The genus *Heteroninella* (Gastropoda, Turbinidae) from the Lower Pliocene of Estepona, southern Spain

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A species of the turbinid genus *Heteroninella* Magne, 1941 is described from the Velerin Conglomerates (Zanclean, Pliocene) near Estepona (southern Spain); this constitutes the first record of this genus from the Neogene of Europe. Originally, *Heteroninella bertarellii* (Andreoli & Marsigli, 1997) was placed in the trochid genus *Gibbula* Risso, 1826.

**KEY WORDS:** Pliocene, Spain, Gastropoda, Turbinidae, *Heteroninella*.

**Introduction**

The Lower Pliocene (Zanclean) deposits exposed at Velerin are beginning to yield a wealth of interesting and new, endemic species. Although some have been described recently (Muñiz Solís, 1995; Landau & Marquet, 1999, 2000), none are more unusual than the species discussed in the present paper. Originally, we considered this to be a new species; however, it has since turned out that it is undoubtedly the same shell as that described by Andreoli & Marsigli (1997), from the vicinity of Serre di Rapolano (Siena, Italy), under the name of *Gibbula bertarellii*. Andreoli & Marsigli’s description was based on a juvenile shell and an incomplete adult specimen. The species is obviously extremely rare in Italy, and for this reason we consider it useful to offer a new description here of the complete adult shell.

The Málaga Basin is located in the western sector of the Internal Zones of the Betic Cordillera. The sea gateway, which extended from the Mediterranean to the Atlantic during the Late Miocene (Tortonian) had shrank to a small basin in the Pliocene, extending from the present Málaga-Torremolinos area inland in an E-W direction for about 30 km. The Pliocene series consists of conglomerates and sands, which give way laterally to bluish grey marls and clays, topped by yellowish-white sands (Sanz de Galdeano & Lopez Garrido, 1991). Although these deposits comprise a variety of facies, ranging from coarse sands, representing nearshore or beach deposits, to fine clayey sands deposited at relatively greater depths, the gastropod species discussed herein is found only in a coarse conglomerate (the Velerin Conglomerates). This conglomerate, which must have been deposited relatively rapidly or in storm conditions, contains the richest fauna; a curious admixture of large and small, both waterworn and perfectly preserved, shells in between boulders and lumps of mudstone of varying sizes.

**Systematic palaeontology**

*Abbreviations* — Below, the following abbreviations are used:

- AA  apical angle;
- H   height;
- MNHN Muséum national d’Histoire naturelle, Paris;
- W   width.

Superfamily Trochoidea Rafinesque, 1815  
Family Turbinidae Rafinesque, 1815  
Subfamily Turbininae Rafinesque, 1815  
Genus *Heteroninella* Magne, 1941  

*Type species* — *Turbo parkinsoni* de Basterot, 1825, by original designation.

*Heteroninella bertarellii* (Andreoli & Marsigli, 1997)  
Figures 1a-d, 2/1-3  


*Material* — Three specimens (MNHN-PL 15297A, PL 15297B, PL 15297C, leg. B. Landau); six, three subadult
and four incomplete specimens (B. Landau Collin, Albufeira); one complete, repaired adult specimen (R. Marquet Collin, Antwerp); and a single complete, adult specimen (Vera-Peláez Collin, Málaga). All material is from the Velerín Conglomerates, near Velerín (Estepona, southern Spain).

**Diagnosis** — Large species of *Heteroninella*, with very strong elevated spiral sculpture, separated by deeply excavated interspaces and with a wide, deep umbilicus.

**Description** — Shell large, trochiform, with convex whorls. Protoconch and early teleoconch whorls eroded in all specimens available. Five teleoconch whorls preserved in fully-adult specimens, convex, with the periphery just above the suture. Suture deeply impressed and narrowly canaliculate. Ornament on spire whorls consisting of three strong, raised, regularly spaced spiral cords, with a fourth appearing just above the abaxial suture on the penultimate whorl.

