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# ***Globigerinoides kennetti*, a new Late Miocene to earliest Pliocene planktonic foraminifer from the Atlantic and Pacific Oceans**

## **ABSTRACT**

*Globigerinoides kennetti*, n. sp., is described from upper Miocene to lower Pliocene sediments of the Atlantic and Pacific Oceans.

## **INTRODUCTION**

Independently conducted investigations in the Atlantic Basin (Poore, 1979) and the Pacific Basin (Keller, in press; Poore, in press) reveal a new, distinctive planktonic foraminifer in upper Miocene to lowermost Pliocene sediments. The wide geographic distribution and limited stratigraphic range of this foraminifer warrant its description as a new species; in addition, its common occurrence in subtropical regions and dissolution resistance make this new species a valuable stratigraphic marker.

## **TAXONOMY**

***Globigerinoides kennetti* Keller and Poore, n. sp.**

Plate 1, figures, 1–10

*Globigerinoides* cf. *G. ruber* (d'Orbigny).—POORE, 1979, p. 470, pl. 11, figs. 1–6.

**Description:** Test free, globular to subglobular, average size for the genus with 2 or 3 whorls of 3 to  $3\frac{1}{2}$  spherical to subspherical chambers per whorl. Sutures are distinct and incised. Typical specimens are low-spined and have 3 chambers in the ultimate whorl. The umbilical, small, circular primary aperture of the ultimate chamber is centered over the suture between the penultimate and antepenultimate chambers (pl. 1, figs. 1, 7). The primary aperture of specimens with  $3\frac{1}{2}$  chambers in the final whorl, and of some specimens with 3 chambers in the final whorl, is asymmetrically placed over the suture between the penultimate and antepenultimate chambers (pl. 1, fig. 10). Moderately high-spined individuals are occasionally encountered (pl. 1, figs. 4–6). Supplementary apertures are commonly, but not always, present at suture junctions on the spiral side of the ultimate and, less frequently, penultimate chambers of the final whorl. Specimens are usually heavily encrusted, so that it is often difficult to tell whether or not supplementary apertures are present. Encrustation similarly masks details of test surface structure, but spine bases, and thus evidence for a spinose test, are seen on some specimens (pl. 1, fig. 9).

**Holotype:** Specimen figured by Poore (1979, pl. 11, figs. 1, 2) from the core-catcher sample of Core 27, Deep Sea Drilling Project, Hole 410, in the North Atlantic Ocean (USNM 249219). Sample 410–27cc is assigned to the upper Miocene, foraminiferal zone N17, and *Discoaster neorectus* nannofossil Subzone.

**Paratypes:** Specimens figured by Poore (1979, pl. 11, figs. 3–6) from DSDP 410–27cc (USNM 249221, 249222) and from DSDP 410–29cc (USNM 249220). The holotype and paratypes are deposited in the Cushman collection of the United States National Museum, Washington, D. C.

*Globigerinoides kennetti* is named for Dr. James P. Kennett, University of Rhode Island.

**Comments:** *Globigerinoides kennetti* differs from *Globigerinoides bollii* Blow in typically possessing 3 to 3½ instead of 4 chambers in the last whorl, less embracing chambers, and a more subquadrate outline. *Globigerinoides kennetti* is distinguished from *Globigerinoides ruber* (d'Orbigny) by a more heavily encrusted test, more embracing chambers, and variable supplementary apertures which, if present, are very small compared to the large supplementary apertures commonly found in *G. ruber*. A heavily encrusted test and a constricted primary aperture distinguish *G. kennetti* from *Globigerinoides subquadratus* Brönnimann. In addition, these 2 species do not have overlapping ranges. *Globigerinoides kennetti* appears to have evolved from the *Globigerina woodi* group, and specimens judged intermediate between *G. woodi* Jenkins and *Globigerinoides kennetti* are occasionally encountered (pl. 1, figs. 11–12). Typical *G. kennetti* is easily distinguished from *Globigerina woodi* by having 3 chambers in the last whorl, a subquadrate outline, commonly developed supplementary apertures, and usually a more prominently encrusted test.

#### STRATIGRAPHIC DISTRIBUTION

In the North Atlantic and Pacific DSDP sites studied (Holes 410, 470A, 310, 292, 296, 319), *Globigerinoides kennetti* is restricted to the upper Miocene, ranging from the *Discoaster bellus* Subzone of the *Discoaster neohamatus* nannofossil Zone to the *Discoaster berggrenii* Subzone of *D. quinqueramus* Zone (of Bukry, 1975) (table 1). Within these sites the first appearance of *G. kennetti* falls within the upper *D. neorectus* Subzone of the *D. neohamatus* Zone, with the exception of southeast Pacific DSDP Hole 319

and Northeast Pacific Hole 470A, where *G. kennetti* is restricted to the (lower) *D. bellus* Subzone of the *D. neohamatus* Zone. A somewhat longer range is indicated in the South Atlantic cores CH 115–64 and CH 115–86 (Rio Grande Rise), where *G. kennetti* has been observed (RZP) to range from the *D. neohamatus* nannofossil Zone (*D. bellus* Subzone) to the basal Pliocene *Amaurolithus tricorniculatus* Zone (*Ceratolithus acutus* Subzone) (table 1).

