Hydrol. Earth Syst. Sci. Discuss., 7, C1493–C1496, 2010
www.hydrol-earth-syst-sci-discuss.net/7/C1493/2010/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Fog interception by Ball moss (*Tillandsia recurvata*)" *by* A. Guevara-Escobar et al.

Anonymous Referee #1

Received and published: 19 July 2010

This manuscript describes a laboratory experiment to evaluate interception storage capacity of a widely distributed epiphyte. Although this paper addresses a relevant scientific subject and presents novel data, it needs to be considerably improved before it can be published in HESS.

Specific comments:

1. The authors used laboratory experiments to overcome the difficulties and the errors of field measurements. However, these kind of experiments can only be useful and relevant if the laboratory conditions are similar to the natural environment conditions which they try to simulate:

a) Although the authors refer that there are two meteorological stations near the experimental sites they only report mean air temperature (T) and relative humidity (HR) during early hours of the day (page 1676, Fig. 4). Nothing is said about radiation and wind speed or even T and HR during the other periods of the day.

b) In Fig. 3 (page 1675) the authors show the decaying of canopy water with time when HR is less than or equal to 30

c) The description of the rain experiment is almost non-existent (page 1661, lines 9-11). What was the dimension of the drops? How was the spray applied (vertically, horizontally, ...)? Did the authors try to simulate natural rain features/conditions? Once again, this information will be quite important to make reliable extrapolations from lab data to field conditions.

2. The authors use a set of formulas to calculate the dew point temperature (page 1663, lines 10 and 13) which I was unable to derive/understand: a) They say that 'according to Monteith and Unsworth (1990) a factor of 4.81 is used instead of 6.11'. I am afraid I could not find that recommendation in the mentioned book.

b) I tried to derive eq. 9 using the empirical equation of Tetens (1930), as given by Murray (1967, cite by Monteith and Unsworth, 1990), without success. According to this author,

$$e_s(T) = e_s(T*) \exp(A(T - T*)/(T - T'))$$

where $A = 17.27$, $T* = 273$ K, $e(T*) = 0.611$ kPa, $T' = 37$ K that results in

$$e_s(T) = 6.11 \exp(17.27T/(T - 236)) = 6.11 \times 10^{(7.5T/(T+236))},$$

with T in ^{0}C and e_s in hPa (although one of the coefficients has the same value, this is not the equation presented in the m/s).

c) The authors must explain how they derive eqs. 7 and 9. Besides, equation 7 should be related with eq. 9 but I could not understand how!

d) I also do not understand why the authors use the base-10 in eq. 9 if they use natural logarithms in eq. 7.

e) The authors should indicate the units of temperature and vapour pressure.

3. Considering the linear relationship between Cmax/Cmin and Wf0 during fog conditions (page 1664, lines 4-5), I do not think that an r^2 of 0.52/0.56 with a p-value of 0.02 is very relevant. In my opinion this shows a very weak linear relationship between these variables.

4. The authors say that 'In the present work, it was possible that coalescence increased drainage in the immersion tests for S' and therefore, C'min was higher for fog compared to rain' (page 1664, lines 16-17). This sentence does not make much sense as the C'min values for rain were not obtained by immersion! Please rewrite the above sentence.

5. I think it is quite inappropriate to call sub-section 3.2 'Field study' (page 1665, line 14). Considering that the authors have not done any field study, I think this sub-section should be renamed. Something like 'Extrapolation to natural condition' would be more appropriate. Besides, some of the results/discussion of this sub-section needs to be improved:

a) The authors explain how they convert the rain value of C'min from mg/mg to mm (page 1665, lines 17-18). However, if the same procedure is applied to the fog C' values (mg/mg) of Table 1 (page 1672), the values obtained are not equal to those presented (in mm) in the same Table. The authors should confirm them or explain how they were obtained.

b) The authors say that 'the contribution of T. recurvata to rainfall interception was calculated as 5

c) The authors present a relationship between C and t (page 1665, lines 22-23). How did they get it? Was this obtained with the data of Fig.2? Once again this should be explained in the text (and the units of the variables explicitly stated).

d) The authors should also explain why data from Figs. 2 and 3 are not consistent: looking at Fig. 2 (page 1674) we see that after one hour of simulated fog, the mean value of C' is around 0.5 mg/mg whereas in Fig. 3 (page 1675) the same value (mean stored water after 1h wetting, t=0) is just a little over 0.3 mg/mg. Shouldn't these two values be similar?

e) The authors say 'In June and July, T and Tf were similar' (page 1666, line 2). Analysing Fig. 4 (page 1676) we see that it is in fact in May and June that those two temperatures were similar. Please correct this (but also take into account my comment 2).

6. Some minor comments:

a) Page 1660, lines 9-10 – complete information about the manufacturing companies of the mentioned instruments is missing;

b) Page 1661, line 25 – What is D?

c) Page 1663, line 2 – replace '(Olalde and Aguilera, 1998)' by 'Olalde and Aguilera (1998)';

d) Page 1666, line 28 – replace 'infiltrataion' by 'infiltration';

e) Pages 1668-1671 – all the references end with a number (1666, 1657,...). Is this correct? What is the meaning of these numbers?

Overall, the work presented needs revision to correct and clarify all the aforementioned points. Only after a major revision could this manuscript be considered for publication in HESS.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1655, 2010.