

Nutrient gains by stem flow, through fall and rainfall in Teak ecosystem

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Abstract

In any forest woodland ecosystem, nutrient cycling is an important process and it involves various factors and processes involved in it. A considerable amount of nutrients are added through stem flow and through fall which are passing through the canopy of trees and also by rainfall to the soil that are made available for re-absorption in addition to the litterfall from the vegetation. These nutrients play a major role in nutrient gains in the nutrient cycling process in the forest ecosystem. Having this in mind, studies were conducted to quantify the stem flow, throughfall and rainfall in eighteen years old teak plantation at Forest College and Research Institute, Mettupalayam, Tamil Nadu, India during 2006-2007. The range of stemflow nutrient gains by was 1.30 mm (August) to 54.5 mm (October) and in general stemflow was low during the summer months and high during rainy months. In case of throughfall, it was in the range of 6.00 mm during June to 264.7 mm during October. The amount of throughfall recorded was low during the months from March to September and was high during October and November. Interception loss was high from March to June and low during October and November. On an overall basis, the total effective rainfall recorded was 966.6 mm per annum. Of which, 14.87 per cent was recorded as stemflow, 75.52 per cent was recorded as throughfall, and 12.61 per cent was recorded as interception loss from the study area. As that of nutrient contents, the contribution was the highest for Ca followed by Mg, N, K and P. The total annual nitrogen contribution from stemflow, throughfall and rainfall was 10.75 kg ha⁻¹ and was in the order of throughfall > rainfall > stemflow. In case of phosphorus, the total annual nutrient addition was 5.08 kg ha⁻¹, of which throughfall contributed 3.86 kg ha⁻¹ and stemflow 1.22 kg ha⁻¹. The overall annual contribution of potassium from stemflow, throughfall and rainfall was 7.81 kg ha⁻¹ of which throughfall contributed 4.96 kg ha⁻¹ and stemflow contributed 2.85 kg ha⁻¹. The total annual contribution of calcium was 32.34 kg ha⁻¹ from stemflow, throughfall and rainfall of which the major share was from throughfall (23.01 kg ha⁻¹) and was followed by stemflow (9.33 kg ha⁻¹). The total annual contribution of magnesium through stemflow, throughfall and rainfall was 21.41 kg ha⁻¹ of which throughfall contributed 15.61 kg ha⁻¹ and stemflow 5.80 kg ha⁻¹. From the present study, it is concluded that the highest amount of nutrient gains in teak ecosystem was occurred by throughfall followed by stem flow and the least amount by the rainfall.

Key words: Teak, nutrient gains, N, P, K, Ca, Mg, stemflow, throughfall, rainfall