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Tree Crown Structure in a Mixed Coniferous Forest in Mexico

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Abstract

Characterisation of tree crown structure provides critical information to assess a variety of ecological conditions for multiple purposes and applications. For biomass growth, for example, tree crowns have basic physiological functions: assimilation, respiration, and transpiration. How tree crowns spatially interact and grow can bring about a seamless landscape of unique features and microclimatic conditions that are highly relevant to biological diversity, soil processes, productivity, wildlife habitats, ecosystem health and sustainability. Approaches to measuring tree crown structure and variability within multiple diameter distributions are particularly important in uneven-aged, multi-species natural stands. Results of using diameter distributions and various crown index measurements to describe their respective tree crown attributes and properties are presented and discussed. Specific patterns of values of these indices were found which suggest they have potential for use as indicators of crown structure complexity and variability across a wide spectrum of forest conditions and types. In light of these results, we also address the relevance of these results for forest inventory and monitoring programs. This research presents the results of indicators for tree crown structure in a mixed forest in Sierra Madre Oriental, México. Diameter, height, basal area and crown parameters of 504 trees were measured. Several crown indexes (crown width index, crown thickness index, crown spread ratio, crown projection area and crown surface area) were used. The ratio between the crown surface area regarding the surface area of the light crown and the crown projection area differs greatly between the tree species. The conclusion of this research is that mixed forests present a specific structure, in accordance with its stem parameters, diameter distribution, and crown indexes. This study was financially supported by Consejo Nacional de Ciencia y Tecnología and Comisión Nacional Forestal, through the project: “Análisis Estructural de los Ecosistemas de *Pinus cembroides* (Pino Piñonero) y su Aprovechamiento en el Estado de Nuevo León: 14660” and by Universidad Autónoma de Nuevo León.

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