

## A new species of microforaminifera (*Gavelinopsis caledonia*) from the continental shelf, west of Scotland

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**ABSTRACT** – *Gavelinopsis caledonia* sp. nov. is a distinctive, tiny (<160 µm in greatest diameter) foraminifer which has the compressed trochospiral, low planoconvex shape commonly associated with an attached or clinging mode of life. It is described from modern sediments on the continental shelf to the west of Scotland. Previously, it had been recorded from Recent sediments off Ireland and in the North Sea, and from the Quaternary of Northern Ireland, but under the name of the Cretaceous taxon, *Rotalina* (or *Discorbina*) *polyrraphes* of Reuss. *J. Micropalaeontol.* 20(2): 179–182, December 2001.

### INTRODUCTION

During an ecological survey of the benthic foraminifera from the Muck and Stanton Deep, depressions on the continental shelf to the west of Scotland, our new species was regularly encountered in small numbers in the modern sediments (Fig. 1). Previous studies of the Scottish shelf include those of Williamson (1858, various localities), Brady (1865, Shetland), Heron-Allen & Earland (1916, Scottish coastal areas), Edwards (1982, North Minch Channel), Murray (1985, shelf west of the Outer Hebrides to Fair Isle Channel) and Hannah & Rogerson (1997, Clyde Sea). Of these, only Heron-Allen & Earland (1916) reported the new species which they incorrectly identified as *Discorbina polyrraphes* (Reuss, 1845), a little-known Cretaceous taxon. The purpose of this note is formally to describe and name the new species. The type and figured specimens (together with

other, unfigured specimens) are deposited in the Department of Palaeontology, The Natural History Museum, London, registration nos. ZF 5134 – ZF 5150.

### SYSTEMATIC DESCRIPTION

Suborder **Rotaliina** Delage & Hérouard, 1896

Family **Rosalinidae** Reiss, 1963

Genus *Gavelinopsis* Hofker, 1951

**Type species.** *Discorbina praegeri* Heron-Allen & Earland, 1913; by original designation.

*Gavelinopsis caledonia* sp. nov.  
(Plates 1, 2)

1910 *Rotalina polyrraphes* Reuss; Wright: 4, pl. 1, figs 3a–c [non Reuss, 1845].

1913 *Discorbina polyrraphes* (Reuss); Heron-Allen & Earland: 128, pl. 12, figs 10–13.

**Derivation of name.** Of *Caledonia*, the Roman name for Scotland. *Gavelinopsis* is feminine (see Macfadyen & Kenny, 1934).

**Diagnosis.** A minute species of *Gavelinopsis*, <160 µm in diameter; test almost circular in outline, trochospirally coiled in a very compressed cone, with around 8–9 chambers per whorl; conspicuous pores (c. 2–3 µm across) on the umbilical side; with an extraumbilical aperture and remnant umbilical flaps on the penultimate few chambers.

**Type specimens.** BMNH no. ZF 5134 (holotype). BMNH no. ZF 5135–ZF 5141 (figured paratypes), ZF 5142–ZF 5150 (unfigured paratypes). Deposited in the Micropalaeontological Collections, Department of Palaeontology, The Natural History Museum, London.

**Material.** More than 50 specimens.

**Type locality.** Muck Deep, on the continental shelf, west of Scotland. Holotype, ZF 5134, from sample MD6a, 0.0–0.5 cm,

