Invasion of moso bamboo into a Japanese cedar plantation affects the chemical composition and humification of soil organic matter

A research team led by Dr. Chih-Yu Chiu, Research Fellow, Biodiversity Research Center, Academia Sinica, found the invasion of moso baboo into a Japanese cedar plantation will affect the chemical composition and humification of soil organic matter and cause soil degradation. This research result has been published in *Scientific Reports* on August 25th, 2016.

Bamboo, which has dense culms and root rhizome systems, can alter soil properties when it invades adjacent forests. Therefore, this study investigated whether bamboo invasions can cause changes in soil organic matter (SOM) composition and soil humification. The research team combined solid-state ^{13}C NMR spectroscopy and chemical analysis to examine the SOM in a Japanese cedar (*Cryptomeria japonica*) and adjacent bamboo (*Phyllostachys edulis*) plantation. Bamboo reduced soil organic C (SOC) content, compared to the cedar plantation. The value of ΔlogK (ratio of absorbance of humic acids at 400 and 600 nm) was cedar > transition zone > bamboo soils.

The results of this research indicated that bamboo increased SOM humification, which could be due to the fast decomposition of bamboo litter with the high labile C. Furthermore, intensive management in the bamboo plantation could enhance the humification as well. Overall, litter type can control an ecosystem's SOC nature, as reflected by the finding that higher labile C in bamboo litter contributed the higher ratios of labile C to SOC and lower ratios of recalcitrant C to SOC in bamboo soils compared with cedar soils. The invasion of bamboo into the Japanese cedar plantation accelerated the degradation of SOM.

The full article entitled "Invasion of moso bamboo into a Japanese cedar plantation affects the chemical composition and humification of soil organic matter" can be found at the Scientific Report website at: http://www.nature.com/articles/srep32211

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Fig. 1. Appearance of moso bamboo invasion to cedar forest in mountain area of Nantou, Central Taiwan (A) Aerial view, moso bamboo (in light green) distributes in cedar (in dark green) forest; （B）Side view；（C）Internal view.

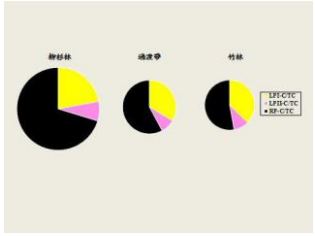

Fig. 2. Soil organic matter content and proportion of recalcitrant-C (in black) tend to decrease when moso bamboo invaded cedar forest.

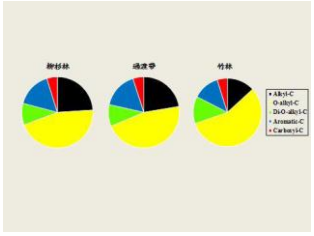

Fig. 3. Proportion of functional groups in litter of different forest types. Bamboo litter has the highest O-alkyl-C (in yellow and light green) and the lowest Alkyl-C (in black) content, indicating that bamboo litter can be decomposed easily.