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# Long-term patterns of diameter and basal area growth of old-growth Douglas-fir trees in western Oregon

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**Abstract:** Diameter growth and age data collected from stumps of 505 recently cut old-growth Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) trees at 28 sample locations in western Oregon (U.S.A.) indicated that rapid early and sustained growth of old Douglas-fir trees were extremely important in terms of attaining large diameters at ages 100–300 years. The diameters of the trees at ages 100–300 years (D100–D300) were strongly, positively, and linearly related to their diameters and basal area growth rates at age 50 years. Average periodic basal area increments (PAIBA) of all trees increased for the first 30–40 years and then plateaued, remaining relatively high and constant from age 50 to 300 years. Average PAIBA of the largest trees at ages 100–300 years were significantly greater by age 20 years than were those of smaller trees at ages 100–300 years. The site factors province, site class, slope, aspect, elevation, and establishment year accounted for little of the variation observed in basal area growth at age 50 years and D100–D300. The mean age range for old-growth Douglas-fir at the sample locations was wide (174 years). The hypothesis that large-diameter old-growth Douglas-fir developed at low stand densities was supported by these observations.