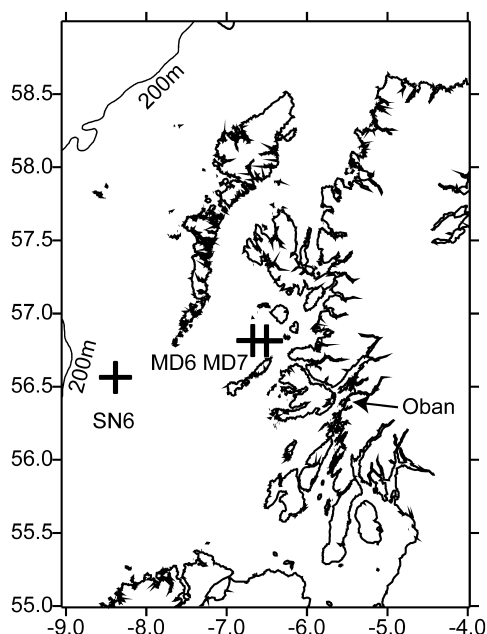
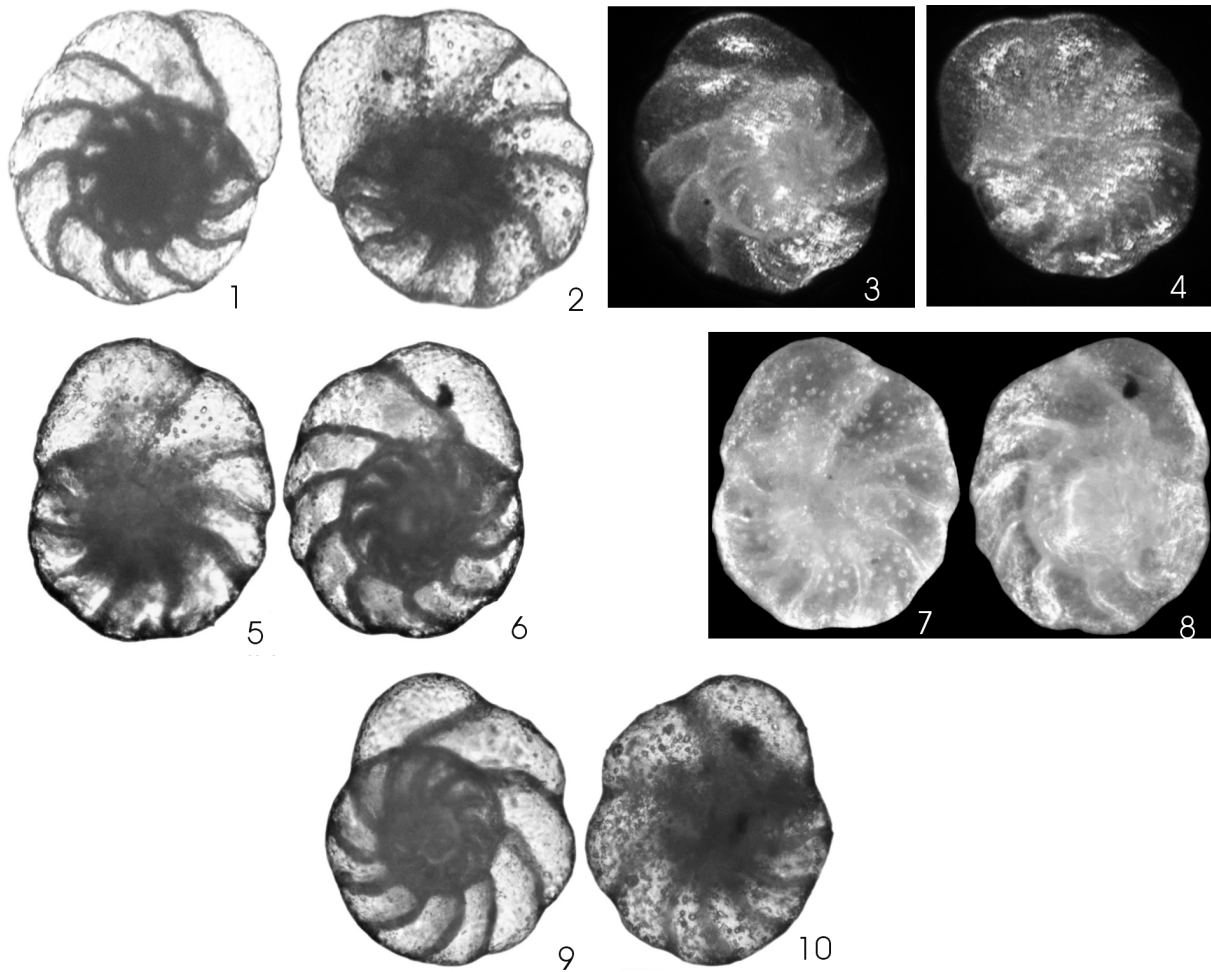


Fig. 1. Map of the shelf off Scotland to show the position of the cores sampled. SN6 is in Stanton Deep; MD6 and 7 are from Muck Deep.



Explanation of Plate 1.

