

Evaluation on Carbon Storage in Aboveground Biomass of Yang na at Plant Genetic Protection Area, Ubon Ratchathani Province

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ABSTRACT

*We aimed to study the ecological service in Plant Genetic Protection Area Ubon Ratchathani Zoo, Ubon Ratchathani Province, Thailand, by focusing upon the carbon storage in aboveground biomass and influences of canopy of the Yang na (*Dipterocarpus alatus* Roxb. ex G.Don.) Moreover, the current study aimed to investigate influences of canopy of Yang na on other factors. The plant survey was undertaken using quadrat sampling method with an area of 2,400 m² for 6 sampling plots of 20x20 m., trees (DBH > 4.5 cm and height > 1.30 m). Our results showed that the Plant Genetic Protection Area Ubon Ratchathani Zoo which is classified as dipterocarp forest and dry evergreen forest had 30 of tree species and 21 families. The most abundant tree species included *Dipterocarpus alatus* Roxb.ex G.Don, *Canarium subulatum* Guillaumin, *Ellipanthus tomentosus* Kurz var. *tomentosus* and *Parinari anamensis* Hance. Besides, 17 species and 13 families of undergrowth plants were found in the area. *Polyalthia evecta* (Pierre) Finet & Gagnep., and *Polyalthia debilis* Finet & Gagnep were the predominance plants. According to the analysis on plant community, our results show that the canopy of Yang na had the highest importance value index (129.23) suggesting that canopy of Yang na is plentiful and very important for ecology in the study area. The total*

aboveground biomass of Yang na was 39.40 tons/1,600 m² (rai), and carbon storage in aboveground biomass was 19.53 tons/rai. Moreover, carbon storage in aboveground biomass's was found highest in trunk (14.65 tons/rai), followed by branch (2.96 tons/rai), and leaf (1.92 tons/rai). When analyzing the relationship between aboveground biomass and circumference and height, and the relationship between Yang na's carbon storage and circumference and height using Pearson Correlation Coefficient, we found that there was a high - level relationship with a statistical significance at a level of 0.01. In addition, our findings revealed that a total of wood volume was 26.0946 m³ or 0.5219 m³ of each tree. Furthermore, the average of canopy coverage in Yang na was 87.2%. When investigating the relationship of a percent of canopy coverage, circumference, height, and wood volume, we found that there was less and averagely opposite relationship. In contrast, there was high relationship in the same direction when the relationship of a percent of canopy coverage in Yang na was analyzed. There was, moreover, averagely opposite relationship when examining the relationship of a percent of canopy coverage in Yang na and the amount of other trees. Collectively, when there was a higher percentage of canopy coverage of Yang na, the circumference, height, and wood volume of Yang na slightly decreased. Moreover, a large number of Yang na was accompanied with a smaller number of other trees in the plots, and there was also a small quantity of plant species diversity. Therefore, it could be suggested that the Ubon Ratchathani Zoo should promptly implement the plan for the promotion and conservation of Yang na as well as knowledge transfer activities to communities.

Keywords: Carbon storage, Aboveground biomass, *Dipterocarpus alatus* Roxb. ex G.Don, Influences of canopy, Tree volume, Importance value index

INTRODUCTION

Global warming or climate change has intensified and damaged many countries according to a report by the Intergovernmental Panel on Climate Change (IPCC). In 2007, it was clear that the current climate change was caused by the increase of greenhouse gases in the world atmosphere and over 90 percent of these greenhouse gases are released from human activities, such as fossil fuel burning, deforestation, agriculture and industrial processes. In particular, carbon dioxide (CO₂) has the highest emission factor at 77% of all greenhouse gases (World Resources Institute, 2006). The increase in carbon dioxide in the atmosphere is about 20 percent due to the loss of carbon stored in the wood (Office of Environmental Policy and Planning, 2000) It is well known that forests can adsorb carbon dioxide as a component of wood and tree elements in the form of biomass from the previos study of forest management in Asia of Brown (Brown, 1996). There are 133 million hectares of natural forest and 48 million