



# Nutrient dynamics of teak (*Tectona grandis*) in a dry tropical teak forest of Rajasthan

G. QAZI, J.I. N. KUMAR AND ROHIT K. BHOI

## ABSTRACT

A study was conducted in a dry tropical forest at Udaipur, Rajasthan, India during 2008 to study the nutrient concentration in teak (*Tectona grandis*), the most dominant tree species in the teak forest), litter and soil. Observations were recorded to determine the nutrient content *i.e.*, nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, chloride and sodium in the different parts such as lateral roots, tap root, bark, cork, bole, branches, leaves, flowers/fruits/seeds and litter, and to explore nutrient content *i.e.*, nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, chloride, sodium and organic carbon in soils at different depth like 0.00-10.00cm, 10.00-20.00cm and 20.00-30.00cm in the same LSE. It was found that the highest amount of the nutrients was present in the foliage and poorer concentration of the nutrients was recorded in the lateral roots. The concentration of the nutrients in the tree components was in the order: reproductive parts > leaf > branch > bole wood > cork > bark in the above ground parts and main root > lateral root in the below ground parts. Greatest amounts of the nutrients were recorded in the 0-10.00cm depth layer while as the lesser or poorer amounts were recorded in the lower layer. The upper layer of soil was found to contain more number of nutrients because of the high organic content present in the upper layer. The leaf component of the plant was found to be the most metabolically active part and it accumulated the high amount of the nutrient. It was observed that the concentration of the nutrients in the soil decreased while as the concentration of the nutrients in the trees increased indicating the accumulation of the nutrients by the plant. There was the reduction in the nutrient concentration of the litter leaves as well as branch litter indicating the transfer of the nutrients from the litter to the soil.

**KEY WORDS :** Teak, Nutrient dynamics, Tropical forest, Rajasthan

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## INTRODUCTION

The tendency of human populations to concentrate in drier climates has hastened the rate of dry forest degradation and the functioning of the ecosystems, particularly with regard to primary production, is generally influenced by the availability of nutrients, and this in turn depends on their distribution and rates of cycling at the ecosystem level. The litter fall and decomposition are two primary mechanisms through which nutrient pool of forest ecosystem gets maintained. If the nutrients are not available to the tree species to an optimum in a forest, the

forest is liable to get disturbed. The present investigation was an initial attempt to study the nutrient dynamics of teak (*Tectona grandis*) in dry tropical forest of Rajasthan as the nutrient dynamics studies in dry tropical forests of India have not been extensively studied compared to the other forest types.

## MATERIALS AND METHODS

The site was located between 24.580°N Latitude and 73.680°E Longitude in Udaipur of Rajasthan. It has an average elevation of 598 meters (1961 feet). The climate of Udaipur is tropical with the mercury staying between a maximum of 42.3°C and a minimum of 28.8°C during summers. Winters are a little cold with the maximum temperature rising to 28.8°C and the minimum dipping to 2.5°C. The annual total rainfall received at Udaipur is 61 cm. The forest type is dry tropical forest and the area is totally hilly with undulating terrain.

The composite plant sample was collected from different parts of plants like leaves, twigs, flowers, fruits, seeds, bole (cork and bark) for 10-15 trees. The samples

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