Recognition of Blow's (1969) planktonic foraminiferal zonation is difficult in some of the North Pacific DSDP sites studied because of the rarity or sporadic occurrence of *Globorotalia plesiotumida* Banner and Blow, whose first evolutionary occurrence marks the base of zone N17. In North Atlantic Site 410, where *G. plesiotumida* is well represented, *Globigerinoides kennetti* (recorded as *G. cf. G. ruber* by Poore, 1979) is restricted to the lower part of N17. In South Atlantic cores (CH 115–64, CH 115–86), *G. kennetti* ranges from N17 to N18 (table 1). In the Pacific sites examined *Globorotalia plesiotumida* is useful as zonal indicator in only 2 sites (Sites 310 and 319); in Southeast Pacific Site 319 the first appearance of *G. plesiotumida* coincides with the last appearance of *Globigerinoides kennetti*, and in North Pacific Site 310 *Globorotalia plesiotumida* first appears slightly above (90 cm) the last appearance of *Globigerinoides kennetti* (Keller, in press). Based on these data, the range of *G. kennetti* in the Pacific has been interpreted to be mostly in the upper part of zone N16 (table 1). However, in North Pacific Sites 310, 292 and 296, the first and last appearances of *G. kennetti* coincide with intervals of increased dissolution and are often associated with short hiatuses (Keller, in press). Thus, *G. kennetti* may extend into N17-equivalent sediments of the Pacific Basin.

#### PLATE 1

Scale bar is 5 µm for figure 9 and 25 µm for all other figures

##### 1–10 *Globigerinoides kennetti* Keller and Poore, n. sp.

1–3, specimens from DSDP Site 310, Core 8, Section 6, 90–92cm. 1, umbilical view of specimen; 2, side view; note low spire; 3, spiral view showing supplementary aperture. 4–6, specimen from DSDP Site 310, Core 8, Section 6, 90–92cm. 4, umbilical view; 5, oblique side view; note high spire; 6, spiral view. 7–9, specimen from DSDP Site 296, Core 22, Section 5, 120–122cm. 7, umbilical view; 8, spiral view; 9, detail of ultimate chamber; note evidence of spine bases on ridges between pores. 10, umbilical view of specimen with slightly asymmetrical aperture, DSDP Site 296, Core 22, Section 5, 120–122cm.

##### 11–12 *Globigerina woodi* Jenkins

Transitional specimen between *Globigerina woodi* Jenkins and *Globigerinoides kennetti*, n. sp., DSDP Site 310, Core 8, Section 6, 10–12cm. 11, umbilical view; 12, spiral view.

