

# Separated cases of static allometry reflect structural changes in the macroevolution of the male genitalia in *Limnebius* beetles

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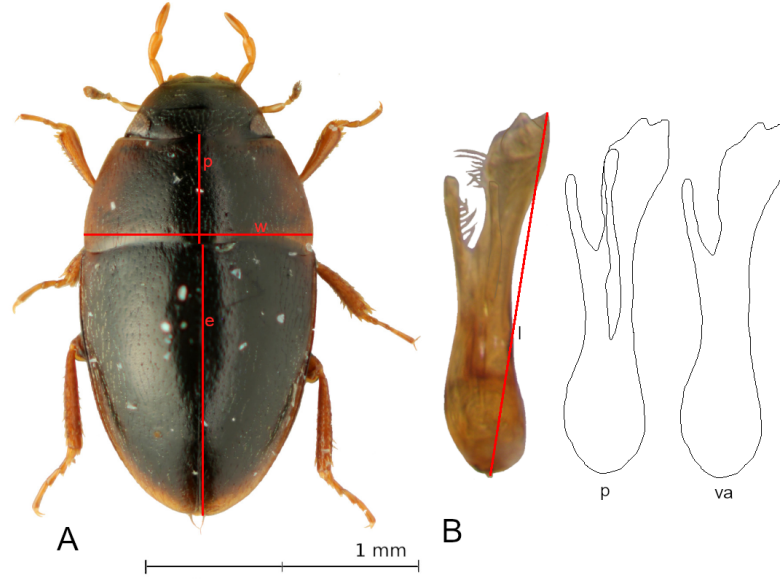
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## Abstract

*Limnebius* water beetles exhibit exceptionally high diversification of male genitalia but a uniform external appearance. We examined a connection between the magnitude of interspecific variability in each subgroup and static allometry between male genitalia and body size. Several lineages with simple genitalia show low diversification of body and male genitalia. High magnitude is caused by diversification among lineages with different complexity compositions of male genitalia and clusters of species with small and large body sizes. In the *Limnebius parvulus* group high intraspecific variability corresponds between the coefficients of static allometry, size of male genitalia, variabilities of female body size, indicating a role of the females in the selection of wide and long male genitalia. The general evolutionary trend of the genera fits with the superposition of all intraspecific allometries. It is usually neutral; negative is associated with local picks of the male genitalia complexity, featuring a trade-off between size and complexity, reflected in the magnitude of the corresponding values, Positive was observed only on the populational level, with negative allometry in the same species in a rapidly evolving species complex in the *L. nitidus* group. The *L. nitidus* subgroup exposes the highest magnitude of the male genitalia complexity and the ventral area, evolving faster than length. Intraspecific heterogeneity is also featured by two specimens with long genitalia in species from the same subgroup, with the simplest male genitalia in its subgenera. The phylogenetic position of both heterogeneous species featuring abrupt changes in male genitalia illustrates macroevolution on a microevolutionary level.

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