

Modeling of growth and phyllotaxis pattern in *Eucalyptus grandis*.

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The study aimed to identify the ontogenetic, environmental and phyllotactic growth components, observed in *Eucalyptus grandis*. The trees grown in Itatinga Experimental station near Sao Paulo (Brazil) were affected by two treatments: addition of Potassium and rainfall partial exclusion. Tree growth data correspond to the retrospective measurement of the length of successive internodes along the main stem. The growth of eucalyptus main stem was decomposed into three components: (i) an ontogenetic component structured as a succession of roughly stationary phases at coarse scale (ii) growth fluctuations corresponding to the impact of the changing climatic conditions at an intermediate scale and (iii) a more or less systematic alternation of long and short internodes at fine scale. The ontogenetic component shows three main growth phases: an establishment phase, a maximum growth phase and a drift phase. The Potassium addition and the rainfall partial exclusion do not affect the succession of growth phases but only, for the Potassium addition, the growth level within the phases. The alternating pattern was a direct consequence of phyllotaxis and strongly depends on the mean internode length. We show that this alternating pattern can be disrupted in case of meristem death.

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