

**Donoso, P. J. (2005): Crown Index: a canopy balance indicator to assess growth and regeneration in uneven-aged forest stands of the Coastal Range of Chile. Forestry 78(4): 337-351., doi: 10.1093/forestry/cpi046**

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First author: Donoso, Pablo J.

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Abstract

Crown Index: a canopy balance indicator to assess growth and regeneration in uneven-aged forest stands of the Coastal Range of Chile

Pablo J. Donoso

Summary:

A balanced diameter structure, i.e. similar crown area allocated to the different cohorts in uneven-aged forest stands, has been traditionally regarded as a requirement for achieving better growth rates and regeneration. Long-term experiments have demonstrated the sustainability of these structures, but quantitative data informing on how growth and regeneration behave under a balanced diameter structures have been scarce. Similarly, vertical structure has not been properly accounted for as a variable that can affect growth and regeneration in uneven-aged stands. In this study a Crown Index (CI) was used as a surrogate of a balanced diameter structure and an indicator of vertical structure. This new index is obtained by dividing the canopy area of trees in the main and upper canopy positions in a stand by the canopy area in lower strata. A CI of 1.0 indicates, on average, an even allocation of canopy area to each of four strata, namely, a balanced structure; values >1.0 or <1.0 reflect unbalanced structures, with excess canopy cover of large trees or medium and small trees, respectively. From data obtained from stands at relatively poorer and better sites in uncut and partially cut old-growth stands in the Coastal Cordillera of southern Chile, the effects of CI, proportion of large and small trees, canopy area, and basal area on diameter growth of *Laurelia philippiana* Looser (Monimiaceae) - the

most important species in these forests - and regeneration of all canopy tree species were tested. Results indicated the following: the CI was most strongly correlated to the proportion of large and of small trees (i.e. structural indicator), and to a lesser extent to basal area (a density indicator); the CI was by far the best explanatory variable of growth at better sites and of regeneration at poor sites; and, in general, greater growth and more seedlings occurred as CI values decreased towards 1, which reflects a balanced diameter structure. Results support the value of balanced diameter structures in managed uneven-aged stands, but also suggest that alternative structures could be sought.

[forest structure: stand](#)

[forest structure: regrowth](#)

[ecosystem: growth, development, production](#)

Notes

Crown Index: a canopy balance indicator to assess growth and regeneration in uneven-aged forest stands of the Coastal Range of Chile

Pablo J. Donoso

Tartalom:

Introduction

Methodology

Study area

Methods

-Plots

-Growth

-Calculating of CI

-Analyses

Results

Discussion

CI as related to other density/structure indicators

Importance of vertical stratification on diameter growth and regeneration

Implications for management

References

Címszavazva -GE

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