knife at the base of the bud & carefully cut out the bud including a sliver of wood

- Make a horizontal cut just above the bud to sever it and the sliver of wood from the budwood stick
- Insert the bud, right side up, into the opening of the T cut
- Slide it tightly into the cut and secure it with a rubber banding strip
- Wrap the banding strip above and below the bud, stretching the banding strip to make a tight wrap that will prevent moisture loss

T-Budding



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Preparing the stock

Beginning the horizontal cut.

Middle of the horizontal cut.

Completed inverted-T incision.

Cutting the bud

Start of bud cutting.

Middle of cutting.

Finish of bud cutting.

Bud cutoff, if necessary.

Completed bud ready to insert.

Inserting the bud

Start of bud insertion.

Complete bud insertion.

Side view of the inserted bud.

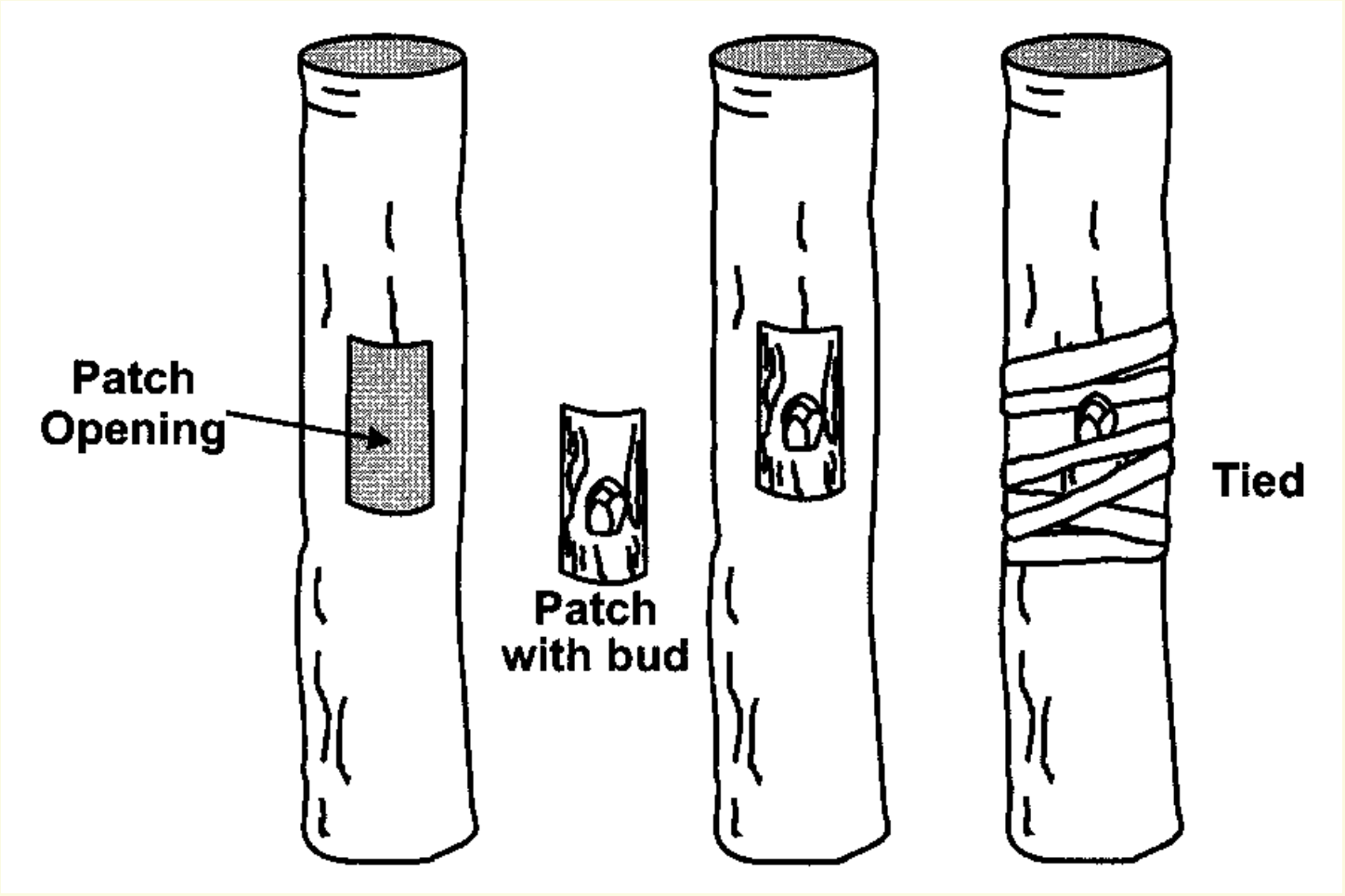
Bud wrapped with polyethylene tape.

Patch Budding

- ***Patch budding*** is used when the plant's bark is thick, such as on pecans and walnuts
- This method is done before growth starts in the spring
- The bud patch must be precisely matched with the patch opening in the bark on the rootstock

- Special budding knives are used to make the cuts on both the budstick and the rootstock
- The area, except for the bud, is then covered with grafting wax or waxed cloth to hold the bud in place and prevent water loss

Patch Budding



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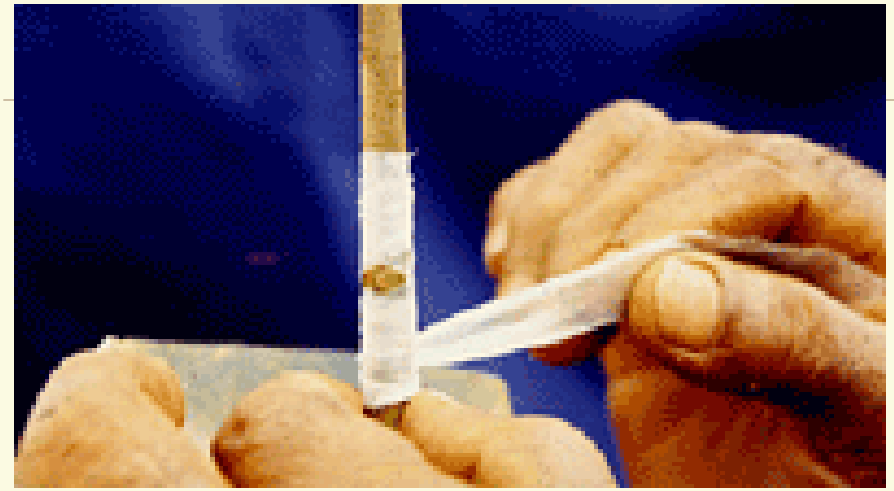
Patch Budding Example

A healthy seedling ready for budding

Preparing rootstock removing bud patch

Bud patch removed from scion shoot



Tying budded portion after inserting the patch

Budding tape removed 21 days after budding

Summary

- Why is grafting used to propagate plants?
- What is the difference between a scion and a rootstock?
- When grafting, what is the layer in the stems which must be in contact for successful growth?
- Describe whip and tongue grafting.
- What kinds of plants can be propagated by cleft and bark grafting?

Summary Continued

- How is budding different from grafting?
- Describe the process of T-budding.
- Give an example of a plant propagated by T-budding.
- When should patch budding be done?
- What kinds of plants are used for this method?