

Final Report

Stem form of Nitrogen-fertilized Douglas-fir trees

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Justification

- Volume response to fertilization is typically based on measurements of DBH and height
- Log volume and final yield based on the size of the scaling diameter
- Recently published results from limited sample in mid-rotation DF plantations found increased upper stem diameters following fertilization
- Benefit from N-fertilization best based on experiments most closely simulating operational conditions (SMC type VI)



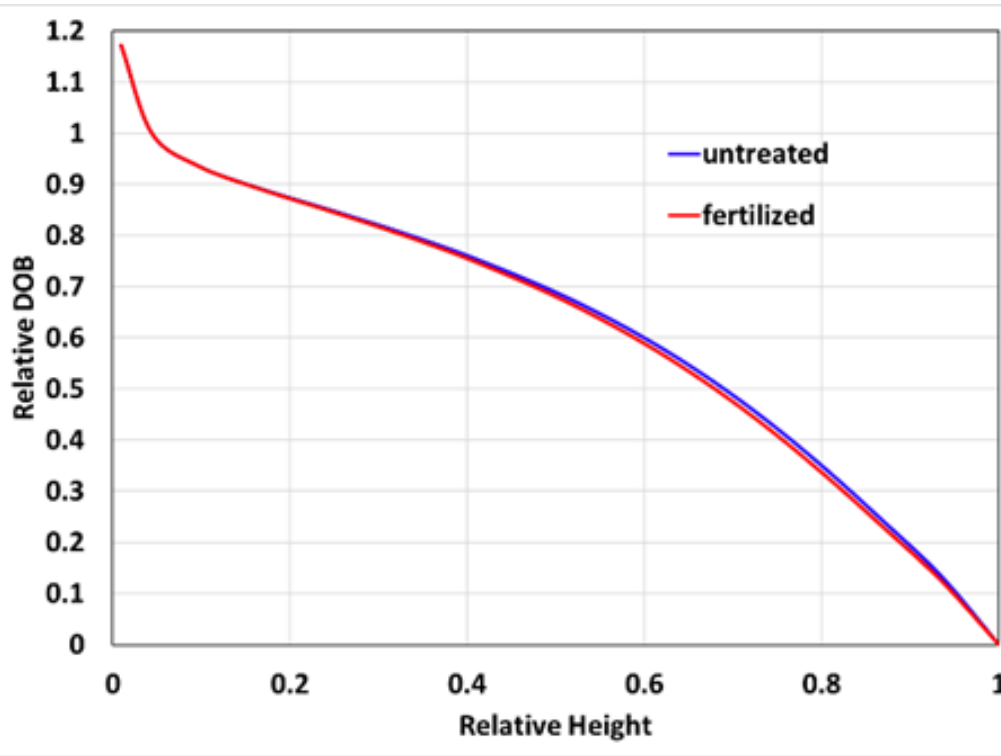
Hypotheses or Objectives

- **H:** Upper DOBs of trees responding positively to operational nitrogen fertilization are under-estimated relative to DBH using standard taper equations.
- **O:** Construct a taper modifier equation to adjust DOB estimates of standard taper equations when applied in Douglas-fir stands fertilized with nitrogen.