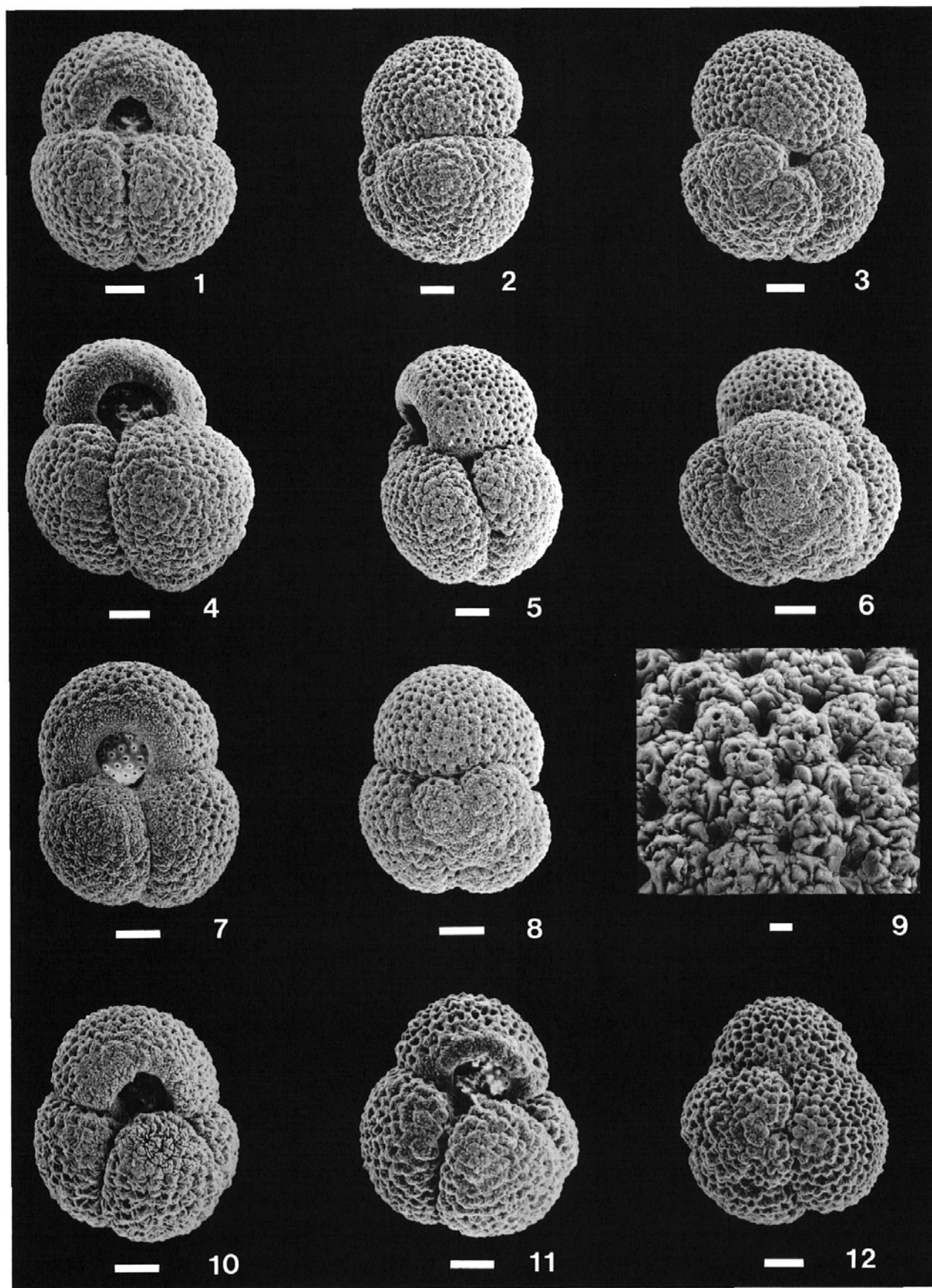


TABLE 1

Location	Occurrence of <i>Globigerinoides</i> <i>kennetti</i> Depth in meters below sea level	Planktonic foraminiferal zones	Nannofossil subzones	Abundance of <i>Globigerinoides</i> <i>kennetti</i>
DSDP Site 292 NW Pacific	75.0–77.5 m	N16–?N17 Keller, in press	<i>D. neorectus</i> (?)– <i>D. berggrenii</i> Ellis, 1975	≤ 5%
DSDP Site 296 NW Pacific	204–213.5 m	N16–?N17 Keller, in press	<i>D. neorectus</i> – <i>D. berggrenii</i> Ellis, 1975	13–25%
DSDP Site 310 Central Pacific	69.5–71.5 m	N16–?N17 Keller, in press	<i>D. berggrenii</i> Bukry, 1975	15–60%
DSDP Site 319 SE Pacific	27.2–28.5 m	N16–?N17 Keller, in press	<i>D. bellus</i> Bukry, 1976	≤ 5%
DSDP Site 470A NE Pacific	86.8 m	N16 or N17 (RZP)	<i>D. bellus</i> Bukry, pers. communication	—
DSDP Site 410 N. Atlantic	249.5–270.5 m	N17 Poore, 1979	<i>D. neorectus</i> Bukry, 1979	≤ 5%
CH 115–64 S. Atlantic	1.61–7.61 m	N17–N18 (RZP)	<i>D. bellus</i> – <i>T. rugosus</i> Haq & Berggren, 1978	≤ 5%
CH 115–86 S. Atlantic	4.42–6.82 m	N17–N18 (RZP)	<i>D. neorectus</i> (?)– <i>C. acutus</i> Haq & Berggren, 1978	≤ 5%

## GEOGRAPHIC DISTRIBUTION

*Globigerinoides kennetti* has been observed in deep-sea cores of the Atlantic and Pacific Oceans, where it occurs most abundantly in North Pacific subtropical faunal assemblages (20–60% in DSDP Sites 310 and 296) and in fewer numbers in tropical faunas of the Pacific (less than 5% in DSDP Sites 292 and 319) and subtropical faunas of the Atlantic Ocean (table 1). Planktonic foraminifers are too sparse in upper Miocene sediments of Hole 470A to allow reliable abundance estimates. *Globigerinoides kennetti* has not been observed in the tropical faunas of the equatorial Pacific Sites 77B and 158, or in the cool temperate faunas of Site 173. In the North Pacific Sites 310 and 296, where *G. kennetti* is most abundant, it dominates the faunas with *Globorotalia conoidea* Walters, suggesting that these 2 species favor similar environments.

In summary, *Globigerinoides kennetti* is a distinctive planktonic foraminifer with a wide geographic distribution and a limited stratigraphic range. The typically developed calcite crust of *Globigerinoides kennetti* makes this taxon resistant to dissolution, and thus *G. kennetti* may prove to be an especially valuable stratigraphic marker in sediments that have undergone moderate dissolution.

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