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COMMENTARY†

Response to Torres-Ruiz *et al*. 2016, "Why do trees take more risks in the Amazon?"

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In the piece recently published in the *Journal of Plant Hydraulics* Torrez-Ruiz *et al.* (2016, from now on TR2016) suggest that the control (non-droughted) forest in Rowland *et al*. (2015, from now on R2015) has an unusually low and negative hydraulic safety margin (HSM). To calculate this value the minimum leaf water potential (ψ_{Lmin}) from seven trees from the control forest in Extended Data Figure 4 of R2015 was used. These seven trees were used by R2015 because they were accessible from a walk-up tower, not because they were representative of the composition of the forest. We see significant problems with estimating plot-scale ψ_{Lmin} from them because:

1) not one species in this group of seven trees is among the common (i.e. most representative) species on the plot from which the P_{50} values were measured, and from which TR2016 obtain P_{50} plot-level average (using 18 trees); and

2) two of these seven trees were *Manilkara bidentata*. This species is very unusual in being able to achieve more negative ψ_{Lmin} than all the other common Amazonian trees in R2015.

For these reasons R2015 used data from these seven trees cautiously as example of potential diurnal responses of ψ_L to VPD. The methods in TR2016 fail to give the reader the information needed to identify the bias in the samples used, by not stating where data for ψ_{Lmin} and P_{50} were taken from within R2015, what the species mismatch is, and associated (and different) *n* values. Furthermore, there is a large discrepancy between average ψ_{Lmin} used by R2015, for calculating the percentage loss of conductivity (R2015, Fig. 4, inset) and average ψ_{Lmin} used in TR2016 (-0.91±0.22 MPa, R2015 vs -2.05±0.32 MPa, TR2016. The less negative value from R2015, gives a plot-level mean HSM of +1.2 MPa. As stated in R2015, the ψ_L data were collected during the dry season but when VPD was unusually low. Therefore, while the ψ_{Lmin} in R2015 can be considered an upper limit to calculate HSM, the values employed by T2016 for the same period are unrepresentative and biased.

† Invited unrefereed comment

In summary, and as we have already communicated to TR2016 through a prior assessment of their piece, we are certain that the HSM calculations presented within TR2016 are misguided. We would be concerned to see these numbers they have calculated considered as accurate or ecologically representative, particularly as the piece lacks key information on methodology.

References:

Rowland L, Da Costa ACL, Galbraith DR, Oliveira RS, Binks OJ, Oliveira AAR *et al*. 2015. Death from drought in tropical forests is triggered by hydraulics not carbon starvation. *Nature* 528:119–122

Torres-Ruiz JM, Cochard H, Delzon S. 2016. Why do trees take more risks in the Amazon? *Journal of Plant Hydraulics* 3: e005