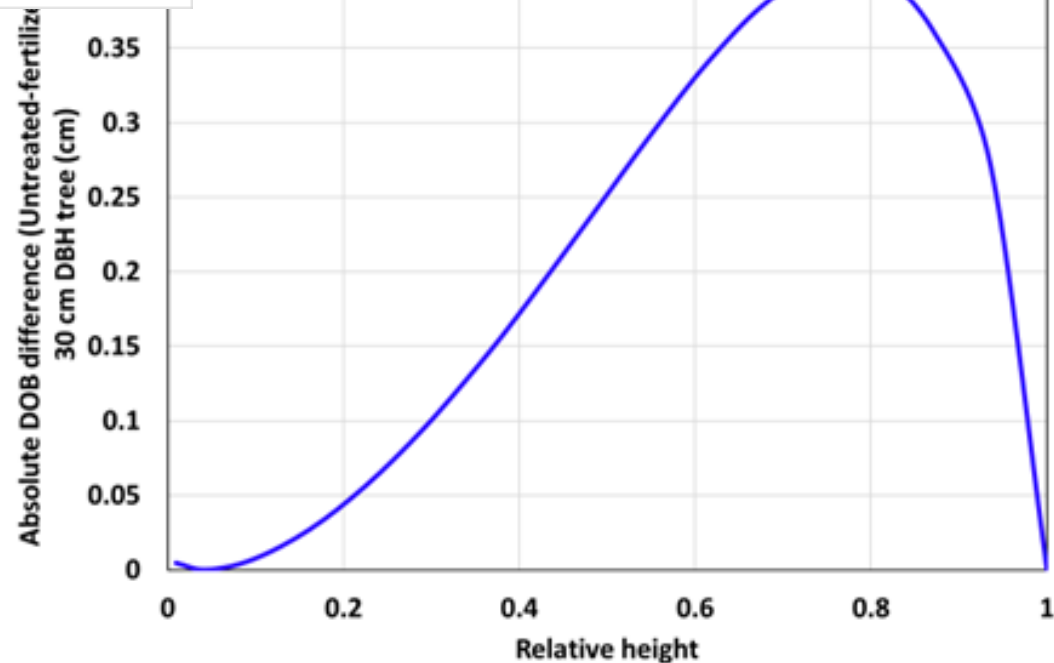


Major Findings

- Reduced upper stem diameter of fertilized trees, all else being equal.

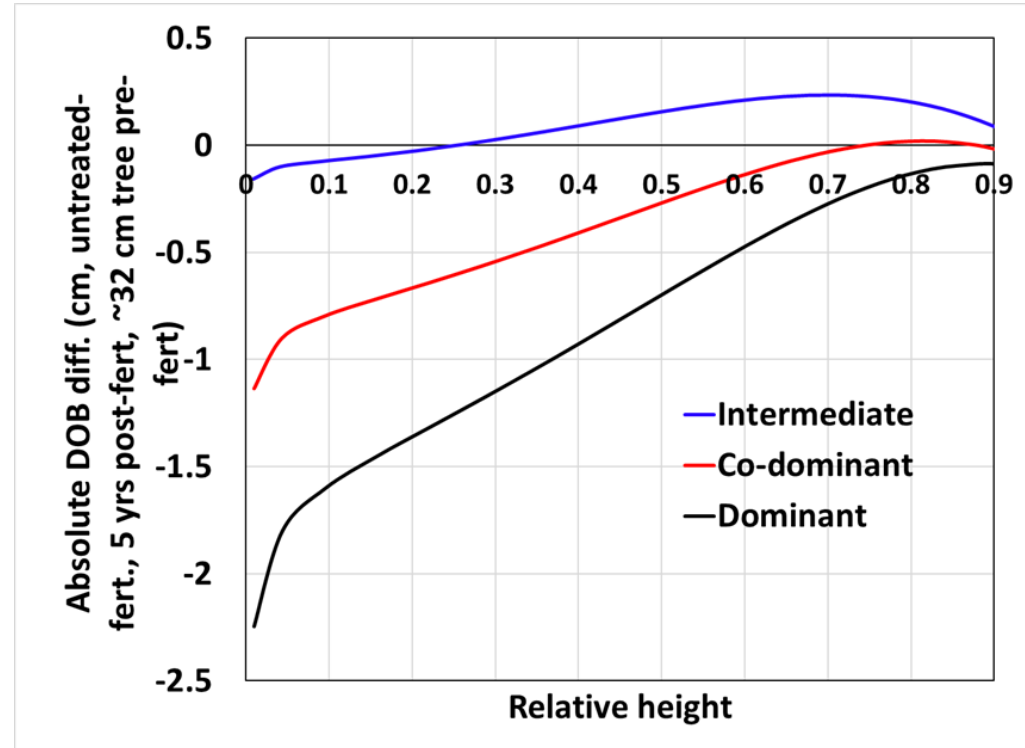


- Max difference in USD is at ~80% relative height, approximately corresponding to 10 cm DOB (*0.4 cm for 30 cm DBH tree*)



Major Findings

- Previous graph assumes trees of same size
- Trees responding to fert exhibit greater relative response lower in the tree
- DOB difference of trees of same size year 0, projected after applying FERT multiplier



Company Benefits

- Clarification of taper effect of fertilization
- Clarified assessment of volume/financial benefit of fertilization when accounting for the upper stem
- Independent validation dataset for testing taper models



Recommendations

- Assume no impact of fertilization on stem form
 - Small predicted difference, primarily near the top of the tree
- When investigating treatment-related effects on stem form, use destructive sampling
 - Conduct taper assessment of type VI plots at time of final harvest

