



Fruit Tree Budding

A Brief Guide to Creating
Your Own Fruit Tree



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Introduction



This report is based on a workshop held August 22, 2012 covering the basics of tree propagation, with a focus on the process of budding fruit trees. This is the third in a series of four learning modules covering the basics of fruit tree growing in the Pacific Northwest. The workshops are hosted by Evergreen in Vancouver, BC; the hands on portions of the workshops are carried out in Evergreen's mobile urban orchard which consists of 60 dwarf apple trees.

These workshops were facilitated by Dr. Kent Mullinix, a pomologist who has worked with fruit trees for the past 35 years. He attended the University of Missouri where he earned a B.Sc. in Agriculture, an M.Sc. in Horticulture (specializing in Pomology) and a Ph.D. in Agriculture Education (curriculum and program development, crop sciences and soil conservation). He also earned a Ph.D. from the University of British Columbia in Plant Science, specializing in Integrated Pest Management. He is a Professional Agrologist with the British Columbia Institute of Agrologists and is currently the Director of Sustainable Agriculture and Food Security at the Institute for Sustainable Horticulture, Kwantlen Polytechnic University.

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What is Budding?



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That apple you're biting into probably didn't grow from a seed like the Johnny Appleseed story would have us believe. Nearly every fruit we eat comes from a tree that was budded or grafted.

Why is this?

Budding and grafting let us select the genetic variety of fruit we want to grow. We take a sample of tree tissue from our chosen fruit variety, and attach it to a new set of roots. If we did not employ these techniques, our fruit would come from a random combination of genetic material which would very likely not be edible.

What is the difference between budding and grafting?

Budding doesn't include woody tissue: you are only attaching the bud and some epidermal tissue to a new rootstock. Trees are budded in the late summer while the tree is still running sap. Grafting is done in late winter or early spring – a month or so before bud break. In grafting you use dormant wood on dormant rootstock. This module will primarily cover budding.



Above: a budded rootstock

Below: a grafted scion



Requirements



What are the requirements for successful budding?

Rootstock and Cultivar must be compatible:

It is very rare that interspecies budding (i.e. a pear with an apple) will work – the plants are often incompatible. However there are exceptions to the rule. For example, it is possible to graft together a potato and a tomato.

Must be done during proper physiological state:

Budding should be done in late summer before dormancy. Grafting should be done about a month before bud break to ensure that the tissue has time to heal and connect.

There must be contact between cambiums (see images at right):

In order for a 'bud' to be successful, the vascular tissue of the bud must be in direct contact with the vascular tissue of the rootstock. This ensures that the wound response cells touch, allowing the tree to heal and form a bond.

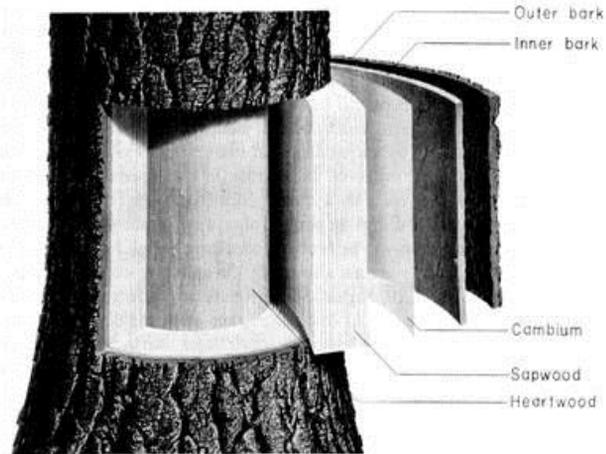


Image: USFS Illustration

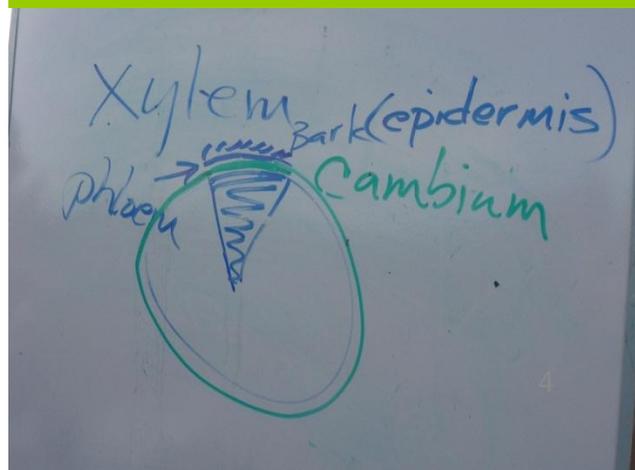
Layers within a tree

Bark: Epidermis, skin tissue.

Phloem: Conducts photosynthates from leaves to point of use.

Cambium: Only one cell layer thick, where cell division occurs, creating new Phloem and new Xylem.

Xylem: Hard wood in the interior of the tree. Thickest layer, it conducts water up the tree.



