

White Oak. Height at first budset was highly correlated with trunk diameter four years after planting for White Oak, but not Chestnut, Pin, or Black Oak. The utility of screening a group of germinated oak seedlings in this manner would therefore be species-specific and beneficial for White Oak production. White Oak is considered by most to be a superior adult tree but it is seldom available in the nursery trade because slow growth increases production costs for the finished product. Our data indicate that superior growth could be expected if, for example, 50% of the shorter plants were discarded at first budset during the propagation stage. Our data also indicate that Chestnut Oak grows as rapidly as the popular Pin Oak and may therefore be an alternative for this often over-planted species.

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### **(166) Stem Cutting Propagation of *Ilex rotunda* Thunb.**

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*Ilex rotunda* Thunb. is widely cultivated in the landscapes around warm temperate regions for its loaded red fruits. To asexually propagate it, effects of collection time, rooting media, cutting length, and rooting hormones on the rooting of *I. rotunda* stem cuttings were investigated. Timing had significant influence on rooting percentage and quality. Cuttings collected in October rooted at 79.7%, which was significantly higher than those collected in March (42.5%) and May (38.6%). Rooting quality, as indicated by number of roots and mean root length, was significantly better if the cuttings were collected in October. Number of roots per cutting was 14 in October and 5 in March and May. Rooting media should be perlite and peat moss (3:1 by volume), which produced the highest rooting percentage at 71.7% and better root quality. Each cutting should be 8–10 cm long. The root percentage was significantly lower (20.7%) if cutting was 5 cm long. Root quality showed the similar trend as the rooting rate. Rooting hormone concentrations (hormodin #1, #2, and #3) had significant impact on rooting of cuttings. Stem cuttings treated with hormones had better rooting rate and rooting quality. The highest rooting percentage (83.3%) was obtained under the treatment of hormodin #1 (1000 mg·L<sup>-1</sup>). To produce the quality cuttings, growers should collect stem cuttings in October, prepare cuttings at 8–10 cm, treat with hormodin #1, and place the cuttings on perlite and peat moss media.

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### **(167) Improving the Early Growth of Woody Cuttings by Warming the Basal End at Low Air Temperature**

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We investigated the effects of warming the basal end of poplar cuttings at low air temperature on their early growth after planting, to develop an advanced propagation technology that can provide the cuttings in which rooting preparation are well advanced regardless of the weather. [Expt. 1] Single-node leafy cuttings of poplar (*Populus × canadensis*) were warmed with a temperature of 30 °C or non-warmed, at an air temperature of 10 °C and a photosynthetic photon flux density (PPFD) of 10 μmol·m<sup>-2</sup>·s<sup>-1</sup> with continuous lighting in a cold chamber for 8 days. The warming treatment was applied to the cuttings by soaking the basal end of cuttings in warmed water. The cuttings were supported by insertion up to the cut-end in a hole in an adiabatic board floating on the water. The warmed and non-warmed cuttings were then grown in a growth chamber at air temperature of 30 °C and a PPFD of 100 μmol·m<sup>-2</sup>·s<sup>-1</sup> for 8 days. Control cuttings were grown at air temperature of 30 °C and a PPFD of 100 μmol·m<sup>-2</sup>·s<sup>-1</sup> for 16 days immediately after obtaining the cuttings. The shoot dry weights of warmed and non-warmed cuttings after the growing period were greater than that of control. The leaf necrosis of cuttings was reduced in warmed cuttings compared with non-warmed and control cuttings. There was no significant difference between root growths of warmed and control cuttings. The warming treatment at a low air temperature probably reduced water stress of the cuttings by improving their rooting after the start of growing. [Expt. 2] The warming treatment (30 °C) was applied to poplar cuttings with dormant terminal bud for 18 days at the beginning of 46 days' low temperature (5 °C) storage. Non-warmed cuttings were stored 46 days without the treatment. The warmed and non-warmed cuttings were then grown in the growth chamber at air temperature of 25 °C and a PPFD of 100 μmol·m<sup>-2</sup>·s<sup>-1</sup> for 63 days. The control cuttings were grown in the growth chamber for 109 days immediately after obtaining the cuttings. The both rooting and sprouting was improved in warmed cuttings, whereas the only rooting or sprouting was improved in control or non-warmed cuttings, respectively.