Comparative primary branching structure among seven plantation conifers in North America

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Numerous models for predicting the location and size of primary branches on tree boles have been constructed for a variety of conifer species. These models facilitate estimation of wood quality by directly implying the size and location of knots in lumber sawn from constituent logs in mill or simulation studies. To some extent, the size and location of primary branches can be controlled silviculturally, but other branching features such as whorl formation, polycyclic growth, size and density of interwhorl branches, size and density of whorl branches, and lammas growth are controlled by genetics both within and among species. The branching structures of seven commercial conifer species from North America were compared, including *Picea rubens*, *Larix decidua* x *leptolepis*, *Abies grandis*, *Pinus contorta*, *Pinus ponderosa*, *Tsuga heterophylla*, and *Pseudotsuga menziesii*. The number of branches per unit length of bole was greatest for *Larix decidua* x *leptolepis* (52/m), *Tsuga heterophylla* (47/m), and *Abies grandis* (47/m), and least for *Pinus ponderosa* (6-17/m), followed by *Pinus contorta* (11-29/m) and *Picea abies* (11-30/m). Relative branch diameter increased consistently among species through depth into crown, up to a point at or slightly above crown base. Trends in relative branch diameter within an annual bole segment varied considerably among species forming interwhorl branches, with an clear difference between species like *Pseudotsuga menziesii* and *Abies grandis* that form more or less distinct whorl of branches and species like *Larix decidua* x *leptolepis* and *Tsuga heterophylla* that do not form a distinct whorl but rather have branches more or less evenly distributed along the stem. Relative plasticity of branching structure is examined with respect to potential for silvicultural manipulation.