Budding



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Above: A budded pear tree at the Urban Orchard.

Below: Current season growth perfect for budding. Buds are located between the leaf and stem on current season growth.



Budding is the joining of two genetically different species of a particular fruit variety through the cohesion of their cambiums.

We do this so that we can grow the kind of edible fruit we want on a manageable size of rootstock.

This process requires rootstock and bud wood.

Rootstock: Rootstock is the roots and trunk on the tree – you can purchase these from nurseries. The optimal size of rootstock to be budded is pencil size. Bigger than that, and it will need to be grafted instead.

Bud wood: Bud wood is current year growth with lateral buds from the fruit tree variety that you want to have on your new tree. Choose bud wood from healthy shoots that have seen lots of sun and are moderately vigorous. Use the buds in the middle of the shoot: buds at the base are too old and the ones at the tip are not mature enough. Be sure to cut off the leaves so the bud wood does not dry out and keep sticks in the refrigerator until use.

Technique



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There are two main budding techniques used commercially. **T-budding** is a more traditional method of propagation. **Chip Budding** is more commonly practiced commercially as it produces a straighter trunk on the resulting tree.

What you'll need: A budding knife, rootstock, budding wood, elastic bands or plastic tape for wrapping.

Preparing rootstock for T-budding, a traditional technique



STEP 1: Make a deep horizontal cut



STEP 2: Make a vertical cut downwards



STEP 3: Peel back the bark to reveal the cambium, and slip your bud in

Technique



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Steps For Chip Budding

You will know whether your bud has 'taken' within a week: the petiole (leaf stem) will fall off.

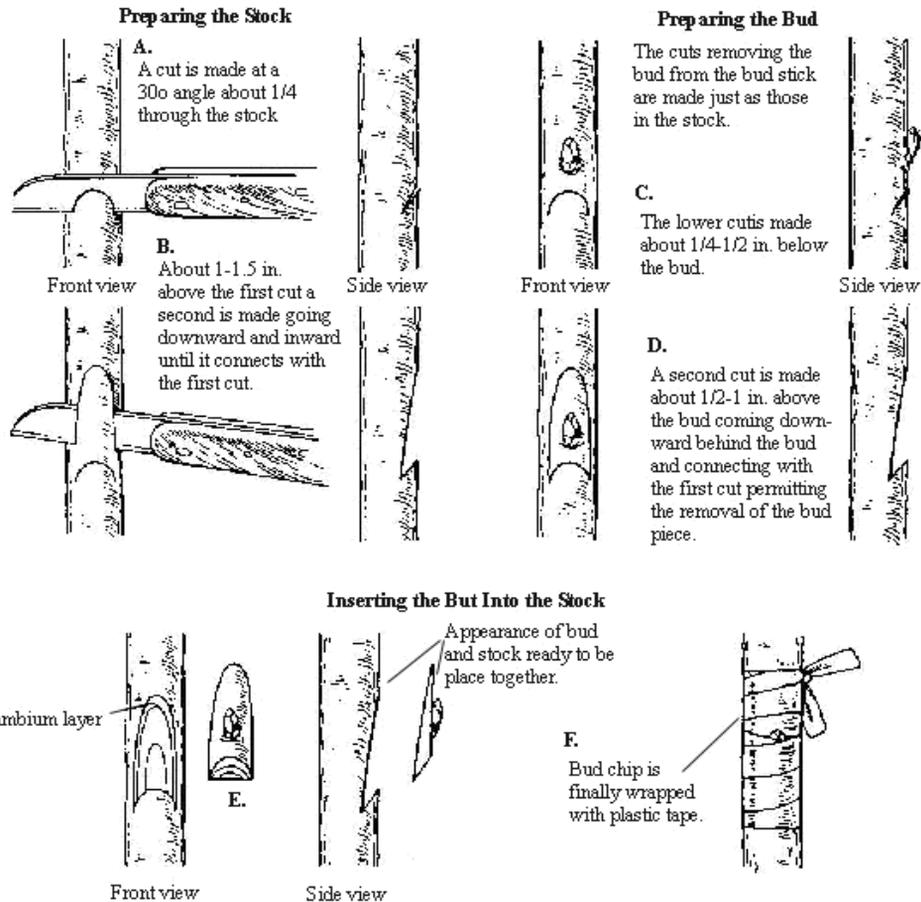


Image: INRA Angers-Nantes

1: Cutting the bud

2: Preparing the rootstock

3: Fitting the bud into the prepared rootstock

4: Binding to seal the two together

Wrapping Up



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Above: Budding pear trees with Red Kalle and Red Anjou pear bud wood.

What next?

In the spring, cut all excess rootstock that lies above the successful bud. This ensures that at bud break only the newly taken bud will shoot, putting all the tree's energy into new growth.

Make sure your trees are well watered and have enough nutrients and Nitrogen, helping them to heal quickly.

Happy Budding!

