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เรื่อง Long Term Seasonal Variability on Litterfall in Tropical Dry Forests, Western Thailand

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Long Term Seasonal Variability on Litterfall in Tropical Dry Forests, Western Thailand

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Abstract: Nutrient recycling is one of the most important services that supports other processes in ecosystems. Changing litterfall patterns induced by climate change can cause imbalances in nutrient availability. In this study, we reported the long-term (28-year) interplay between environmental factors and variability among litterfall fractions (leaves, flowers, and fruit) in a tropical dry forest located in Kanchanaburi, Thailand. A long-term litter trap dataset was collected and analyzed by lagged generalized additive models. Strong seasonality was observed among the litter fractions. The greatest leaf and flower litterfall accumulated mostly during the cool, dry season, while fruit litterfall occurred mostly during the rainy season. For leaf litter, significant deviations in maximum temperature (Tmax), volumetric soil moisture content (SM), and evapotranspiration (ET) during the months prior to the current litterfall month were the most plausible factors affecting leaf litter production. Vapor pressure deficit (VPD) and ET were isolated as the most significant factors affecting flower litterfall. Interestingly, light, mean temperature (Tmean), and the southern oscillation index (SOI) were the most significant factors affecting fruit litterfall, and wetter years proved to be highly correlated with elevated fruit litterfall. Such environmental variability affects both the triggering of litterfall and its quantity. Shifting environmental conditions can therefore alter nutrient recycling rates through the changing characteristics and quantity of litter.

Keywords: long term ecological research; litterfall seasonality; interannual variation

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1. Introduction

Litterfall is a fundamental ecological process that influences carbon and nutrient cycling as a result of the decomposition of aboveground litter into soil [1,2]. Litter is considered essential for the maintenance of soil fertility in terrestrial ecosystems [3,4]. The seasonality of litterfall is tightly related to plant vegetative phenology (i.e., leaf emergence, development, aging, and abscission) because most of the litterfall necromass is composed of leaves [5]. Climate change is a major driving force of variability in litterfall production, its spatiotemporal patterns, and the dynamics of productivity and nutrient balance in

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Marod, D., T. Nakashizuka, T. Saitoh, K. Hirai, S. Thinkampheang, L. Asanok, W. Phumphuang, N. Danrad and S. Pattanakiat. 2023. Long Term Seasonal Variability on Litterfall in Tropical Dry Forests, Western Thailand. **Forests**. 14: 1-17.

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