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[1]   [2]   [3]

1998   7   1999   7

T_L

18

40cm   9   40   100cm

0.5   80%

95% T_L T_i

$T_L < T_i$

5.2   27.1   42.6   25.1%

λE   0.53~3.3mm

1.4±0.46mm   0.2 ~ 0.41 cal ^{1} m ^{3}

Characteristics of the Thermal Environment of a
Natural Machilus zihoensis Woods

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ABSTRACT   This study aimed at observation of the microclimate in a natural Machilus forest. A series of observations for the net radiation, soil heat flux, temperature of leaf, air and earth, relative humidity and wind speed were performed from July 1998 to July 1999. An observation tower collected all the data, which was located to the east of an experimental watershed of National Pingtung University of Science and Technology, Taiwan (elevation=90m; latitude=22^{0}39'N; longitude=12^{0}036'E). The results showed that leaf temperature T_L was less than air temperature above the canopy, and that solar radiation was still absorbed by the canopy. The mean temperature under the ground surface was higher than 18   in winter. Consequently, the behavior of the earth temperature was documented at 0 to 40cm depth increasing at

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9 a.m. and decreasing at midnight. However, there was an isothermal layer existing at 40 to 100cm, and the layer surrounding temperature difference was less than 0.5 . The relative humidity (R.H.) under the canopy was more than 80% but at nearby ground surface it was up to 95%. The correlation between R.H. and height were shown as $T_L < T_i$ (air temperature under canopy) if positive and $T_L > T_i$ if negative. The analytical heat budget in Machilus woods to find the average proportion of soil heat flux, sensible heat, latent heat and canopy heat storage to net radiation were 5.2, 27.1, 42.6 and 25.1%. A regressive relationship between latent heat and net radiation showed a non-linear curve. Estimating evapotranspiration by the latent heat indicated a mean value of 1.4±0.6mm. Then, the estimated canopy heat capacity would be between 0.2 and 0.41 cal $^{-1}$ m^{-3}.

Key Words: Machilus zihoensis woods, microclimate, heat budget.