



Air Layering for Bonsai by Joe Greenspon

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Introduction

- **Air layering is a common plant propagation method in many disciplines of plant production (fruit trees, foliage plants, bonsai etc.)**
- **Tonight we are going to discuss air layering as a bonsai technique – both for producing new material in a short time as well as to fix flaws in existing material.**

Why air layer bonsai?

1- Inexpensive way to produce material

- If you have a landscape tree with a branch that has a bulge, good movement or is a species or variety you covet, it is a great way to produce a bonsai from it in 2 – 3 months time.



Why air layer for bonsai?

2- Fix inverse swellings – bring new life into a tree that has flaws

- If you have a bonsai that has a big bulge part way up the tree – this is generally considered an aesthetic flaw. We can air layer at this area and create two trees from one, the bottom does not have a swelling anymore and can be rebuilt
- The swelling can be used as the base of a new tree, which will likely have good taper going up.

Why air layer for bonsai?

3- To fix a defective root base (nebari)

Often times with deciduous trees, we have one or two thick or strong roots coming from the trunk, but no radial root flare. If these roots detract from the aesthetic you are trying to achieve, ground layering (air layering at the soil level is an effective technique.

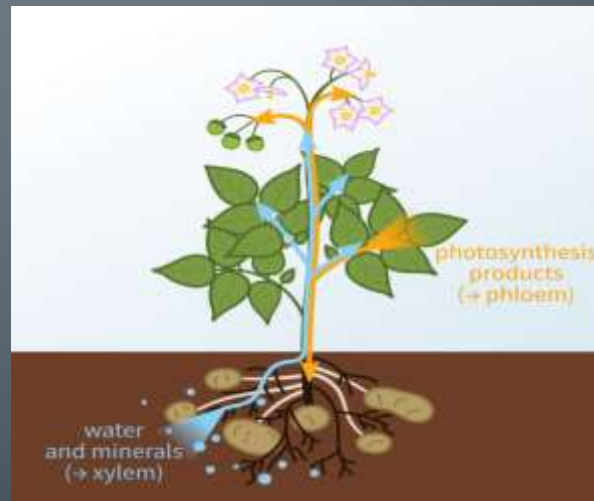
If we ground layer and put a tourniquet just below the cut site as pictured above, we can encourage a new radial root base. We would use the plastic pot with bonsai soil technique here.



Air layering physiology

Air layering follows basic plant physiology principles

- When we make an air layer cut the outer tissue under the bark down to the sapwood (xylem).
- This allows water to flow up the tree to keep the upper foliage hydrated, but blocks sugars, starches, and other compounds for feeding the root system and other areas of the tree generated by the leaves in the layered area. (Phloem)
- We are essentially replicating when a branch comes in contact with moist soil and sets roots in nature.



So how do we do it?

- Air layering is an easy technique, however there is some skill and precision involved.

When air layering for bonsai, we have to consider a few extra things too:

- We want roots coming from all areas of the cut site as much as possible
- We want as fine roots as possible to ease the transition into bonsai cultivation, and to produce fine feeder roots in a quick time frame
- A common substrate used for air layers is sphagnum moss – this is not my first choice for bonsai purposes but it is acceptable. My first preference is a high water retention open pore sifted substrate (Chabasai, akadama, diatomaceous earth etc.)

The two approaches under my grow lights last winter – Left is a hibiscus rooting in a bag of sphagnum moss (not intended for bonsai) and the right is a Tiger Bark Ficus rooting in chabasai in a pot tailored for the situation and suspended in the tree. It is intended to be a gorgeous sumo shohin bonsai.)



So how do we do it?

- First off, we need to ensure we have a sharp knife – fresh boxcutter blades, X- ACTO blades, razor blades, and grafting knives work well.
- Next, we consider the size of the branch or trunk we are layering, the size of the gap between top and bottom should be proportional to the girth of the branch/trunk. I do not really have an exact ratio, I do it by feel but studying the pictures helps and has worked for me.
- Make a cut all the way around the trunk/branch, as even and flat as possible. Through the green phloem tissue down to the xylem as pictured above.
The top cut is where we want to be the most careful, as that is where the roots will form. The bottom cut does not need to be as clean.

So how do we do it?

-After both cuts have been made, we have to make a vertical incision to join the two cuts together.

Then we peel the bark and phloem in between the two cuts all the way around. Effectively forcing the phloem to stop moving resources to the root system.

- Do not be afraid to scrape bark off if it does not come off in one shot.
- Small adjustments are common and often necessary to ensure the top and bottom cuts do not heal. Some species have a high propensity to heal the two areas and not layer (elms, hornbeams, maples etc.), ensuring there is no bark of cambium/phloem, as well as applying the tourniquet with aluminum wire helps prevent this.

