

Developing ramification in bonsai

Albury Wodonga Bonsai Society.

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Ramification is the finely divided small twigs that can make our bonsai look more like real trees. When we look at an old tree we see the trunk and roots. We see larger branches growing from the trunk. We see smaller branches growing from the large main branches and growing from those smaller branches we see lots of small twigs holding the leaves. This is ramification. Sometimes the terms primary, secondary and tertiary ramification or branching is used to describe this in bonsai and it is this fine tracery of small twigs that can make our small bonsai look like real trees.

While we love the look of many small twigs our trees have other ideas. Their main purpose in life is to grow faster and outcompete the neighbours so they can become the tallest tree in the area. Access to sunlight can mean the difference between life and death for trees so they have developed ways to maximize growth.

The highest shoots on most trees produce hormones called auxins that circulate down the branches and stems in the sap. Those auxins suppress lower buds so that the upper ones don't have to share resources and can grow even faster. That is fine for a wild tree that needs to get tall really quick but it means our bonsai branches just get really long and leggy – not a particularly attractive look for a miniature tree.

Fortunately bonsai growers have worked out ways to circumvent this natural tendency to encourage more ramification.

Pruning is the key.

Pruning those upper shoots temporarily removes the source of those bud suppressing auxins. That allows a number of dormant buds to grow below the pruning cut. Where there was just one shoot we now have several and ramification has increased.

Note that usually only a couple of buds below the site will grow and as the new shoots start to grow they will also start to produce auxins to restrict lower competition. This means that cutting high will not usually produce the desired result. Always prune just above where you want the ramification to start.

It is also important to understand that stronger growing shoots will usually produce more side shoots after pruning. Really weak branches often only have enough energy to activate one replacement shoot and that clearly won't produce ramification. To get good results trees need to be strong and healthy so feed well and allow your trees some growth before pruning for ramification. Pruning really weak branches can sometimes result in death of part or all of a tree. Build up tree health before starting on pruning.

In practical terms we can feed well and allow shoots to grow to gain strength. Prune back to where ramification is required and wait for new buds to produce replacement shoots. Continue to feed and water while those shoots grow to gain strength. When the new shoots reach 20-30 long prune them

back to 2 or 3 sets of leaves. Again new buds should emerge and grow into shoots which are again allowed to grow out. Continue grow and prune cycles until ramification has reached desired density.

While this is the basic procedure to develop ramification in most plants there are subtle variations depending on the species being grown.

Plants that do not bud well on bare wood:

This includes many conifers like pines. These plants can grow new buds from the base of any leaf but rarely bud on bare wood. Always leave some healthy leaves or needles to be sure of new shoots.

Pines often produce lots of shoots all round the trunk or branch (whorls). Allowing them all to grow will quickly result in localised swelling so remove spares soon to create 2x2 structure (Y forks).

Plants with opposite buds:

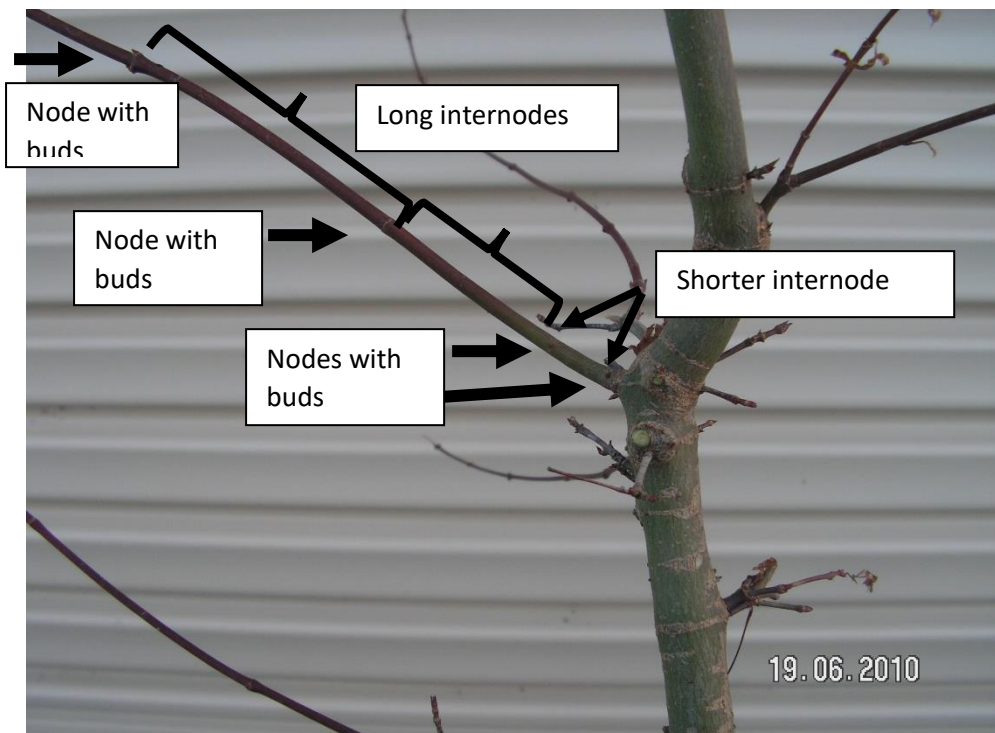
Maples are in this group. Leaves and buds are in pairs on opposite sides of the shoots. When we prune we often get shoots on opposite sides of the trunk or branching. While that can rapidly increase ramification there are unintended consequences. Opposite, or 'bar', branching can cause localised thickening which does not look good. Bar branches also interfere with the visual flow as our eyes move through the branch structure. For those reasons bonsai growers try to remove one side shoot or the central shoot wherever possible to create 2x2 branch structure or Y shaped forks.

