

LITTER PRODUCTION IN A DRY DECIDUOUS FOREST IN THE FOOT HILL ZONE OF GARHWAL

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ABSTRACT

This study deals with the litter production in a subtropical deciduous forest of foot-hill zone of outer Garhwal Himalaya. A little work has been done on litter production of these forest. Out of sixteen species recorded five were evergreen. *Holoptelea integrifolia* had highest annual leaf fall (8555.0 kg ha⁻¹) and lowest in *Erythrina* and *Acacia nilotica* with temperature.

Key words: *Garhwal Himalaya, deciduous forest, litter production, leaf fall*

INTRODUCTION

Fall-off of plant parts i.e. leaves, twigs, flowers, fruits, bark and branches are known as litterfall. The process of litterfall is very important for the forest ecosystem because it regulates the nutrient cycle of the particular area. All parts of the plant contain different quantities of elements. These part on decomposition produce organic material to the forest ground. This organic matter reduce the bulk density, increase water holding capacity and cation exchange capacity and serve as nutrient reserve for plants grown there (Hoyle, 1973) Litterfall plays vital role in transfer of energy from autotrophs to heterotrophs which in habitats in soil.

Forest floor surface is a fundamental component of the forest ecosystem in various references i.e. it provide nutrient pool involving inputs. Outputs and turnover of chemical elements. Bray and Gorham (1964) stated that the study of quantitative aspects of litter present on the forest floor is important part of forest ecology, since it deals with a major pathway for both energy and nutrient transfer in the ecosystem. It acts as pool of organic matter and nutrient regulating functional aspect of the ecosystem.

The accumulated litter on the forest floor reduces soil erosion and runoff. Because of the dense cover over the forest ground it increase percolation rate and nutrient concentration (Singh *et al.*, 1984) Leaf fall on the ground also helps seeds to grow by protecting them from severe cold and other animal enemies and providing a thick cover with moisture, temperature, nutrients and aeration. The breakdown of ground litter completes the nutrient cycle by its decomposition. Litter

production is a functional aspect forest ecosystem. Since this aspect is rather less analysed in the for the foothills forests, so the present study is an effort to evaluate the natural process.

MATERIALS AND METHODS

The present work has been carried out in the Ganga valley near Rishikesh. The study area is the foot hill dry deciduous forest in the sub-montane zone of the Garhwal Himalaya lying between 400-600 m. above sea level. Meteorological data for the study area have given in Table 1. Total rainfall was 1667.9 mm with a monthly average of 138.9 mm. Average minimum and maximum temperature were 28.72°C and 15.86°C respectively. Average relative humidity ranged from 58 to 70.5%. Soil analysis indicated highest nitrogen concentration in 10-15 cm depth (0.29 ppm). Organic carbon was maximum (1.82%) at the depth 0-5cm.

To collect the litter, 12 traps were laid for each species on the forest floor. Each trap covered an area of one meter square following the method of Bray and Gorham (1964). At every 30 days interval the traps were harvested for litter, which was taken to laboratory. The litter was separated into different parts washed, oven dried and weighed. Care was taken in washing because the fragile parts are delicate enough to be broken and run off in water.

RESULTS AND DISCUSSION

Among all 16 species studied, five were evergreen, because there is no clear-cut demarcation of shed down of old leaves and emergence of new leaves *Syzygium cumini* (Jamun) showed highest annual litterfall (8735.0 kg ha⁻¹) while for other evergreen species it ranged from 5210.0 (*Ficus bengalensis*) to 5820.0 kg ha⁻¹ (*Aegle marmelos*). In *S. cumini* highest litterfall was recorded in June and August, and lowest in July and December (Table 2)

Maximum contribution to annual litterfall on the forest floor among deciduous trees was made by *Holoptelea intergifolia* (8555.0 kg ha⁻¹), Highest leaf fall was recorded in March and April *Schleichera oleosa*, which had second highest value (7175.0 kg ha⁻¹), produced maximum litterfall in the month of June and July, the hottest month of the year. The contribution to litterfall by other species ranged from 3615.0 (*Erythrina suberosa*) to 6065.0 kg ha⁻¹ (*Adina cardifolia*).

The leaf fall being the major part of litterfall is the process by which the plants save themselves from the unfavourable and adverse climatic conditions or after maturation of plant parts. Other part may fall after maturation or accident. In dry forest, litter production is limited by water availability, while in wet conditions other factors are responsible (Bullock and Solis-Magallanes, 1990; Martinez-Yrizer, 1995) Shoot growth and leafing are governed either by Climate of the year of bud formation or by both, the Climate of previous year and that of the year of leafing (Mikola,

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