

Rooting Potential of *Fagus grandifolia* Cuttings®

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INTRODUCTION

Fagus grandifolia Ehrenb. is a very common forest tree of the Eastern U.S.A. from New England to as far south as the southern Appalachians, with a subspecies listed as *F. grandifolia* var. *caroliniana* (Loud) Fern Redh. There is considerable interest and demand for the tree for reforestation work and for ornamental plantings. Efforts to meet the production requirements for *F. grandifolia* are often stymied by the inability to graft it to other *Fagus* species particularly *F. sylvatica* and by the consistent lack of seed. Individual trees of *F. grandifolia* often set seed in an unpredictable rotation with as much as 7 and 11 years between good seed set. What exactly determines when a good seed year is approaching is not readily discernable. A recent cut test of a large healthy tree showed on average of 30% sound seed. It is known though that in the case of a poor seed set there will be copious amounts of nutlets "thrown" from the tree starting in mid to late summer and by fall almost all of the current years production will be on the ground. This early shucking of the beechnuts pretty well indicates a poor seed set.

Fagus grandifolia is also poor at rooting and the objective here was to look at possible manipulations of cutting type to increase the possibility of rooting cuttings. One starting place is to consider how to increase the juvenility of the cutting wood. Old highly attractive beeches have the problem of being sexually mature and while they do flower, this in and of itself indicates that cuttings will not root. Stem tissue taken from any arboreal portion of the tree generally will not root.

However, *F. grandifolia* will sucker profusely from exposed or near surface roots and by being in close proximity to the roots these suckers should have a reasonable degree of juvenility. The purpose of this experiment was to examine this possibility.

MATERIALS AND METHODS

Shoots from exposed roots were selected in May 2003. These cuttings were from four to six nodes long and had not formed a terminal bud. Also, such cuttings have pale green stems and are generally quite pubescent. The leaves in most if not all were fully expanded at the basal portions of the cuttings but the apical portions of the stem were not fully expanded and were also of a light green coloration, not having matured to the thick-textured dark green of more mature leaves.

Cuttings were placed in a plastic Ziploc bag with a moist paper towel, some 2 h later were wounded on two sides, and treated with Dip N Gro, 1/5 (IBA 2000 ppm, NAA 1000 ppm). Cuttings were stuck into 2 1/4 inch pots (32's) with Grace 500 Mix as a substrate. Filled trays of cuttings were placed on bottom heat at 70 °F with mist set at 15 sec every 10 min.

RESULTS AND DISCUSSION

The cuttings were slow to root and experienced significant leaf degradation due to the mist. However, after about 90 days the earliest signs of rooting were detected by removing the cuttings from the substrate and visually checking the status. In

many cases there was copious amounts of callusing but little or no rooting. However in a select few the rooting was observed to be starting with the first few roots being about 1 mm long. There did not appear to be any correlation of rooting and callusing, although the roots did emerge from the general vicinity of the callus. Cuttings that were observed to be rooting were restuck and isolated from the nonrooters so that their progress could be monitored more closely.

By the end of 90 days some 13 of 64 (20%) cuttings had rooted. In another 2 weeks an additional three more cuttings were found to have rooted bringing the total to 16/64 (25%).

Some specific problems have to be overcome. One significant problem is the leaf deterioration from the mist on the cuttings. Two, it is hard to ascertain the rooting of the cuttings by a quick tug. In most cases the rooted cuttings had to be removed from the pot to fully determine rooting. Finally, due to the leaf degradation problem the overwintering of these cuttings is suspect and most likely a large percentage will die during the winter.

Possible suggestions for increasing the take on the rooting of the cuttings include using the sucking shoots as an effective tool for increasing the juvenility of the cuttings. Timing is critical and it is possible that much further work needs to be done to pinpoint the timing in a more exact manner. It is entirely possible that hormone formulations can be adjusted to more active levels and some improvement of the substrate to increase aeration might prove to be beneficial. Trying to root *Fagus* cuttings under a fog system might also be beneficial to delay or decrease the amount of leaf deterioration.

From this experiment it can be said that *F. grandifolia* cuttings will root given specific parameters.