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Allometric Biomass Models for European Beech and Silver Fir: Testing Approaches to Minimize the Demand for Site-Specific Biomass Observations

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摘要 In this paper, site-specific allometric biomass models were developed for European beech (Fagus sylvatica L.) and silver fir (Abies alba Mill.) to estimate the aboveground biomass in inca virgin?forest, Romania. Several approaches to minimize the demand for site-specific observations in allometric biomass model development were also investigated. Developing site-specific allometric biomass models requires new measurements of biomass for a sample of trees from that specific site. Yet, measuring biomass is laborious, time consuming, and requires extensive logistics, especially for very large trees. The allometric biomass models were developed for a wide range of diameters at breast height, D (6-86 cm for European beech and 6-93 cm for silver fir) using a logarithmic transformation approach. Two alternative approaches were applied, i.e., random intercept model (RIM) and a Bayesian model with strong informative priors, to enhance the information of the site-specific sample (of biomass observations) by supplementing with a generic biomass sample. The appropriateness of each model was evaluated based on the aboveground biomass prediction of a 1 ha sample plot in inca?forest. The results showed that models based on both D and tree height (H) to predict tree aboveground biomass (AGB) were more accurate predictors of AGB and produced plot-level estimates with better precision, than models based on D only. Furthermore, both RIM and Bayesian approach performed similarly well when a small local sample (of seven smallest trees) was used to calibrate the allometric model. Therefore, the generic biomass observations may effectively be combined with a small local sample (of just a few small trees) to calibrate an allometric model to a certain site and to minimize the demand for site-specific biomass

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can affect the allometry and the performance of the reduced local sample approach.

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