

High plant diversity has a positive effect on soil properties and soil fauna in rubber plantations

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Plant diversity affects soil properties, which in turn affects plant productivity. Soil quality (SQ) includes the assessment of soil properties

and its processes related to the ability of soil to function effectively as a component of a healthy ecosystem. However, almost no studies have reported on the relationship between plant diversity and SQ under different seasons in the rubber plantations in Xishuangbanna.

In a study published in *Ecological Indicators*, researchers from Xishuangbanna Tropical Botanical Garden (XTBG) tried to analyze the response of soil properties as indicators of [soil quality](#) in different plant diversity and seasons. They proved their hypothesis that high plant diversity had a positive effect on both soil properties and soil fauna in rubber plantation.

The researchers collected [soil samples](#) during dry and rainy seasons at 0–10 cm depth at four sites (Bubeng, Jingtai, Nabanhe National Nature Reserve and XTBG) in Xishuangbanna, SW China and analyzed 16 soil properties. Soil quality index (SQI) was computed from the minimum data set derived from principal component analysis.

They found that the soil quality index (SQI) values differed significantly among different plant diversity at different seasons. Low plant diversity significantly reduced the nematode abundance in all four study sites. Seasonality (dry and rainy) and plant diversity (high and low) had more impact on the arthropod population.

The increase of plant diversity resulted in a [positive effect](#) on soil quality, and the highest values of SQI occurred in the dry season.

Total organic carbon, total nitrogen, arthropod abundance, the mass of dry root, nematode abundance and total sulphur were identified as key [soil](#) quality indicators, where total nitrogen and total organic carbon contributed the maximum to SQ.

"We thus suggest that management of natural understory vegetation

would be beneficial for the maintenance of SQ in the [rubber plantations](#) of Xishuangbanna," said Prof. YANG Xiaodong, principal investigator of the study.

More information: Zhila Hemati et al. Identification of indicators: Monitoring the impacts of rubber plantations on soil quality in Xishuangbanna, Southwest China, *Ecological Indicators* (2020). [DOI: 10.1016/j.ecolind.2020.106491](#)

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