



Water balance analysis of a watershed dominated by *Eucalyptus grandis* hybrid plantations in Felixlandia (MG, Brazil)

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Commercial eucalyptus plantations are commonly associated to excessive water use despite the fact that numerous studies have demonstrated significant differences among species and environmental systems. In fact, the analysis of its impact on water balance depending on specific environmental conditions is essential to guarantee its sustainability.

The water balance of *Eucalyptus grandis* hybrid plantations in the Basin Creek of Riacho Fundo in Felixlândia, Minas Gerais (Brazil) is presented through a study of 2.6 years of measurements in a catchment of 719.9 ha. The objective of this study was to analyze the relationships among precipitation, interception and evapotranspiration of eucalyptus plantations, for evaluating the weight on flow and effective precipitation.

A triangular weir with a set of level- and baro-logger were used for measuring flow. Rainfall was measured with 2 pluviometers and evaporation using two evapotranspirometers Soil Control, Model JR-200mm. For throughfall, eight plots of 136.5 m² each were installed with twelve pluviometers. To estimate the stemflow, the empirical equation $Et = -0.060 + 0.053 (P)$ was used, where P is the precipitation. The effective precipitation was calculated by summing of the throughfall value plus the stemflow. The losses by interception were obtained by the difference between precipitation and effective precipitation. The analysis was carried out on the monthly and annual scales.

The results showed that the measured rainfall was close to the average for the region, reaching values close to 1200 mm. The interception of the eucalyptus plantation for the period was approximately 12% of the external precipitation. There were neither significant relationships between flow and evapotranspiration nor between flow and effective precipitation, which shows the complexity of water components at the catchment scale. This is likely associated to the delay effect of the subsurface flow. The average flow for the period of study was 37.8 liters per second, approximately equivalent to 13.8% of the rainfall. For the dry season, mean daily flows of 18.3 liters per second were recorded (equivalent to 6.7% of the rainfall) whereas 51.4 liters per second were measured for the rainy season (18.8% of the rainfall). These results illustrated the high inter-annual variability of the catchment responses as well as the low component of runoff on the rainfall.

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