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Hydrology and Earth System Sciences Discussions

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

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General comments
The paper describes a study on the water storage in Ball moss. Although this could be an interesting and relevant study, the paper fails to bring the main message across. It seems like the authors did a lot of lab experiments, but just show the results of some of the experiments. However, their conclusions are based on the entire data set. This makes it very difficult for the reader to check and understand the results.

Furthermore, the structure of the paper is not logical. Although the English is correct, the reasoning of the authors is often difficult to follow. Often cause and effect is not

logically presented. This can also be caused by the fact that the results are presented in one big paragraph, without a clear structure. Also the Material and Method Section is not well structured. I would advise the authors to clearly explain which experiments they did under which conditions. The same holds for the Results Section, where also more data can (and should) be shown. The current state of the paper raises more questions than answers.

Concerning the used approach, I think the authors should emphasis more the limitations of the current study. They choose for a laboratory experiment, which was not representative for the reality. First, their samples where only taken from juvenile species (P1659 L20) causing an overestimation of the storage capacity in comparison to reality. Second, the applied fog rate was higher than occurring in natural conditions (P1664 L19) again leading to an overestimation of the results.

I recommend that the authors restructure their paper into a logical structure, check cause and effect sentences in the manuscript, show more of their data, and emphasis better the limitations of study.

Specific comments
P1656 L3-6: The authors state that fog drip can cause 'negative interception'. However, this is not caused by the fog drip, but by the fact that fog drip is not taken into account in the precipitation measurements.

P1656 L17: *T. recurvata* apparently contributes to 20% of the rainfall interception of their shrub hosts; however this percentages is not mentioned somewhere in the manuscript. How is this calculated?

P1658: I think important references to the work of L.A. Bruijnzeel are missing. Bruijnzeel did a lot of research in cloud forests. For example: Bruijnzeel, Tropical montane cloud forest: a unique hydrological case Forests, Water and People in the Humid Tropics, 2005, 462-483.

P1658 L21-23: I do not agree with the authors that field measurements are 'indirect'. Lab experiments have the advantage that one indeed can control the environment. However, with lab experiments one also introduces large errors by taking samples from the field. So both approaches have their pro's and con's and their value. Choosing for a lab experiment is in my view a good approach; however, then one should try to mimic the 'real world' as good as possible. Concerning the way this experiment is executed, I have major concerns on this point. After reading the reply of the authors on Anonymous Referee 1, my concerns on this point become even bigger.

P1659 L7: I think BS_1K should be BSk

P1659 L20-21: Since the authors only took juvenile, vegetative specimens, their results are not representative for semi-arid scrubs areas. Personally, I find this a limitation of the present study, and makes the results less usable for others. I think that the authors should emphasis more that their results are an upper boundary in the results, discussion, conclusions and abstract section.

P1659 L21-24: This paragraph is unclear to me. How are the 99% confidence intervals determined and how was this related to the samples? Please elaborate.

P1660 L17-20: Personally, I don't see why C_{max} is an important parameter, since it only occurs during the rain event and does not have any influence on the water budget.

P1660 L24-26: This is a result and should not be in the Materials and method Section.

P1660 Eq1: Since Wf_{max} can be confused with Wxf_{max} I would change the name of this parameter in a one symbol, e.g. W. This also counts for the other parameters in the next equations.

P1661 L15-19: To me it's not clear why C_{min} can differ from S. Please elaborate.

P1661 L20-21: I am confused on how the experiments where carried out. Please clarify how each experiment is carried out, since it seems there are different ways. Apparently, some samples were immersed, others wetted by rain, and some were wetted by fog. Am I right, that C is determined by applying fog and S by immersing?

P1661 L25: What is D?

P1661 Eq4: If S is different than C_{min} then Equation 4 and 2 should not be the same.

P1662 L6: Why were only 6 out of 12 plants used?

P1662 L7: Is there any difference in ΔWf and C_{min}?

P1662 L1-17: It unclear to me why these additional tests are executed. Please clarify. Apparently the authors would like to investigate the effect of day and night, but this is explained at the end of the Section. Please restructure.

P1663 L1-13: As also mentioned by Anonymous Referee1 Monteith and Unsworth 1990 is not the correct reference for the used equations. Furthermore, the authors should explain why they changed the 4.81 into 6.11. Is that allowed taking into account the units (in vapour pressure equations the units are very important!)? And why did the authors use these (unknown?) equations instead of the equation of Monteith and Unsworth?

P1664 L4-6: Why is the data of these regressions not shown? This would give more information than just a r^2.

P1664 L6-8: So is Wf_0 then a good descriptor for C_min? Please elaborate.

P1664 L6-10: If W_s is not related to C_{min} and Wf_0 is, then apparently the initial moisture conditions are important. What were the initial moisture conditions of the plants? I think this is really important and should be shown in the results.

P1664 L12-14: This seems to me speculation. How can the authors derive this conclusion from the results?

P1664 L16-17: I don't understand this reasoning. Why would coalescence occurring in the test of S' have an influence on C'_{min}? In my view it is not so surprising that the storage capacity is higher for fog than for rain. In the case of fog, droplets are attached to all sides of the species, while with rain only the upper sides of the species are wetted. Can this not be the reason for higher C_{min} with fog in comparison to rain?

P1664 L18-19: So the lab conditions are not representative for natural conditions?

P1664 L20-21: I don't understand why the authors can conclude from Figure 2 that the fog lab conditions are likely higher than in reality. Please clarify.

Figure 2: Elaborate on Figure 2. Why is there a sudden jump in the graph after 7 hours? When did the fog stop?

P1664 L27: absorved => absorbed

P1665 L1: The authors state that during night the specie absorbs more water than during day time. From which results did the authors concluded this?

P1665 L5: What is a CAM specie?

P1665 L5-9: I would be much clearer if a graph of these results was made.

P1665 L9-11: Maybe this graph also helps to understand why these results apparently show that "*T. recurvata* water relations depended upon recurrent conditions favorable for fog formation or condensation". Now this is not clear. Please clarify.

P1665 L18-19: How is C_{min} scaled up for *T. recurvata* and the hosts shrubs? And how is the 5% determined? Please clarify.

P1665 L23: How is this equation derived? From Figure 2?

P1665 L23-25: I don't understand this statement. According to Figure 2, indeed after one hour of fog the weight has increased with 50%. However, the drying of that 50% takes much longer than 12 hours according to Figure 3. Please clarify.

Figure 3: I think more on this graph can be said. Please elaborate

P1666-1667: I think Section 3.3 belongs in the Introduction Section. This is more literature review than discussion.

P1668: The conclusions can be extended to all results: comparison wetting method, comparison drying curves, relation between dry weight and storage capacity, effect of day and night, etc.

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