Plants with alternate buds:

Elms and ficus both have alternate buds so leaves are never opposite on the stems. When you prune the new shoots will be staggered along the branch which makes it easy to grow well shaped branches.

Nodes, internodes and buds:

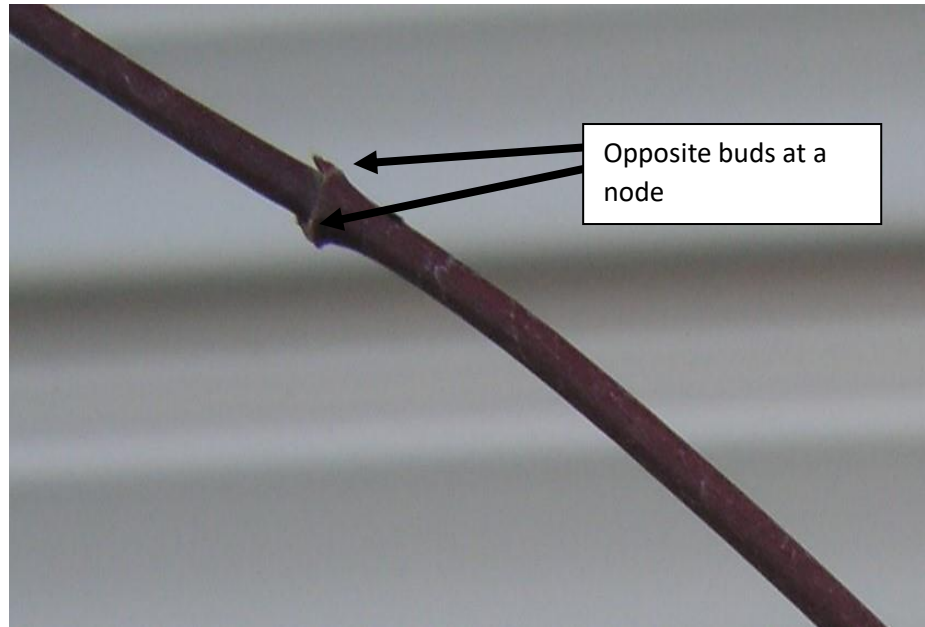
Nodes are the growing points on a branch, usually visible as a slightly raised ridge around the shoot or branch. You can often see buds at a node.



Internodes are the pieces of branch between the nodes. In most plants new shoots will only grow from the nodes and not from the internode sections so we need to be careful about which sort of sections we build our bonsai trunks and branches from.

