



Research Article

Litterfall and carbon, nutrient returns in stands of *Ceiba pentandra* (L.) Gaertn. sub-humid tropics of Eastern India

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ABSTRACT : The study was conducted in a nine-year old *Ceiba pentandra* stands planted in a three tree spacing 4 x 4 m, 4 x 6 m and 4 x 8 m and pruning regimes. A litterfall sample was collected from the field of *C. pentandra* for the experimental research for 12 months. Data collected was analyzed in laboratory and the result was subjected to descriptive and inferential statistical analyses using the MSTATC 1.41 Version. The results shows that the litterfall occurred throughout the year showing significant differences between tree spacing, pruning regimes and months. Total litterfall includes tree components (leaf litter + wood litter + flower litter + pod litter) ranged from 0.451 to 1.153 mg ha⁻¹ in through out of the year. Total litterfall followed unimodal pattern with highest peak in April and lowest in August. In different tree spacings, for total monthly litterfall, leaf litter contributed from 59 to 60 per cent, wood litter from 30 to 31.6 per cent, flower litter from 2.4 to 3.0 per cent and pod litter from 6.2 to 6.8 per cent. Litterfall was significantly higher in 4 x 4 m and lower in 4 x 8 m tree spacing. Pruning of trees had reduced by 7.8 per cent in total litter production. Annual litterfall production in 4 x 4 m tree spacing 9.09 Mg ha⁻¹yr and in 4 x 6 m and 4 x 8 m tree spacings was statistically at par. The order of annual litter production of tree components leaf litter> wood litter> flower litter> pod litter. The study showed that climatic variable and litterfall was strongly and positively correlated with temperature and negatively correlated with relative humidity. The *Ceiba pentandra* stands with high density, where the canopy closure produce highest amount litterfall in 4 x 4 m tree spacing, which return highest amount of C and nutrients to soil quantity of carbon and nutrients returned to soil via annual litterfall ranged from 345.49 to 385.16 kg C ha⁻¹ yr⁻¹, 228.55 to 239.10 kg N ha⁻¹ yr⁻¹, 21.79 to 23.74 kg P ha⁻¹ yr⁻¹ and 119.45 to 142.81 kg K ha⁻¹ yr⁻¹. Choice cultivation of *C. pentandra* is a one of multipurpose tree species for agro forestry planted with 4 x 4 m which produce highly litter to implications in returning carbon and N, P, K nutrients elements to the soil through litter which increase the fertility and productivity of soil as compare to the other tree species in India.

KEY WORDS : Litterfall, Pruning, Carbon, Nutrient returns, *Ceiba pentandra*

How to cite this Article : Gawali, Anil (2014).Litterfall and carbon, nutrient returns in stands of *Ceiba pentandra* (L.) Gaertn. sub-humid tropics of Eastern India. *Internat. J. Forestry & Crop Improv.*, 5 (1) : 1-8.

Article Chronical : Received : 13.03.2014; Revised : 01.05.2014; Accepted : 15.05.2014

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