Estimate the influence of three different forests litter decomposition on soil CO_2 efflux in central Taiwan

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Soil respiration is one of the most important source of natural carbon emission, and therefore influence the atmospheric amount of carbon. As the soils of different vegetation cover emit different amounts of carbon, this research set three different adjacent measurement plots including a mixed broadleaved trees stand, a Japanese cedar stand and a Bamboos stand, located in FengHuang mountain, Xitou, central Taiwan.The main aim of this study was to determine the link between the litter decomposition of different vegetation types and their soil respiration. We used EGM-4 (Environmental Gas Monitor, PP systems) to observe soil respiration using three different treatments: (1) including litter and living roots, (2) without litter, and (3) without litter nor living roots. Besides, we placed 60 litter bags on the ground of each different vegetation plots to observe and compare the decomposition rate of their leaves. The results showed that the soil respiration rate of the mixed broadleaved stand was superior to the other stands. The relationship between soil temperature and the soil respiration of different treatments showed a significantly strong correlation for the broadleaved and bamboo stands (r^2 = 0.42~0.72), and the Q_{10} values of different treatments were in the same range (1.65~2.45). The litter decomposition rate was slower for the cedar stand, probably due to the higher acidity of that stand soil, influencing the micro-organisms activity. This study has already been hold for one year and will last at least three years, in order to better understand the carbon cycles of those three kinds of vegetation.

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