Report on the PhD thesis of Matthias Seidel

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It has been my genuine pleasure to peruse this thesis concerning the systematics and biogeography of Southern Hemisphere Hydrophilidae, which includes a generous helping of related topics. Based on both published papers (in respected journals) and unpublished manuscripts, this thesis work displays an extremely broad range of skills and competence in virtually all avenues of organismal systematics, from collecting and fieldwork aspects, to molecular labwork, to operating a variety of (often very tricky and tedious) analytical programs, to morphological dissection and study, to the creation of beautiful figure plates, to making sound taxonomic decisions, to mastering the historical literature of a group and consequent nomenclatural procedure, all the while bringing in considerations of habitat, risk of extinction, fossils, biogeography and other aspects of evolution and natural history.

What most impresses me about this work is that it is obvious that Mr. Seidel has not just "carved off a piece" in which to narrowly specialize in isolation, as so often happens with systematics students. Connecting what one is studying with multiple other areas of knowledge is a priceless skill and excellent habit of the true scientist, and does not require (as many people imagine) being an expert in all related fields in order to do successfully.

The progression of studies from the broad dating of the entire beetle tree of life and its major lineages, through hydrophilid evolution and classification, down to studies on individual habitat-restricted lineages in the Southern Hemisphere, makes for an impressive, well-integrated, logical flow.

In summary, beyond the topic itself, this thesis excels in two areas: scope and integration, while certainly not overlooking or sacrificing details. The latter is essential for good taxonomic studies, the former aspects are an enormous and refreshing bonus.

To mention a couple of the very few flaws I noticed in this work, the English is rough and occasionally ambiguous in some places (e.g., p. 16, "added few localities…" – is this truly "few" as in "not very many" or "a few" as in "some additional"?). I do understand and sympathize with the difficulties in high-level English writing as a non-native speaker, but I would encourage Mr. Seidel to make it a goal to weed out certain ambiguity-prone words and phrases such as these. There are a few other, more obvious errors, e.g. "conspecific" was used instead of "congeneric" (on p. 21). However, I should point out that all errors I noticed were minor and did not have implications for the overall conclusions of any of the manuscripts.

There are, of course, very many "unpubl." notes indicated, as well as two major chapters presented within that are unpublished manuscripts. These are notably more roughly written than the already-published chapters, and would benefit from a rigorous editing as presumably the published manuscripts were. In any case, I sincerely hope these manuscripts will be published soon.

Students with Mr. Seidel's skills are precisely what our field needs—broad, integrated and careful thinkers. In addition, on a personal note, while I have never directly collaborated on a project with Mr.

Seidel, I have had the pleasure of his company in many situations past, including conferences, courses, and museum visits. In my experience he has been nothing but an enthusiastic and friendly colleage.

I do have a few questions, mostly spurred by pure curiosity, as follows:

- Do your findings contradict other modern, comparable published work on New Zealand or Gondwanan biogeography? If so, why do you think that is? If not, do you think this is conclusive evidence that the historical biogeography of Gondwana has been figured out?
- What, in your view, is the reason you do the sort of scientific work that you do? (I'm looking here for your honest answer about what motivates you, not necessarily for the "politically correct" answer or what you would say for the cameras or headlines)
- Are there any negative trends in the science of systematics that you would like to see changing? What are the positive trends, if any?

I hereby declare that the contents of this thesis are fully in line with the standards that would satisfy degree requirements for a PhD in my country (USA), and hence are adequate for granting such a degree to Mr. Seidel.

Sincerely,

Matthew L. Gimmel