



ECHO's Tropical Fruit Nursery

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by Andy Walsh

<http://www.evergreengardenworks.com/airlayer.htm>

What is Air Layering?

Air layering is the process of removing a large branch or section of the trunk of a tree to create another tree. Before the branch is removed it is girdled, protected with peat moss or other media and the girdled section is allowed to root. After rooting the branch is removed from the tree and potted up to grow on its own.

Transport of Food, Water, and Nutrients

Under the bark of trees (dicotyledonous ones) there is a layer of cells called the phloem. This tissue transports carbohydrates and other photosynthates (including auxin) down from the leaves to the lower parts of the plant. Beneath the phloem layer is another layer called the xylem that transports water and mineral nutrients from the roots and soil up to the leafy parts of the tree. Beneath the xylem is another xylem layer called the secondary xylem. These xylem layers are thicker and deeper into the wood of the tree than the phloem layer. Lying on top of these layers just under the bark is a layer of actively dividing cells called the cambium.

The Air Layering Process

In the process of air layering, the bark, the cambium, and the phloem layer are removed by cutting away about a 1 inch wide ring of these tissues from around the circumference of the shoot. The xylem however is left intact. This is known as girdling. Wet sphagnum moss (or another moisture retentive soil) is then bunched around and over this girdled site and covered with plastic or aluminum and sealed.

What Happens at the Air Layer Site

The removal of the bark, cambium, and phloem, but not the xylem, prevents carbohydrates and photosynthates from flowing down the trunk past the girdling site but still allows water and mineral nutrients to flow upward to the leaves. This keeps the leafy portions of the shoot from drying out and maintains them with an adequate supply of nutrients. The removal of the actively growing cambium layer prevents the regeneration of phloem and healing over of the wound. Because of this the carbohydrates and photosynthates flowing down the trunk collect at the girdling site. The presence of these excesses of carbohydrates and photosynthates (esp. auxin) at the girdling site, plus the presence of the water in the sphagnum moss, causes dormant adventitious buds in the area to grow into roots. When there are enough roots to sustain the shoot independently the shoot is cut off of the tree and then planted or potted.

The Difference Between Air Layers and Cuttings

The propagation of plants by cuttings occurs by the same principles and has very similar circumstances. The difference is that the shoot is removed from plant at the start and water and nutrients flow up the shoot from the cut site by capillary action instead. This kind of propagation can only be done with small and thin shoots since the flow of water is insufficient for larger branches. Air layering solves this problem and allows the creation of new plants from very large parts of trees.