**Figs 1–10.** *Gavelinopsis caledonia* sp. nov. **1–8**, holotype, ZF 5134, greatest diameter 130  $\mu\text{m}$ : **1**, spiral side, transmitted light; **2**, umbilical side, transmitted light; **3**, spiral side, reflected light; **4**, umbilical side, reflected light; **5**, umbilical view, transmitted light; **6**, spiral view, transmitted light; **7**, umbilical view, combined transmitted and reflected light; **8**, spiral view, combined transmitted and reflected light. All approx.  $\times 280$ – $310$ . **9, 10**, paratype, ZF 5135, greatest diameter 155  $\mu\text{m}$ : **9**, spiral view, transmitted light; **10**, umbilical view, transmitted light. Both  $\times 245$ . Figs 1–4, *AutoMontage* micrographs, taken at the University of Southampton; Figs 5–10, *PalaeoVision* micrographs, taken at The Natural History Museum, London.

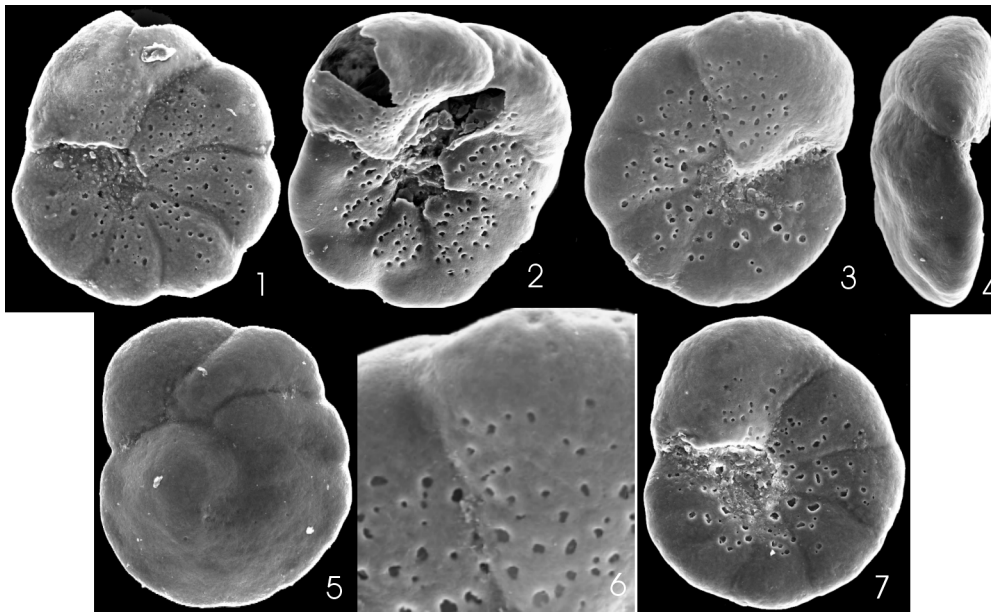
paratypes ZF 5135, ZF 5144–ZF 5150, from sample MD6a, 0.5–1.0 cm, both at latitude  $56^{\circ} 48.9'N$ , longitude  $06^{\circ} 40.5'W$ , 167–172 m water depth; paratype ZF 5139, from sample MD7a, 1.0–2.0 cm, paratypes ZF 5136–ZF 5138, ZF 5140–ZF 5143 from sample MD7b, 15–16 cm, both at latitude  $56^{\circ} 48.8'N$ , longitude  $06^{\circ} 30.2'W$ , 209–236 m water depth.

**Description.** Test planoconvex, spiral side gently convex, umbilical side planar; periphery acute; with 9 chambers in the outer whorl. Sutures on spiral side arcuate and swept back, flush except for final few which are slightly depressed; those on umbilical side slightly curved to straight, radial, slightly depressed. Aperture a slit at base of final chamber, extending from near the umbilicus to near the periphery; remnant umbilical flaps around the umbilicus. Wall calcareous, hyaline; pores either extremely tiny or not present on the spiral side, around 2–3  $\mu\text{m}$  in diameter on umbilical side but absent from near the periphery.

**Dimensions.** *Holotype* (ZF 5134): Greatest diameter 130  $\mu\text{m}$ , thickness 50  $\mu\text{m}$ . *Paratypes*: the dimensions of the figured paratypes (ZF 5135–ZF 5141) are given in Table 1.

**Variation.** Tests colourless to slightly brownish.

**Distribution.** The first record of *Gavelinopsis caledonia* sp. nov. was (as *Rotalina polyrraphes* Reuss) from Quaternary clays in Northern Ireland but it was also said to be present in modern sediments from the intertidal zone to 55 m water depth off Ireland (Wright, 1910). Subsequently, Heron-Allen & Earland (1913) recorded it as *Discorbina polyrraphes* in their Clare Island Survey (of western Ireland). They also noted that it was present around the Scottish coast and in the North Sea, and that one individual had been found attached to a molluscan shell fragment. In their 1916 paper on the Scottish shelf, Heron-Allen & Earland noted that it was present especially at their station 4 (Loch Sunart, 22 m) and station 18 (off Eigg,



Explanation of Plate 2.

