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A survival model for unthinned loblolly pine plantations that incorporates non-planted tree competition, site quality, and incidence of fusiform rust

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Abstract

Future biomass yields are functionally related to the number of trees surviving at a given age. A stand level survival model was developed that incorporates competition of non-planted trees, site quality, and the incidence of fusiform rust (*Cronartium quercuum* [Berk.] Miyabe ex Shirai f. sp. *fusiforme*). The model consists of a system of two equations, one of which represents the number of surviving trees infected by fusiform rust while the other represents the number of trees not infected by fusiform rust. Data from unthinned loblolly pine (*Pinus taeda* L.) plantations in East Texas were used to fit and evaluate the survival model and illustrate its use. The model successfully predicted that the number of surviving loblolly pine trees decreased as the number of non-planted trees increased. The model also successfully predicted the transition of loblolly pine trees from an uninfected to an infected status by fusiform rust.