SLASH PINE GROWTH AND YIELD MODEL CALIBRATED TO INCORPORATE GENETICS IN PLANTATION OF SOUTHEAST UNITED STATES

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Slash pine (*Pinus elliottii* Engelm.) has an important economical, social and ecological role in the southeast United States. The increased use of genetic improved material, together with more intensive silvicultural practices in slash pine stands, expands the demand for suitable growth and yield (G&Y) models to help predict conditions about forests and to plan future silvicultural managements. With the aim of bridging the gap between slash pine growth and yield model, and their need to consider silviculture and genetic specific modules, this study tests and recalibrates an existing slash pine model that considers silviculture information and updates the G&Y model to incorporate genetic specific modules of dominant height, mortality and basal area. The calibration stage begins by using existing long-term plot data from unimproved and improved genetic plots measures from ages 5 to 21 years (average 9 years). The new model was calibrated for the unimproved plots and validated with the improved plots. At a later stage, the calibrated model was modified to consider as input the genetic entry, by developing flexible genetic specific modules, such as dominant-height and mortality. Here, long-term plot-level data from different genetic entries is correlated in the simulations against its estimated breeding values, generating a system including silvicultural and genetics. This system of equations is converted into an application to predict and project G&Y of stands, with silviculture information, accepting tree measurements or stand-level data input. Our tool also includes an option to perform simulations by projections starting at the desired age from known initial stand conditions. The open source code is based on R programming with a flexible modular structure and an interactive web application build using Shiny. This tool constitutes a framework that can be extensively modified to easily construct G&Y models for other tree species with an array of dynamic web interfaces.