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Examiner's Report on MSc Thesis — Waldhauser

I have now read and reviewed Mr Waldhauser's thesis entitled "Evolutionary history and diversification dynamics of the viperid snakes". The thesis presents an in-depth analysis of the evolutionary history and diversification of the Viperidae. The primary objectives of the thesis were to construct a well-sampled and robust phylogeny of the Viperidae, assess diversification rates across the family, and investigate the correlation between these rates and key evolutionary innovations, as well as various macroecological variables. The candidate successfully achieved these objectives by producing a phylogeny that encompasses 95% of the currently recognized viperid species, including genetic data for several species for the first time. The thesis demonstrates that diversification rates vary across the phylogeny and geographical regions, with the shift from oviparity to viviparity identified as a key predictor of these rates. The exploration of other factors, such as distribution area sizes, inhabited elevation, and body size, yielded very weak or no correlations at all.

The strength of the thesis is the production of a well-supported, well-sampled phylogeny for the Viperidae—I look forward to seeing it in publication. The tests of variation in diversification rate provide clear evidence of rapid diversification in several lineages, primarily in line with what we already understand about the family. Somewhat surprisingly, only the shift from oviparity to viviparity shows any correlation with diversification rate although some of the other analyses (eg, temperature) may offer relative simplifications of the actual factors that might influence rate of diversification and therefore explain why they do not appear to correlate with diversification rate.

My expertise is limited to the natural history, biogeography, macroevolution and macroecology of viperid snakes, so I am not well-placed to assess the molecular methods described in the thesis. That said, the molecular methods appeared to cover all required elements.

The quality of the writing is generally good, though the style is somewhat casual in places and a number of statements should probably have cited relevant work. While this does not detract from the overall clarity or impact of the thesis, it is worth noting that the tone is less formal than typically expected in academic writing. This is not problematic, but future work might benefit from

a more conventional academic style. However, I would like to commend the candidate for producing a well-written thesis in a language that is not their primary language.

Overall, this thesis is a solid piece of work that successfully meets its objectives and contributes meaningfully to the field of herpetology and evolutionary biology. The candidate has demonstrated a strong understanding of the subject matter and has produced a thesis that is both informative and insightful. I commend the candidate for their hard work and dedication, and I am confident that this thesis will be a valuable resource for future research in this area.

Sincerely,

Prof Bryan Maritz