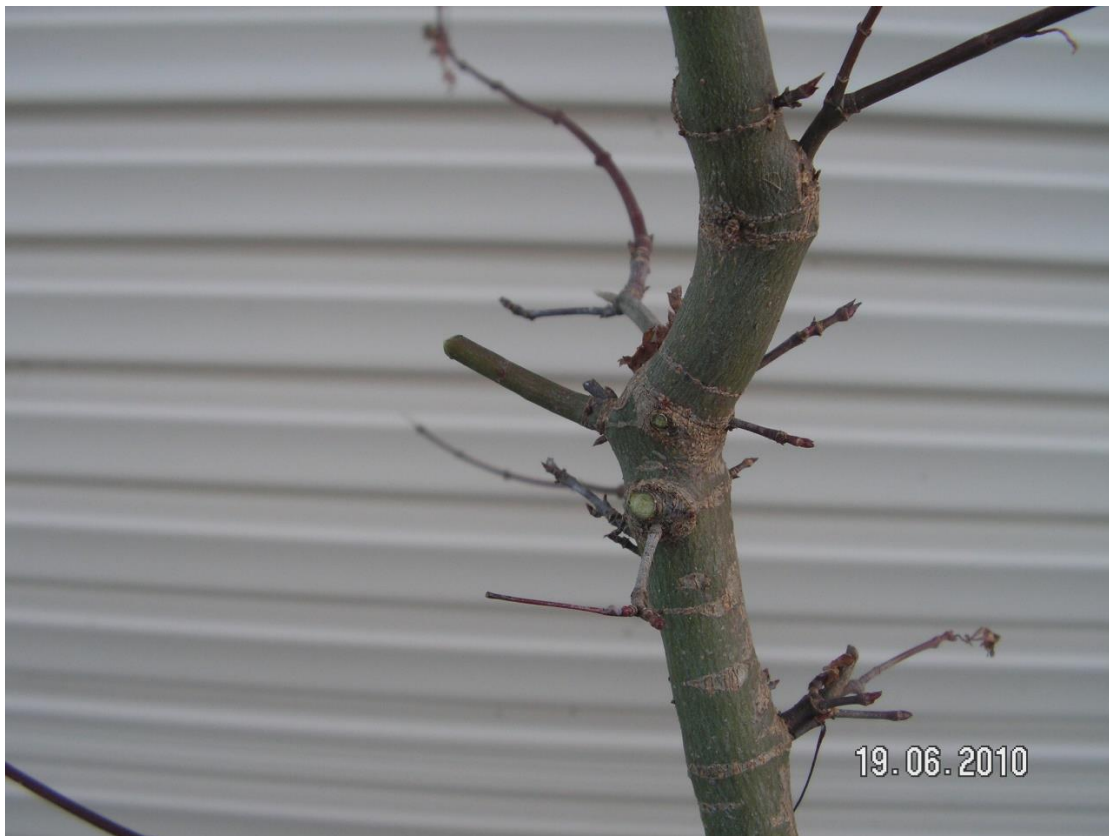
There are one or more buds at a node. Buds are embryonic shoots, usually pointed oval shape. Buds may be very small. Dormant buds are not visible but every node will have some buds somewhere.

The picture shows a maple node with 2 opposite buds.



New shoots will only develop from buds. New shoots will not grow from the bare sections between the nodes so retaining long internodes will limit the number of shoots and therefore the ramification you can get on the branch.

Best to remove long internodes when you are pruning.



The shoot has been pruned just above a suitable node. Note that I have left a little extra above the node to make sure I don't damage the buds.

Multiple shoots growing close together:



Some species react to pruning by activating lots of dormant buds. If you allow all of these to grow the area will quickly thicken giving reverse taper at that point. Remove extra shoots as soon as possible. Japanese maples are notorious for this so keep a close watch on them.

2X2 pruning:

Maples and other opposite budding trees often sprout shoots on both sides of a branch or twig. Bonsai growers often refer to this as bar branching. Not only will bar branching produce swollen areas where they occur but it also interferes with the way our eyes travel along the trunk and through the branches.

Where bar branching occurs try to remove one so there is only a main branch and a single side branch.



This Japanese maple has a number of the features I have outlined above so I'm going to use it to demonstrate how I deal with each of those issues.



This tree grew well last season.

The branch indicated starts with a short, 1cm internode then has that very long 5 cm internode with no buds. 5cm may not seem very much but in a bonsai branch, especially up near the apex that will leave too much bare space. Long internodes have to go, even if the branch is otherwise good,



The long sections at the top have been pruned back to just above the nodes.

There are clearly a couple of other long sections on the branch below so they also need to be removed.

The remaining nodes are all short enough to provide useful branching when the new shoots grow.

Those remaining thicker branches are way too close together but I will deal with that later.....

The other issue with this Japanese maple is the cluster of shoots growing from an old node. They are quite young but will still cause excessive thickening if I leave all of them to grow.



I have cut several of those smaller shoots. That should slow down any excessive bulges for another season.



Over a number of years of grow and cut cycles you should be able to build up well ramified trunks and branches. Unfortunately there are no short cuts (pun intended). Bonsai takes time. Good bonsai can take even longer.

Here's a photo of what I think we should be aiming for



All forks are 2x2 – no bar branching.

All branches progressively taper to finer and finer twigs as they divide.

This one is less dense but still shows the same 2x2 ramification and good taper through the whole structure.



Key Points:

Pruning is used to develop good branch structure and ramification.

Cut long branches back to where you need the branch to fork out into smaller branches.

Use grow and prune cycles to develop ramification.

Healthy trees grow new shoots much better than weaker ones so feed and water well before and during pruning for ramification.

Remove excess shoots before they cause problems, especially on pines and maples.