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European phylogeography of *Rhyacophila tristis* Pictet (Trichoptera: Rhyacophilidae): preliminary results

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Abstract

We present preliminary results of a phylogeographic analysis of *Rhyacophila tristis*, a wide-spread European caddisfly. Mitochondrial sequence data (the second part of the mtCOI gene) of 52 of specimens were used to investigate large-scale population genetic patterns of Central European populations of the study species. The results show strong genetic differences between a western and an eastern lineage. The deep split most probably indicates that the identified lineages of *R. tristis* survived in independent Pleistocene refugia in the Alps and in the Carpathians, emphasizing the importance of these areas in the Pleistocene survival of aquatic mountain organisms.

Key words: glaciation, genetic divergence, Carpathians, Alps, Trichoptera

Introduction

The last decade revealed many phylogeographic aspects of the European terrestrial species. However, aquatic, and especially mountain aquatic organisms are still under-represented in the surveys. The genetic population structure among populations of European mountain species can be very different compared to more eastern, lowland species (Schmitt 2009). There are differences among mountain aquatic and terrestrial species (Pauls et al. 2006). Aquatic ecosystems, and especially fast flowing streams provide stable environments over long time periods, in contrast to the majority of terrestrial habitats, thus becoming refugia during glaciations (Malicky 1983).

The few existing studies on aquatic mountain species show that populations inhabiting distinct regions may be genetically very different (e.g., Pauls *et al*. 2006, 2009; Lehrian *et al*. 2009). The cryptic genetic diversity usually stands in contrast with the lack of strongly differentiating phenotypic characters. Nonetheless, careful analysis of phenotypic traits may reveal fine differences, enabling the distinction of cryptic entities at the species level (e.g., Bálint et al. 2009). The number of phylogeographic studies analysing widespread aquatic mountain species of Europe is very limited. The published studies focus on several Trichoptera (e.g., Pauls *et al*. 2006, 2009; Lehrian *et al*. 2009) and Ephemeroptera species (e.g., Williams *et al*. 2006). To help fill this gap we studied the wide-spread caddisfly *Rhyacophila tristis* Pictet.

Here we present preliminary results of a larger-scale investigation of *R. tristis* on its entire range of distribution. The present results are based on a limited number of specimens collected in Central

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