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**Figure 1.** *Heteroninella bertarelli* (Andreoli & Marsigli, 1997), MNHN PL 15297A in various aspects; original height = 56.3 mm; Velerín Conglomerates (Lower Pliocene, Zanclean), Velerín (Estepona, Spain).
The cords are convex but flattened, separated by deeply excavated interspaces, approximately half the width of the cords on early teleoconch whorls. In some specimens the cords remain broader throughout, while in others the interspaces increase in width abaxially to be equal to or wider than the cords on the body whorl. There is a tendency for the cord placed at the periphery to be slightly stronger. Axial ornament absent, except for weak, close-set prosocline growth lines, which cover the whole surface. Base flattened to slightly convex, bearing eight flattened, close-set spiral cords, the peripheral cord being broadest, the remaining cords subequal in strength and width. Strong axial folds are visible on the last half whorl, corresponding to the position of earlier apertures. The umbilicus is wide, about half the diameter of the base and very deep, almost extending to the apex. The slope of the umbilicus is shallow up to a broad, indistinct cord arising from the mid-columellar margin, beyond which the umbilicus dips steeply. The spiral ornament does not extend into the umbilicus. The aperture is tangential, large and subquadrate. The outer lip is regularly arched, with a shallow notch at the junction with the columella, coinciding with the outer border of the umbilicus. Columella somewhat thickened, especially at the mid-portion, erect and slightly reflected over the umbilicus. Basal callus thin and restricted.

**Measurements** (in mm) —

<table>
<thead>
<tr>
<th>Specimen</th>
<th>H</th>
<th>W</th>
<th>AA</th>
<th>remarks</th>
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</thead>
<tbody>
<tr>
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<td>56.3</td>
<td>58.2</td>
<td>70°</td>
<td>adult</td>
</tr>
<tr>
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<td>61.5</td>
<td>90°</td>
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<tr>
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<td>48.5</td>
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<td>58.6</td>
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</tr>
<tr>
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<td>56.8</td>
<td>88°</td>
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<tr>
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<td>56</td>
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<td>Landau Coll., no. 4</td>
<td>c. 58</td>
<td>56.3</td>
<td>65°</td>
<td>incomplete adult</td>
</tr>
<tr>
<td>Landau Coll., no. 5</td>
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<td>49.8</td>
<td>80°</td>
<td>subadult</td>
</tr>
</tbody>
</table>

**Remarks** — From an ecological point of view, the larger turbinel gastropods may be separated into two groups (Beesley et al., 1998), namely:

1. the genus *Bolma* Risso, 1826 and its allies, which are predominantly offshore;
2. the group of *Turbo* Linné, 1758 and *Astraulum* Link, 1807, which are predominantly intertidal to shallow tidal.

The earliest European species of *Bolma* are from the Upper Oligocene (North Sea and Aquitaine basins). Outside Europe, *Bolma* has been recorded from the Upper Eocene of Australia (Beu & Ponder, 1979; Darragh & Kendrick, 2000). At present, the genus is represented in the Mediterranean Sea by *Bolma rugosa* (Linné, 1767). Vera-Peláez et al. (1996) listed four species of *Bolma*.

Although the oldest undisputed species of *Turbo* in Europe is *T. munieri* Vaassee, 1882 (Middle Eocene, France), the major turbinid radiation occurred during the Early Oligocene. For instance, six species of *Turbo*, inclusive of *Heteronolinella parkinsonii*, are on record from the Lower Oligocene of the Aquitaine Basin (Magne & Vergneau-Saubade, 1971) and three from the Upper Oligocene. Only one species has been described from the Lower Miocene of Europe, *Turbo nevillei* Cossmann & Peyrot, 1917 (Aquitaine Basin, France). The genus *Astralium* comprises only *A. aquitanicum* Benoist, 1874, which ranges from the Upper Oligocene to the Lower Miocene (Lozouet et al., 2001).

Subsequent to the Early Miocene, the *Turbo/Astralium* group appeared to be no longer represented in the European fossil record. It is clear that this group must have suffered species extinctions at the Oligocene/Miocene boundary. In this respect, the occurrence of a species of *Heteronolinella* in the Lower Pliocene of the Mediterranean area is particularly astonishing. As indicated by Lozouet (1992), the newly collected material from Málaga is both complementing our views of the Mediterranean Pliocene fauna and aptly demonstrating the necessity for detailed studies of strata occurring beyond the classic Italian deposits.

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References


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