



A new microphthalmic stygobitic *Graptodytes* Seidlitz from Morocco, with a molecular phylogeny of the genus (Coleoptera, Dytiscidae)

IGNACIO RIBERA^{1,2} & ARNAUD FAILLE^{1,3}

¹Institute of Evolutionary Biology (CSIC-UPF), Passeig Marítim de la Barceloneta 37-49, E-08003 Barcelona, Spain.

E-mail: ignacio.ribera@ibe.upf-csic.es

²Museo Nacional de Ciencias Naturales, José Gutiérrez Abascal 2, E-28006 Madrid, Spain.

³Département Systématique et Evolution, Muséum National d'Histoire Naturelle, Bât. Entomologie, 45 rue Buffon, F-75005 Paris, France. E-mail: faille.arnaud@wanadoo.fr

Abstract

We describe *Graptodytes eremitus* **n.sp.** (Coleoptera, Dytiscidae), a depigmented, microphthalmic stygobitic species found in a pool in the deep area of a cave in the High Atlas of Morocco. To establish its phylogenetic position we inferred a molecular phylogeny of the genus *Graptodytes* Seidlitz, using ca. 1.7 Kb of four mitochondrial genes for 18 of the 23 previously known species and subspecies of the genus. *Graptodytes* can be separated in three well supported main lineages, 1) the *G. flavipes* lineage (apex of median lobe narrow in ventral view), 2) the *G. granularis* lineage (apex of median lobe expanded and strongly asymmetrical in ventral view), and 3) the *G. varius* lineage (apex of median lobe expanded but symmetrical in ventral view). The *G. varius* lineage includes the *G. aequalis* and *G. varius* groups, the latter including *G. eremitus* **n.sp.** as sister to *G. delectus* Wollaston (Canary Islands) plus the *G. varius* complex. A molecular clock approach, using a calibration rate of 2.3% divergence/MY for the combined mitochondrial sequence, estimated the origin of the diversification within the genus at ca. 7MY (late Miocene), and the origin of *G. eremitus* **n.sp.** at ca. 2 MY (Pliocene-Pleistocene boundary).

Key words: Coleoptera, Dytiscidae, *Graptodytes*, subterranean medium, new species, diving beetle, molecular phylogeny

Introduction

The genus *Graptodytes* Seidlitz (Coleoptera, Dytiscidae, Hydroporinae) includes 21 known species and two subspecies, with a distribution centred in the Mediterranean basin but including the whole western Palaearctic region, with one species in Uzbekistan (Nilsson 2001, 2003). It belongs to a group of genera including *Metaporus* Guignot, *Stictonectes* Brinck, *Porhydrus* Guignot, *Rhithrodytes* Bameul and the stygobitic *Siئتitia* Abeille de Perrin and *Iberoporus* Castro & Delgado (the “*Graptodytes* group”, Ribera *et al.* 2002, 2008). The morphology of the group is rather homogeneous, and their affinities have long been recognised: they were all included within the genus *Graptodytes* by Seidlitz (1887), with the exception of the subsequently described stygobitic genera. Within the *Graptodytes* group of genera, *Graptodytes* seems sister to *Metaporus* (Ribera *et al.* 2008), with only two known species (Toledo & Hosseinie 2003). These two genera are morphologically very similar, the main difference being the lack in *Metaporus* of a small, longitudinal impressions on each side of the pronotum characteristic of *Graptodytes* and some other genera of the group.

The *Graptodytes* group of genera includes the only known European stygobitic Dytiscidae, the genera *Siئتitia*, with two species in France, and *Iberoporus*, with one species in south Spain (Nilsson 2003). Within *Graptodytes* some species have pale, flattened bodies and are regularly found in interstitial habitats at the edge of rivers or in wells (e.g. *G. fractus* (Sharp), *G. kuchtae* (Breit), *G. aurasius* (Jeannel), see below). In this paper we describe a species known from a single specimen collected in a small pool in the deep area of a cave in Morocco, with morphological characters typical of stygobitic fauna: depigmented, with a wide head,