**Figs 1–7.** *Gavelinopsis caledonia* sp. nov. Scanning electron micrographs: **1**, paratype ZF 5136, umbilical view, greatest diameter 155  $\mu\text{m}$ ,  $\times 270$ ; **2**, paratype ZF 5137, oblique-umbilical view, greatest diameter 130  $\mu\text{m}$ ,  $\times 345$ ; **3**, paratype ZF 5138, umbilical view, greatest diameter 130  $\mu\text{m}$ ,  $\times 325$ ; **4**, paratype ZF 5139, edge view, greatest diameter 130  $\mu\text{m}$ ,  $\times 320$ ; **5**, paratype ZF 5140, spiral view, greatest diameter 120  $\mu\text{m}$ ,  $\times 345$ ; **6**, paratype ZF 5138, detail of pores on umbilical side, approx.  $\times 725$ ; **7**, paratype ZF 5141, umbilical view, greatest diameter 120  $\mu\text{m}$ ,  $\times 345$ .

55 m). These specimens have been examined and checked in the collections of The Natural History Museum, London.

In the present study, this species has been found only as dead (unstained) tests but this is not surprising if the mode of life is attached to shell fragments. It occurs on the continental shelf west of Scotland: at two stations in Muck Deep at 167–172 m and 209–236 m and one station in Stanton Deep at 167 m.

**Remarks.** In spite of its very small size, this species has previously been recognized by workers in Britain who referred it to *Rotalina polyrraphes* Reuss, 1845 (originally described from the late Cretaceous of Bohemia). *Gavelinopsis caledonia* sp. nov. differs from Reuss’s drawing of *Rotalina polyrraphes* in having only 8–9 rather than 14–15 chambers per whorl and being considerably smaller, but no details of the aperture were given in the description of the latter species. Dr Fred Rögl has kindly searched the Reuss Collection at the Naturhistorisches Museum in Vienna and has sent us specimens from Acquisition 39/1891, Collection no. 23 which purports to be from the type locality (Lüschitz, Bohemia). They are, however, of *Gavellinella*

*lorneiana* (d’Orbigny, 1840) or *Gavellinella pertusa* (Marsson, 1878) – two well-known late Cretaceous species – and, even allowing for artistic licence, look little like Reuss’s figured specimen. The *Ellis & Messina Catalogue of Foraminifera* states that the figured specimen was (is) deposited in the Fürstlich Lobkowitz’sches Mineralien Kabinet, Bilin, Bohemia, so it may still be there, or it is lost. For the moment, the true identity of *Rotalina polyrraphes* remains somewhat of an enigma and even more surprisingly, its name does not seem to appear at all in the modern literature on the Bohemian Cretaceous. Nevertheless, whatever the situation, it is clear that our Recent taxon is not only specifically but also generically distinct from that of Reuss (1845).

The illustrations given by Heron-Allen & Earland (1913, pl. 12, figs 10–13) show wall pores on the spiral side. We have checked their specimens in The Natural History Museum, London, and pores are not evident on the spiral side; in this, as in other respects, they resemble our types.

Concerning the supergeneric position of *Gavelinopsis*, we follow Hansen & Revets (1992), who formally designated a lectotype for *G. praegeri* (Heron-Allen & Earland), the type species. In their detailed examination of the aperture they concluded that *Gavelinopsis* should be maintained, together with *Rosalina*, within the Rosalinidae.

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Paratype	Plate/figure	Greatest diameter ( $\mu\text{m}$ )	Thickness ( $\mu\text{m}$ )
ZF 5135	Pl. 1/figs 9, 10	155	55
ZF 5136	Pl. 2/fig. 1	155	55
ZF 5137	Pl. 2/fig. 2	130	50
ZF 5138	Pl. 2/figs 3, 6	130	45
ZF 5139	Pl. 2/fig. 4	130	55
ZF 5140	Pl. 2/figs 5	120	45
ZF 5141	Pl. 2/fig. 7	120	45

**Table 1.** Dimensions of the figured paratypes.

(Network Stratigraphic, Potters Bar, Hertfordshire, UK) gave us his opinion on its identification. Clive Jones (The Natural History Museum, London) took the *PalaeoVision* micrographs for Plate 1, figs 5–10.

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