Asexual Reproduction of Trees by Air-Layering©

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INTRODUCTION

Air-layering is considered a useful and successful technique for producing new plants from mature trees, especially on difficult-to-root tree species. It is also a technique with the advantage of producing and propagating larger plants in a short period of time. We have attempted to root various hybrid species of *Prosopis chilensis*, hybrid species of *Cercidium, Ficus macrocarpa* (syn. *F. nitida*), and *Chilopsis linearis*. *Prosopis* grown from seeds exhibit wide genetic variations in growth rates, growth habit, leaf morphology, and frost tolerance. The *Cercidium* hybrids either produce sterile seeds or seeds do not produce plants identical to the parents. This study was initiated to investigate the potential of air-layering as an alternate vegetative propagation method for producing identical clones of superior quality for the southwestern U.S.A. Rooting of air layers of *Prosopis cineraria* in India (Solanki et al., 1986) and of *Acacia koa* in Hawaii (Skolmen, 1977) have been reported. The results of this investigation indicate that these tree species can be successfully rooted by air-layering anytime during the active growing season.

MATERIALS AND METHODS

Field-grown or container-grown trees (2 to 3 year old) were selected for air-layering. Air-layers were performed on shoots with diameter of 0.5 to 2.0 cm. Leaves and small branches were removed from the area and a 2.0-cm-wide girdle was made by removing the bark at the terminal end of the stem. While in some cases bark was removed in a circle all around the stem, a half circle was removed in some. A mixture of talc containing indolebutyric acid in various concentrations and formulations were applied to the wounded area. The wounded stem portion was covered with peat moss contained in 25 × 25-cm transparent sheets. The layers were then wrapped with aluminum foil and both ends were tied. Rooted air layers were harvested, planted into 5-gal containers, placed under 60% shade in the greenhouse for 3 to 4 weeks, and misted periodically.

RESULTS AND DISCUSSION

Air layers of *F. microcarpa*, *P. chilensis*, *Cercidium* hybrids, and *C. linearis* were rooted with very good success. Roots were visible on these layers after about 3 weeks in June, July, and August and in 6 weeks in April, May, September and October. Layers attempted on stems 1.5 to 2.5 cm in diameter were more successful than those attempted on 0.5- to 1.0-cm-diameter stems.

The effect of different levels of IBA on rooting was examined for air layers started during the period from January through September. The number of roots increased with increasing concentration of IBA from 500 to 15,000 ppm. Rooting percentage averaged 95%-98% during April to October. Air layers also rooted without any rooting hormone during the period of most active growth (July and August). The results indicate that internal physiological conditions of stems were at optimum levels to

produce healthy roots during the active growth period. Stems did not root during the months of December, January, and February corresponding with the dormant growth period in these trees.

Layers attempted on the newer growth with 1-cm stem diameters were more successful than those attempted with previous year's stem growth.

Rooted layers were successfully transplanted to larger containers and trees attained heights of 6-8 ft in 6 months.

LITERATURE CITED

Solanki,K.R., N.L. Kackar, and **S.K. Jindal.** 1986. Air layering in *Prosopis cineraria* (L.) Mac Bride. Indian Forester.112 (3):202-207.

Skolmen, R.G., 1977. Ph.D. Thesis. Dept. Agronomy and Soil Science, University of Hawaii.

Timing for Top Grafting *Cercis* and *Cercidiphyllum* Cultivars©

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In years past top grafting was a simple operation at J. Frank Schmidt and Son. Everything we top grafted, primarily weeping cherry cultivars, fit into the same production cycle. Grow a rootstock stem to the required height in the field, wait for a lovely dry sunny week in late February or early March, dash out and top graft everything and then run back to our greenhouses before the rain returned. Other plants came along, various willows, *Syringa,* and *Fraxinus pennsylvanica* 'Johnson', Leprechaun™ green ash and they all conveniently fit into the same production cycle.

Then we started to get a few plants that didn't fit into our system, the first of these was *Cercidiphyllum japonicum* 'Morioka Weeping' (syn. *C. magnificum* 'Pendulum'). The first time we top grafted these in the field we got about 20% take, results were equally poor the following year. By Year 3 we had lost our enthusiasm for *Cercidiphyllum* grafting and kept putting it off. Finally we went out and grafted them at the end of April. By this time the rootstocks were pushing new shoots from the stems. The take jumped from about 20% to 90%. We have duplicated this every year since and now do not field graft our *Cercidiphyllum* until we see new shoots about 1-3 inches long on the rootstock stems.

Another plant that was giving us some trouble was the weeping *Cercis canadensis* 'Covey', Lavender Twist™ red bud as a top graft on *C. canadensis*. Even in a greenhouse we could not get a consistently good take. Based on what we had seen with *Cercidiphyllum* we began delaying grafting until we found a better "window". For us this turned out to be early to mid May in an unheated greenhouse when the rootstocks had new shoots about 1-3 inches long. As yet we still cannot get a reliable good take when field grafting this plant.

We have also observed similar results with other crops such as *Acer palmatum*. In summary I would suggest that if you are having problems with a particular crop that you need to spring graft trying waiting until the rootstock is active but do keep your scion wood dormant in cold storage.