

## Productivity of Moso Bamboo (*Phyllostachys pubescens*) Forest in Central Taiwan and its Potential to Act as a Significant Carbon Sink

\*Meng-Yin Lin<sup>1,2</sup>, I-Fang Hsieh<sup>3</sup>, Po-Hsuan Lin<sup>1</sup>, Chih-Hsin Cheng<sup>1</sup>, Tomonori Kume<sup>1</sup>

1. National Taiwan Univ., 2. Taiwan Forest Research Inst., 3. Boston Univ.

Bamboo is one of the important forests in subtropical and tropical area. In Taiwan, bamboo forests possess about 7.2% of total forest area. Recently, the aggressive expansion of Moso bamboo (*Phyllostachys pubescens*) forest to surrounding ecosystems has been noticed in eastern Asian countries. The carbon balance including aboveground and belowground carbon stock might be influenced greatly by the vegetation replacements. Moso bamboo has an “off-year” and “on-year” growth phenomenon that would cause significant difference of net primary productivity (NPP) and net ecosystem productivity (NEP) between the two years. So far, few studies have investigated carbon cycling with the consideration of the impact of biennial cycle in Moso bamboo forests. Heterotrophic respiration is a pivotal factor to determine a forest ecosystem as a carbon sink or carbon source. Therefore, the aims of this study were to clarify the characteristic of carbon cycle in a pure Moso bamboo plantation, situated in a montane cloud forest zone of central Taiwan. To these ends, this study 1) examined the aboveground and belowground biomass, 2) estimated the NPP and NEP in the Moso bamboo forest with the long-term data (2012-2015) and 3) compared the results of NPP and NEP in this study with other forests in Taiwan and in the worldwide scale. The NPP and NEP of Moso bamboo forest were 8.95 and 4.17 Mg C ha<sup>-1</sup> yr<sup>-1</sup>, respectively. Comparison of NPP in this study with other forest types showed that the NPP in this study was comparable with that of tropical forests with high annual temperature. The NEP in this study was similar to that of temperate humid forests showing world-largest class NEP. The results revealed that Moso bamboo forest as a potential role of carbon sink in forests ecosystem.

Keywords: bamboo forest, carbon sink, NPP, NEP