So how do we do it?

Next, I like to apply root hormone to the top cut site. This will encourage more even and quicker rooting, and helps species less prone to layering to send roots. If you have a rooting powder, add a few drops of water to make it a paste, apply liberally and evenly.

After the layer is made, we have to introduce our substrate and pot/bag. If you are using a bag, cut a large square of plastic, a bit longer and wider than the area being covered.

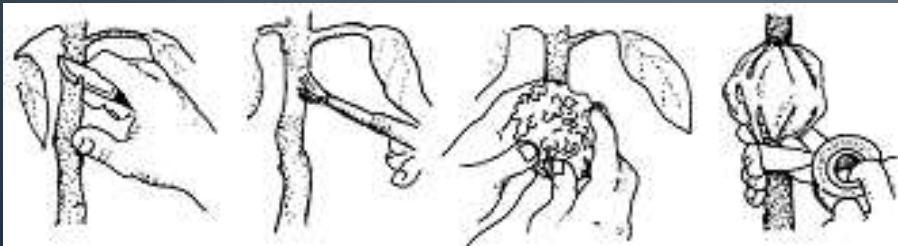
- Wrap the bag and wire just below the bottom cut, ensuring it is open and has even space all the way around. Then we can start packing our pre moistened sphagnum moss. Start with creating a dense layer at the bottom and gradually fill up, ensuring the bag is closed as you go.

So how do we do it?

- It is important to ensure that there are no air pockets in the sphagnum, and it is densely packed. Keep adding and packing sphagnum moss until you get to roughly 1 to 2 cm above the top cut. Once it is densely packed, close the bag around the top and use wire to tie it shut. Give it a squeeze to ensure it feels dense and not airy. Lastly, make 2 – 3 incisions at the bottom of the bag, as well as on top to allow for watering to enter and drain, as well as oxygen. Cover the bag with aluminum foil or tape, it is important to keep the area dark, roots do not like to grow in light and you risk getting a one sided root system.

REMEMBER: roots grow in air not water.

PLEASE NOTE: with conifers, there must be at least one branch below the cut site to continue facilitating water movement, otherwise the layer will not work and could kill the tree.



So how do we do it?

- If you are using a pot, just cut the pot shorter to be just high enough to cover the top and bottom of the cut areas. Cut down the middle and through the bottom of the pot, and make a circle just bigger than the branch/trunk being layered. Prepare a piece of drainage screen to fit inside the pot and around the branch/trunk. Wrap the pot around the prepared area, and secure tight around with wire. Next, make sure it is secured to the tree with wire or another material. If the pot moves, the roots will not grow. Then we can start filling with our desired substrate. Chopstick the soil in, ensuring there are no air pockets and water thoroughly.

Then we wait typically 2 – 3 months for roots to form. During this time period, we need to ensure that the substrate does not dry out dramatically, we need to allow it to dry slightly to allow oxygen in. When there are no roots moving water, it is easy to encourage rot if we water too frequently. As roots form, tailor your approach accordingly.



Separation

- Once you see more roots than substrate, or roots coming out the bottom of the pot, it generally ok to separate the layer.

Prepare your pot for it, with more of the preferred substrate. Then we cut below the bag or pot cleanly, all the way through the trunk/branch. You have a new tree!

Open the pot or bag. If you used sphagnum moss, try to tease as much of the sphagnum out of the roots. Be very careful! Air layer roots are very fleshy and tender. The less sphagnum, the better air to the roots.

Then it is basically a standard first repotting, but with extra care, try to avoid anchoring your tie down wire to the roots if possible. Some use planks of wood to secure the tree or tie to a lower branch.



2- Anchor the tree

These are the results of air layering with bonsai substrate:



The result



After care

- Once you have your new tree, let it grow freely for at least a year to put on as much roots as possible. Once it has rooted through the pot and is showing signs of strength. Training can begin!

Many books say to not allow roots to freeze, however there are new beliefs that air layer roots are so full of sugar and antifreeze compared to fine roots that they are actually less prone to freezing. Protection is up to you.

For temperate trees requiring a dormant season, this work is best done in May or June, or once new growth has hardened off and is capable of producing sugar which will be blocked at the cut site and generate roots. For tropicals, it can be carried out any time they are actively growing. Conifers can take a long time to layer, depending on species, Junipers are easiest. So take extra care with them, I have seen an article on a Cryptomeria that took a couple of years before separation!

Questions?

Sources

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