

Helmstetter et al. – Phylogenomic data reveal how a climatic inversion and glacial refugia shape patterns of diversity in an African rain forest tree species

This paper presents exciting data on the phylogeography of an African species of rain forest trees, *Annickia affinis*. The sampling (112 individuals) shows a long-term dedication to collecting this species, and is impressive. The use of recently developed baiting kit, and the application of several analytical tools that produce coherent results have resulted in a paper that will draw much attention, and will be a forerunner of similar studies in the future.

- It would be good to add references to the second and third hypotheses, which according to the authors have been suggested. I'd be especially interested in seeing a reference for the second hypothesis, because here I feel the metaphor of a hinge may be taken too far by suggesting that flowering times flipped along the North-South axis around 0-3 degrees N. Is there any evidence in other papers than Hardy et al. (2013) to suggest this pattern?

- "If glacial refugia have played an important role in CAR plant dynamics we would expect to find evidence of dispersal inland because most putative CAR refugia are located in the Atlantic Guineo-Congolian region". This seems a very strongly phrased hypothesis to me, given the uncertainty surrounding the location and importance of Pleistocene refugia. The authors have indicated this uncertainty themselves (lines 59-61). Also, several papers, e.g. Piñeiro et al. (2017) have only demonstrated partial overlap at best between Maley's refugia and contemporary genetic clusters. Furthermore, one of the refugia Maley suggested is located in the Congo Basin, to the east, which overlaps with the eastern part of the distribution of *Annickia affinis*. I appreciate the beauty of clearly phrased and unambiguous hypotheses, but in this case I wonder if the clarity of the hypothesis is not disguising suggestions in the literature that would suggest a differently phrased hypothesis.

- The generation time of 15 years is likely to be a serious underestimation, and it would be interesting to see what the effect on the results would be if a longer generation time had been used in the analyses. The generation time is based on a paper on *Annona crassiflora*, a savanna species from the Neotropics. Looking at mortality rates of Annonaceae species in Baker et al. (2014; Ecology Letters 17: 527-536), and assuming that generation times can be approximated by the mortality rate<sup>-1</sup>, the generation times of Neotropical tree species of Annonaceae vary roughly between 40 and 100 years. These species are better comparable to *Annickia affinis* in terms of habit and habitat, and would therefore probably reflect the generation time of the latter species more accurately. I appreciate that the authors are cautious and avoid interpreting the timing of demographic events. Having said that, the patterns that are disclosed in this paper did happen in real time, and a temporal framework is pivotal for linking up this study with other work. Moreover, Fig. 3 has an axis indicating absolute time, and species distribution modelling was done using LGM climatic data – both cases are explicit about absolute time. This will be picked up by the readers regardless of the authors evading to draw strong conclusions on time. So, I think it would be good if the authors could provide more insight into the effect of the short generation time of 15 years on the results of their analyses.

Minor comments:

- Line 71: "affect a greater effect" is not a pretty phrase. Perhaps 'have' instead of affect?
- Line 87: "It is therefore an ideal framework" – unclear what 'it' is referring to.
- Line 183 and 186: psuedoreference = pseudoreferene
- Line 297: "giving a reliable evolutionary history between major clades". Awkward phrase, what are the authors trying to say here?
- Line 386: post-zygostic = post-zygotic
- Line 397-398: how would 'floral composistions' lead to phylogeographic breaks?
- Line 424: played in important role = played an important role

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