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PE-2 Multi-layering structure and woody species diversity in a subtropical evergreen broadleaf forest in Ishigaki Island of the Ryukyu Archipelago

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In order to distinguish multi-layering structure and to quantify its effect on woody species diversity in a subtropical evergreen broadleaf forest, a tree census in a 400 m² plot in Ishigaki Island has been performed. The forest stand consisted of five layers. The species composition between the third and the bottom layers was almost similar, whereas it was almost exclusive between the top and the lower four layers. The fourth layer contained the highest potential number of species. The most dominant species was *Castanopsis sieboldii* (Mak.) Hatusima in the top layer, *Distylium racemosum* S. et Z. in the second layer, *Ardisia quinqueгона* Bl. in the third layer, *Lasianthus plagiophyllus* Hance in the fourth layer and *Ardisia quinqueгона* Bl. in the bottom layer. The values of Shannon's index H' and Pielou's index J' tended to increase from the bottom layer upward, except for the H' -value of the top layer. The values of H' and J' were 4.36 bit and 0.69, respectively, for the total stand. High woody species diversity depended on large-sized trees. The spatial distribution of trees was random in each layer, except the bottom layer. However, trees in the bottom layer showed an aggregated distribution. The result of the degree of overlapping in the spatial distribution of trees among layers suggested that light can not penetrate easily to the lower layers. Mean tree weight of each layer decreased from the top toward the bottom layer, whereas the corresponding tree density increased from the top downward. This trend resembled the mean weight–density trajectory in self-thinning plant populations.

Keywords: multi-layering, Ishigaki Island, spatial distribution, subtropical evergreen broadleaf forest, woody species diversity