



## The genus *Haedropleura* (Neogastropoda, Toxoglossa=Conoidea) in the Plio–Quaternary of the Mediterranean basin

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### Abstract

The Plio–Quaternary representatives of *Haedropleura* Monterosato in Bucquoy, Dautzenberg & Dollfus, 1883 are revised. Protoconch and teleoconch characters of 84 fossil and live-collected specimens belonging to the genus, mainly from the Mediterranean basin, were quantitatively assessed. The characters examined allow better delimitation of variability in the genus along with the recognition of eight morphotypes. In particular, four morphotypes were attributed to known species: *H. septangularis* (Montagu), *H. bucciniformis* (Bellardi), *H. contii* (Bellardi) and *H. secalina* (Philippi), whereas two are described as new species: *H. formosa* and *H. parva*. Another two morphotypes represented in our material by few, poorly preserved specimens remain undescribed. We designate three lectotypes (*H. bucciniformis*, *H. secalina* and *H. septangularis*) in order to stabilize usage of the names. The *Haedropleura*  $\alpha$ -diversity in the Plio–Quaternary of the Mediterranean basin is also discussed.

**Key words:** Conoidea, Taxonomy, *Haedropleura*  $\alpha$ -diversity, Pliocene, Pleistocene, Mediterranean basin

### Introduction

The taxonomy of toxoglossans is quite complex and not yet resolved at family and subfamily levels (Puillandre *et al.* 2008). Indeed, toxoglossan representatives are characterized by conspicuous variability in shell features that have conspired to produce many different interpretations of their  $\alpha$ -taxonomy at specific and supraspecific levels. On the other hand, convergence and homoplasy have rendered shell characters a much less reliable tool in conoidean taxonomy than was assumed formerly. Indeed, cryptic taxa (that is, almost morphologically indistinguishable entities) are not a negligible phenomenon among conoideans (Sysoev & Kantor 1990; Tippet 2006; Puillandre *et al.* 2009a).

Hopefully, the large-scale implementation of molecular and morphological studies currently underway will help answer many pending questions (Puillandre *et al.* 2008, 2009a, 2009b). Within Conoidea Fleming, 1822, *Haedropleura* Monterosato in Bucquoy, Dautzenberg & Dollfus (1883) has been traditionally placed in the family Turridae H. & A. Adams, 1853 and subfamily Crassispirinae Morrison, 1966 (Millard 2001; and references therein). However, Puillandre *et al.* (2008), by means of mitochondrial and nuclear genes, revealed several discrepancies (especially at subfamily level), between their phylogeny and traditional classifications (see Taylor *et al.* 1993). In particular, the authors revealed that “Crassispirinae, as commonly conceived, is polyphyletic.” Even though *Haedropleura* is not considered in that study, the position of *Horai clavus* Oyama, 1954 (an allied genus of *Haedropleura*) in a separate clade from the one containing the type genus of Crassispirinae leaves the position of *Haedropleura* at the subfamily level still unresolved.

On a global scale, *Haedropleura* includes more than 20 described species, mostly from Neogene and Quaternary deposits of Northern Europe and the Mediterranean basin (Tucker 2004). However, the genus has also been used for species in other biogeographical provinces (e.g.: *H. ima* and *H. summa*, listed for South Africa by Kilburn 1988; see also Appeltans *et al.* 2010 for other living species). Unfortunately, in many cases the use of supraspecific