

LITTER CHEMISTRY AND DECOMPOSITION IN RUBBER PLANTATIONS

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Philip, A. and Abraham, J. (2009). Litter chemistry and decomposition in rubber plantations. *Natural Rubber Research*, 22 (1&2):10-16.

The quality and decomposition pattern of litter from three different sources viz. rubber (*Hevea brasiliensis*), *Pueraria phaseoloides* and *Mucuna bracteata* and the nutrient release from that in a rubber plantation were studied *in situ* in the central part of the traditional rubber growing tract in India by litter bag technique. Among the three species, rubber litter had significantly higher content of lignin and polyphenol and lower content of nitrogen, phosphorus and potassium than *Pueraria* and *Mucuna*. *Pueraria* litter had significantly higher cellulose, phosphorus and magnesium and lower lignin and polyphenol than the litter from the other two species. Significantly higher carbon, nitrogen and calcium and lower cellulose were recorded in *Mucuna* litter. The rate of decomposition of litter decreased in the order *Pueraria* > *Mucuna* > rubber. The decomposition half life values were 2.7, 3.3 and 3.6 months for *Pueraria*, *Mucuna* and rubber respectively. For 95 per cent decay, *Pueraria* took less time (11.5 months) than *Mucuna* (14.3 months) and rubber (15.8 months) litter. The nutrients remaining in the residual rubber litter were significantly higher than that of *Pueraria* and *Mucuna*. After one year, nitrogen, phosphorus, potassium, calcium and magnesium remained in the residual rubber litter were 13.2, 19.6, 3.3, 7.9 and 7.5 per cent respectively. The corresponding values for *Pueraria* litter were 2.2, 3.1, 1.0, 2.1 and 1.7 per cent and for *Mucuna* litter were 8.8, 7.4, 2.7, 4.1 and 3.9 per cent.

Keywords: Decomposition, Litter chemistry, Litter quality, Nutrient release, Rubber plantation.

INTRODUCTION

Plant litter plays an important role in forest/plantation ecosystems being a substrate for biological processes that enhance the recycling of nutrients. The decomposition of plant litter is the primary mechanism by which organic matter and nutrients are returned to the soil. Decomposition and nutrient release patterns of organic materials are determined by the resource quality, decomposing organisms and environmental conditions (Berg *et al.*, 2000).

Rubber tree (*Hevea brasiliensis*) has a defoliation cycle by which large quantity of litter is added to the soil. The litter addition in a mature rubber plantation is estimated to be about 5 - 6 t/ha/year (Krishnakumar and Potty, 1992; Philip *et al.*, 2003). In immature rubber plantation, leguminous cover crops like *Pueraria phaseoloides* and *Mucuna bracteata* are the main sources of litter input. The litter turnover from these cover crops is estimated to be about 5.5 - 7.5 t/ha/year (Philip *et al.*, 2005).

Chemical composition of plant litter is species-specific. Information regarding the

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