

**Crop Response to Hybrid Poplar Alternative  
Soilless Substrate Component for Pacific  
Northwest Ornamental Container Production**

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Douglas fir bark (DFB) is the primary component used in soilless substrate to grow woody ornamental plants in the Pacific Northwest. Bark is a by-product of the timber industry and is used for landscape mulch, a soilless substrate component, or bio-energy. The decline in the housing market and rise in energy generation from renewable resources has resulted in a diminishing bark supply for container nurseries. Thus, the price of bark has been unstable and shown an overall increase over the last two years. Additionally, nurseries have reported reduced bark supply and decreased consistency. This increasing need for alternative substrates has prompted evaluations of economically feasible, regionally available materials that occur within the Willamette valley. Initial research conducted at Oregon State Univ investigated the use of 9-25 mm whole tree hybrid-poplar (WTP) as a substrate alternative. Two experiments utilizing a premixed soilless substrate containing 20% (v/v) screened pumice, 20% fine DFB (9 mm minus), 60% coarse DFB (9-25 mm) was altered by replacing coarse DFB with 0, 20, 40, and 60% (v/v) WTP. Liners of *Acer palmatum*, *Hydrangea macrophylla* 'Endless Summer', *Juniper horizontalis* 'Youngstown' and *Euonymus fortunei* 'Moonshadow' were potted into 8 L containers. The experiment was conducted using completely randomized design with eight individual plant replications for each taxa within a treatment. The second experiment used liners of *Cotoneaster*

*dammeri* 'Coral Beauty' organized in a completely randomized block design (3 blocks x 4 treatments), where each treatment within each block was independently irrigated to observe the effects of WTP on plant water use. All plants were planted on April 23, 2008. Cotoneaster were harvested on August 4th, 2008, whereas the other taxa were harvested on May 8th, 2009. Growth index (height x width x width), a measurement of plant growth, on euonymus, maples, junipers and hydrangea, showed that a 20% (v/v) addition of WTP produced the largest plants. Cotoneaster root to shoot ratio linearly increased with increasing WTP. This increase was a result of shoot weight. Root weight was unaffected by substrate treatment. Cotoneaster water use efficiency linearly decreased 26% with increasing WTP, producing > 6 g more dry mass per mL of water used. When WTP was incorporated there was greater substrate shrinkage (>4 mm decrease in substrate column height). Other alternative substrates currently being evaluated in Oregon include bamboo, Christmas tree culls, shade tree culls, straw, and forestry slash.

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