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Molecular and morphological analyses confirm two new species of the *Hydraena emarginata–saga* clade (Coleoptera, Hydraenidae) from Spain and France

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Abstract

Using morphological and molecular analyses, the existence of two undescribed species, *H. diazi* from north–eastern Spain and French Pyrenees, and *H. fosterorum* from north–central Spain is confirmed. These species are members of a European endemic complex of hydraenid beetles, the *Hydraena emarginata–saga* clade, belonging to the *"Haenydra"* lineage. The two new species are described and the geographic range of the widespread *H. saga* is revised.

Key words: *Hydraena***,** *"Haenydra"*, new species, Western Europe, mtDNA

Introduction

Hydraena Kugelann, with more than 850 species worldwide, is the most speciose genus within the family Hydraenidae and certainly one of the most speciose genera among aquatic Coleoptera. Within this genus, Jäch *et al.* (2000) recognized some monophyletic derived species groups, and defined them as "lineages". Among them, the *"Haenydra"* lineage (or *H. gracilis* species group) includes ca. 90 species distributed exclusively in the western Palaearctic from Ireland and Portugal to the Urals and Iran (Jäch 2004; Audisio *et al.* 2009).

The monophyly of the *"Haenydra"* lineage is supported, among other characters, by the absence of parameres in the aedeagus (Jäch *et al.* 2000) and by a combination of mitochondrial and nuclear genes (Ribera *et al.* in press). Within the lineage, several species clades can be identified on the basis of external morphology and aedeagal characters. One of these is the *Hydraena emarginata–saga* clade, (Figs 1–11, 13) which includes at least six described sibling species: *H. emarginata* Rey, from northern Spain and the French Pyrenees, *H. hispanica* Ganglbauer, from the Iberian Peninsula, *H. larissae* Jäch and Díaz and *H. tarvisina* Ferro from northern Italy, *H. alpicola* Pretner from the eastern Alps, and finally *H. saga* Orchymont thought to be widely distributed from Spain to the Ukraine. Other species, such as *H. samnitica* Fiori from central Italy, *H. pangaei* Jäch from north–eastern Greece, *H. pelops* Jäch from the Peloponnese, *H. dalmatina* Ganglbauer from the Balkans, and the widely distributed *H. belgica* Orchymont (Belgium to Romania) were thought to be less closely related to the *H. emarginata–saga* clade based solely on morphological data. However, molecular data (see below) suggest closer affinities within this cluster of species, despite their marked morphological diversification.

Hydraena saga was described by Orchymont (1930) from Germany, near Bonn. Preliminary molecular analyses confirmed that the Iberian/Pyrenean populations were in fact not directly related to the eastern populations of *H. saga* (Ribera *et al.* in press). Subsequent morphological examination of material of *Hydraena saga* s.l. from Austria, Bosnia, Czech Republic, France, Hungary, Montenegro, Poland, Romania, Serbia, Slovakia, Spain and Ukraine confirmed these differences and further revealed that the populations from Spain and France in fact represent two new species, which are described below (Figs 1–8). We also include a preliminary molecular phylogeny of the *H. emarginata–saga* clade to better understand the relationships among the studied species.

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