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南岭小坑藜蒴栲群落地上部分生物量分配规律

Aboveground biomass of natural *Castanopsis fissa* community at the Xiaokeng of NanLing Mountain, Southern China

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中文摘要:

采用皆伐法对南岭小坑750 m²天然藜蒴栲群落的生物量进行实测。该群落有43个树种,其中藜蒴栲为优势种,测定胸径2.0 cm以上267株树木的树干、枝、叶烘干重数据以及胸径(D)、树高(H)数据;揭示了该森林群落地上部分总生物量(AGB)在森林各层次、各树种及乔木层各器官中的分配规律,并建立了该群落的生物量回归模型。结果表明,南岭小坑流域藜蒴栲群落地上部分总生物量131.149 t/hm²,乔木层129.895 t/hm²,下木层1.563 t/hm²,层间植物0.267 t/hm²,凋落物层2.424 t/hm²。树干、树枝、树叶生物量分别是乔木层地上部分总生物量的85.0%、10.6%和4.4%。优势树种藜蒴栲和小红栲生物量占乔木层地上部分总生物量的46.3%和9.8%,这说明在早期演替的藜蒴栲群落中生物量主要集中于少数优势种。乔木层各径阶(DBH<5,5-10,10-15,15-20,20-25,≥25 cm)生物量占乔木层地上部分总生物量的百分比分别是1.0%,13.1%,52.2%,26.4%,4.6%和2.7%。天然次生藜蒴栲群落以D为自变量的总生物量模型是 $W_{tagb}=0.116D^{2.384}$, $R^2=0.934$,该模型估算值比皆伐实测值低5.0%;以D²H为自变量的总生物量模型是 $W_{tagb}=184.274(D^2H)^{0.881}$, $R^2=0.952$,模型估算值比皆伐实测值低6.9%;这说明针对天然藜蒴栲群落,以D为自变量的总生物量模型更为实用。

English Summary:

Biomass of natural *Castanopsis fissa* community was measured using the clear cutting method in a 750 m² plot at the Xiaokeng of Nanling Mountain, Southern China, where 43 tree species grew and the *Castanopsis fissa* is distributed as predominant species. We obtained the dried weight of stem, branch and leaf, and measured tree height (H) and diameter at breast height (DBH or D) for all 267 trees with DBH above 2.0 centimeter. Aboveground biomass (AGB) of this forest community and its distribution among different layers, tree species and organs of tree layer were analyzed, respectively. The regression models of biomass were established based on these AGB data. The results suggested that total aboveground biomass of natural *Castanopsis fissa* community is estimated to be 131.149 t/hm². Biomass of tree layer, understory layer, liana and litter layer were 129.895 t/hm², 1.563 t/hm², 0.267 t/hm², 2.424 t/hm², respectively. Tree stem, branch and leaf accounted for 85.0%, 10.6% and 4.4% of total biomass in tree layer, respectively. Biomass of dominant tree species, *Castanopsis fissa* and *C. carlesii* occupy about 46.3% and 9.8% of total biomass of tree layer, respectively, which suggests that biomass of forest community in early succession phase is mainly allocated to a few tree species. The allocation of total aboveground biomass for each DBH class is about 1.0% for <5 cm, 13.1% for 5-10 cm, 52.2% for 10-15 cm, 26.4% for 15-20 cm, 4.6% for 20-25 cm, and 2.7% for >25 cm DBH classes, respectively. The distribution of biomass pattern among different DBH classes indicated that the forest community was in early succession phase. Using D as independent variable, total biomass regression model of single tree species (*Castanopsis fissa*) is expressed as $W_{tagb}=0.086D^{2.538}$ ($R^2=0.947$). The estimated biomass values by this biomass model is 0.3% lower than the measured values by clear-cutting method; The biomass model using D²H as independent variable is expressed as $W_{tagb}=244.79(D^2H)^{1.037}$ ($R^2=0.968$). The biomass estimated by this model was about 1.7% lower than the measured biomass values. Total biomass regression model using D as independent variable for 43 tree species of natural *Castanopsis fissa* community is expressed as $W_{tagb}=0.116D^{2.384}$ ($R^2=0.934$). The biomass estimated by this model is about 5.0% lower than the measured biomass values. The model using D²H as independent variable is calculated as $W_{tagb}=184.274(D^2H)^{0.881}$ ($R^2=0.952$). The model seems to underestimate about 6.9% than the measured biomass values. Therefore, we suggested that the biomass regression model of *Castanopsis fissa* community using D as independent variable had a relatively high precision and more practicality.

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