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Competition for light in forest population dynamics: from computer simulator to mathematical model

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Abstract

In this article we build a mathematical model for forest growth and we compare this model with a computer forest simulator named SORTIE. The main ingredient taken into account in both models is the competition for light between trees. The parameters of the mathematical model are estimated by using SORTIE model, when the parameter values of SORTIE model correspond to the ones previously evaluated for the Great Mountain Forest in USA. We see that the best fit of the parameters of the mathematical model is obtained when the competition for light influences only the growth rate of trees. We construct a size structured population dynamics model with one and two species and with spatial structure.

Keywords: Computer forest simulator, SORTIE model, size structured model, spatial structured model, state dependent delay differential equations.

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