

Comments to the Ph.D. work by Diana Libeth Aparicio Vásquez

The Ph.D. thesis consists of a review of the study topics (19 pages) which is appended with three papers published in IF journals and one submitted paper to *Molecular Ecology*. In two published and one submitted papers applicant is the first author. Three papers handles molecular variability of the model species from the genus *Lupinus* and *Senecio* in the Andean páramo, the fourth one the description of an interesting new species of *Senecio* found during the fieldworks. The thesis appears very compact, is written in a good scientific language, and I see little what can be seriously criticized.

Questions:

- What evolutionary processes you expect to function in the Andes but you have still not detect? Have you discovered something unexpected in this respect?
- Is the spectrum of evolutionary processes different from other alpine mountain systems, like the Alps, Mount Kenya, or other radiating floras, like Cape flora of South Africa?
- What determines that a plant lineage will successfully radiate in Andes? Is there any common pre-adaptation in the radiated Andean groups?
- Are you able to recognize long-distance dispersal from ancestral area fragmentation in your *Lupinus* genetic data? In your paper you use limited dispersal ability of your model species as an argument supporting rare long-distance dispersal events? Wouldn't ancestral area fragmentation provide more biologically meaningful explanation in this case (e.g. explaining high species diversity of *Primula* in the Alps)?
- In all of your molecular papers you tested correlation between genetic and geographical distance (“the isolation by distance”) in the data using Mantel test. Why you depend on Mantel test by testing spatial pattern in your data? It should be noted that the usage of Mantel test for various spatial analyses has been criticized in the recent times and some other alternatives were suggested for analysis of complex spatially dependent data. In particular I remember Mantel test has problems with statistical power and may fail to detect other than \pm linear gradients.
- Has variation in gene expression or adaptive evolution of specific genes been studied in Andean páramo or in other adaptively radiating floras?
- What was the response to the submitted paper (nr. 2) in *Molecular Ecology* and what is the current state of the paper?
- You indicate that speciation rate of Andean *Lupinus* is one of the highest reported for plants. Have you some idea why the *Lupinus* genome is so “speciation-prone” or could this high speciation rate be rather due to low extinction rate (given for example by high availability of free niches)? Could this be somehow tested?
- The ancestral state in Andean *Senecio* in paper nr. 3 is apparently the basal rosette herb while the woody forms found in montane forests represent the derived state. This is a bit counterintuitive for me, given montane forest perhaps represent much older/existing type of habitat than the páramo. From where the rosette *Senecio* species came to Andean páramo?

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