Layering: Almost a Lost Art©

Michael Anderson
Carlton Plants, P.O. Box 398, Dayton, Oregon 97114
Email: michaelanders1@gmail.com

Layering is a propagation process that is steeped in history, being a mainstay propagation tool for centuries employing highly refined techniques. Since the advent of indole-3-butyric acid (IBA), a relatively recent occurrence in the annals of propagation and the even more recent arrival of tissue culture, layering has fallen into the background and is primarily found employed with *Malus* understock and (some) small fruit production. The finer points of layering and the specialized techniques are in danger of being lost.

Layering can be briefly described as the process wherein adventitious roots are formed on a propagule while still attached to the parent plant. Layering can take a number of forms or techniques, including simple layering, tip layering, air layering, serpentine layering, French or continuous layering, mound layering or stooling, and trench or etiolation layering. Bruce Macdonald gives an excellent overview of these sundry methods in his book *Practical Woody Plant Propagation for Nursery Growers*. Layering is also seen commonly in nature, occurring widely in *Rubus* and *Hedera*, among many others.

The physiological basis for rooting is well described in MacDonald's book (as well as other propagation references). Rooting is promoted by the exclusion of light from the stem through blanching or etiolation, sometimes coupled with physical manipulation of the stem by wounding, wrenching, bending, girdling by applying hog rings or twist ties, as well as by application of IBA through stem or foliar applications.

Reviewing propagation and nursery stock production textbooks from the pre-IBA epoch one discovers layering was a common propagation method for genera that included *Acer*, *Magnolia*, *Cotinus*, *Syringa*, *Hydrangea*, and many others. Donald Wyman, published in *Arnoldia* (available online) relates over 200 species that were successfully being layered in Holland in 1953. In some European nurseries simple layering is still routinely used for *Tilia* and *Platanus* propagation.

One very useful reference book is by Wilfrid G. Sheat, *Propagation of Trees, Shrubs, and Conifers*, first published in 1948. In the opening chapter Mr. Sheat has a very interesting quote regarding the use of IBA for propagation by cuttings: "I think it is fair to say that up to now no real commercial advantage has yet been gained by the use of the substance for the production of plants by cuttings. As a practical propagator, I would add a word of warning. The use of chemical root-producing materials is no substitute for exercise of intelligent practice in the art of propagation." Mr. Sheat's book is long out of print, but can be found from online used booksellers.

An equally fascinating publication is *The Nursery Book* by Liberty Hyde Bailey, first published in 1891 and revised in 1915. Both editions can be downloaded from Google books (see bibliography) in their entirety and are absorbing sources of propagation history while also providing relevant information that may still be of great value.

These publications reveal layering technique details that are no longer common knowledge as they perhaps were to our propagation ancestors. Bailey's book has ex-

tensive detail about specialized pots and devices to facilitate air layering, including pots with grooved sides through which branches may be placed and various types of split pots which may be wrapped around branches to be layered. Illustrations also detail trays and racks that allowed multiple layers to be placed in one apparatus.

Sheat's book provides information on practices that had been developed for specific genera and species to yield good results through layering. His details concerning *Cotinus coggygria* Purpureus Group (listed as *Rhus Cotinus*) propagation by means of French layering, relate practices that may be worth attention for those who struggle for success with this species by softwood cuttings. Particularly interesting is the portion concerning wounding of the stems in the autumn of the year the layers are made. The process he describes is summarized as follows:

- Plant stock plants 10 ft apart; plant enough for alternate year production.
- Amend layering soil with coarse sand and peat prior to layering.
- In early spring strong vigorous shoots are pinned down to within 1 inch of the soil, in a radial pattern from the base of the plant.
- New upright shoots will form along the length of these stems.
- As growth commences soil is mounded every 2 weeks or so until at least 5 inches of the upright shoots are covered.
- In the autumn, prior to the cessation of growth the original stem (or layer "lead") is wounded by slicing vertically into the stem and then making a horizontal slice down the stem; this wound is then bound; the effect of this wounding being to encourage rooting along the layered stem and upright shoots.

While IBA-assisted softwood and hardwood propagation has moved layering into the background for many species, there are still a great number that we as propagators struggle with. Tissue culture has served as a valuable additional tool for some difficult items, but sometimes at great expense. A thoughtful examination of the economics of layering as well as research into augmenting success using IBA applications and girdling techniques may serve to rekindle interest in layering; a good place to start is by relearning what our propagation ancestors documented long ago.

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