Rainfall partitioning in several quadrats of lowland tropical rainforest

O. J. MANFROI, K. KURAJI, N. TANAKA and M. SUZUKI (Grad. Sch. of Agric. and Life Sci., The Univ. of Tokyo)

Abstract

Rainfall partitioning studies in tropical moist forests have recognized that the forest canopy strongly modifies precipitation characteristics. The main evidences are the existence of points where the underneath forest precipitation is highly enhanced (more than four times) or depleted in relation to the above canopy precipitation. Also, the variation among stemflow volumes generated by individual trees is very high given the large number of species, and therefore leaf type, bark thickness, branch disposition and so on, found in plots of these forests. In this study we are concerned with how rainfall characteristics and canopy cover interact to change the partitioning of rainfall. For doing so, we are measuring continuously throughfall and stemflow in a fixed quadrat ($10 \times 10 m^2$) and throughfall in several quadrats during short periods of time at the crane site four ha study plot. Stemflow is not measured in several quadrats because of practical reasons. We use 40 throughfall collectors [1], 20 for observing continuously throughfall in the fixed quadrat and 20 for observing throughfall during short periods in different quadrats. Stemflow from 78 trees whose $DBH > 1cm$ have been observed in the fixed quadrat.

For the period from 2001 /07/01 to 2002/06/04 total rainfall gauged by four storage rain gauges set in the gap's middle and above canopy averaged in 2223 (±5%) mm. In the fixed quadrat this total rainfall was partitioned into 81(±21)% as throughfall and 3.5 % as stemflow. Fig.1 shows the short period throughfall ratios for the observations carried in 14 positions (13 quadrats and once in a 60 m transect line-TL) and the ratio for the same period in the fixed quadrat. Each rainfall set along the observation period have produced different ratios of throughfall in the fixed quadrat which when compared to the throughfall ratio observed in the relocating quadrat during the same period is dissimilar as well for most of the observed quadrats. In the oral presentation we will explore the reasons underlying this variations and suggest the necessary future work and observational data for improving our study.

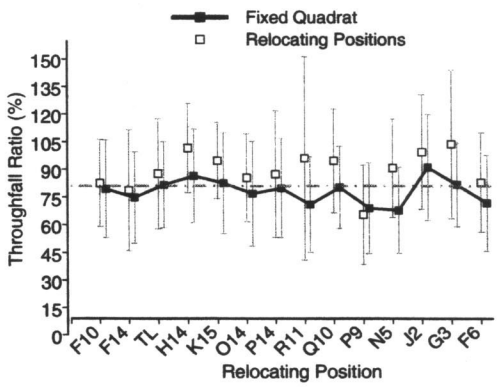

Figure 1: Throughfall ratio of measurements in 14 different positions and the ratio in the fixed plot for the same rainfall set. Error bars are standard error of mean as percentage of rainfall

[1] a steep plastic funnel (⌀=20.6 cm) mounted in a 10 L bottle