

A DISTINCTIVE NEW SPECIES OF *NOTOROTALIA* (*FORAMINIFERIDA*) FROM THE BASAL MIOCENE OF NEW ZEALAND

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ABSTRACT—A highly distinctive new species, *Notorotalia waitakiensis*, is described from the Waitakian Stage in the South Island, New Zealand. Its absence from beds of the same age at well known localities further eastwards in the Waitaki Valley is probably due to a preference for an inner shelf environment.

Key words: *Notorotalia*, Otekaike Limestone, Waitaki Valley, North Otago, Oligocene, Miocene.

INTRODUCTION

The genus *Notorotalia* was proposed by Finlay (1939) for a group of benthic foraminifera that is one of the most characteristic faunal elements of the New Zealand Cenozoic and Recent. The genus is also widely distributed in the South Pacific and a number of species have been recorded from the Cenozoic and Recent of Australia and from the Recent of both the Pacific and Atlantic coasts of southern South America (Hornibrook, 1961).

Finlay astutely observed that *Notorotalia* is distinct from both the rather similar Japanese genera *Faujasina* and *Polystomellina* which appear to be more closely related to *Elphidium*.

Hornibrook (1961), in a revision of *Notorotalia*, divided the group included by Finlay in this genus into three separate genera, *Notorotalia*, *Cribrorotalia* and *Discorotalia*, within a new subfamily Notorotaliinae.

Hofker (1969) confirmed the validity of this classification and suggested that *Notorotalia* was derived from

Elphidiella rather than from an early *Rotalia*-like form as suggested by Hornibrook.

Notorotalia uttleyi Hornibrook, the earliest known species of this genus (mid-Eocene to Lower Oligocene), is characterised by a highly irregular surface rib pattern. A marked trend towards a more regular pattern of intersutural ribs is evident during the Oligocene as *N. uttleyi* (basal Whaingaroan) is replaced sequentially by *N. stachei* Finlay (Whaingaroan) and *N. spinosa* (Chapman) (Duntroonian).

Notorotalia spinosa (Pl. 1, figs. F, G), with a fairly regular pattern of intersutural ribs, ranges from the Duntroonian Stage (Upper Oligocene) (Table 1) to the Altonian Stage (Lower Miocene) being abundant in the Kokoamu Greensand and Otekaike Limestone in North Otago. This was a time of submergence of a wide area of the eastern part of the South Island when the sea transgressed westwards. The westerly occurrence of the distinctive new species described here, in an inner shelf glauconitic sandy facies overlying the Otekaike Limestone and not present in the lower Waitaki Valley, may explain its absence there.

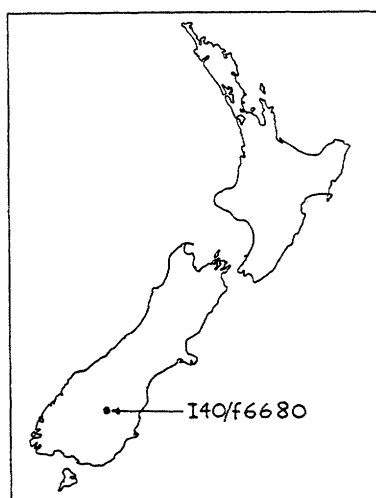


Fig. 1. Type locality of *Notorotalia waitakiensis* (N.Z. Fossil Record No. 140/f6680) in South Island, New Zealand.

Table 1. New Zealand Stages and North Otago formations.

Epoch	NZ Stages	Formations
Lower Miocene	Altonian	
	Otaian	
Oligocene	Waitakian	Otekaike Limestone
	Duntroonian	Kokoamu Greensand
	Whaingaroan	

SYSTEMATIC DESCRIPTION

Genus *Notorotalia*, Finlay, 1939

Type species.—*Notorotalia zelandica* Finlay (Pliocene to Recent)

Diagnosis.—Trochospiral, biconvex, moderately and variably depressed; evolute dorsally, typically lacking a distinct umbonal ventral plug; umbilical region typically

occupied by the overlapping plate-like extensions of inner chamber margins. An internal canal system opens externally through sutural pores; one or two rows of pores in the terminal face substitute for the aperture. Test typically ornamented with distinct, slightly irregular, narrow ribs connecting narrow raised sutures; peripheral spines often present (Hornibrook, 1961, 1989).

Notorotalia waitakiensis Hornibrook, n. sp.

Figs. 3-A-E; figs. 2-1-6

Description.—Test relatively large, strongly compressed and flattened, adults composed of 3 whorls with 15 or more chambers in the final whorl. The periphery bears irregular, stout, blunt spines. Dorsal surface fairly smooth with a distinctive pattern of weak intersutural ribs; densely and coarsely porous with distinct rows of sutural pores visible at high magnification. Ventral surface smoother with weak intersutural ribs and rows of pores aligned along the sutures. Umbilical area indistinctly papillate.

Type locality and age.—N.Z. fossil record no. I40/f6680, collected by R. A. Cooper. Conspicuous cliff face

on north side of small hill between Lake Waitaki and Awahokomo Creek, 13 km NW of Kurow, Grid Ref. ca. I40/020085, weathered glauconitic sandstone 9 m above top of Otekaike Limestone. Age: *Globigerina woodi woodi* Zone of Jenkins (1966), mid-Waitakian Stage, basal Miocene. See also Marwick (1935).

Holotype, NZGS reg. no. TF1636/1, diameter, 1.5 mm; 9 paratypes, reg. nos. TF1636.

Remarks.—*N. waitakiensis* is easily distinguished from the accompanying *N. spinosa* (Pl. 1, fig. F, G) by its larger size and smoother and thicker, more densely porous tests; the intersutural ribs are much more raised and distinct in *N. spinosa*.

N. waitakiensis is one of the most distinctive species of *Notorotalia* present in New Zealand and this remarkable single record of its occurrence tells us nothing about its distribution or its origin, in contrast to *N. spinosa*, which is part of a well-established lineage. Its flattened, compressed shape is typical of inner shelf dwelling species of *Notorotalia* and it possibly represents a remnant of a shallow facies, formerly present further to the west and since eroded during the emergence of the area during the Early Miocene.

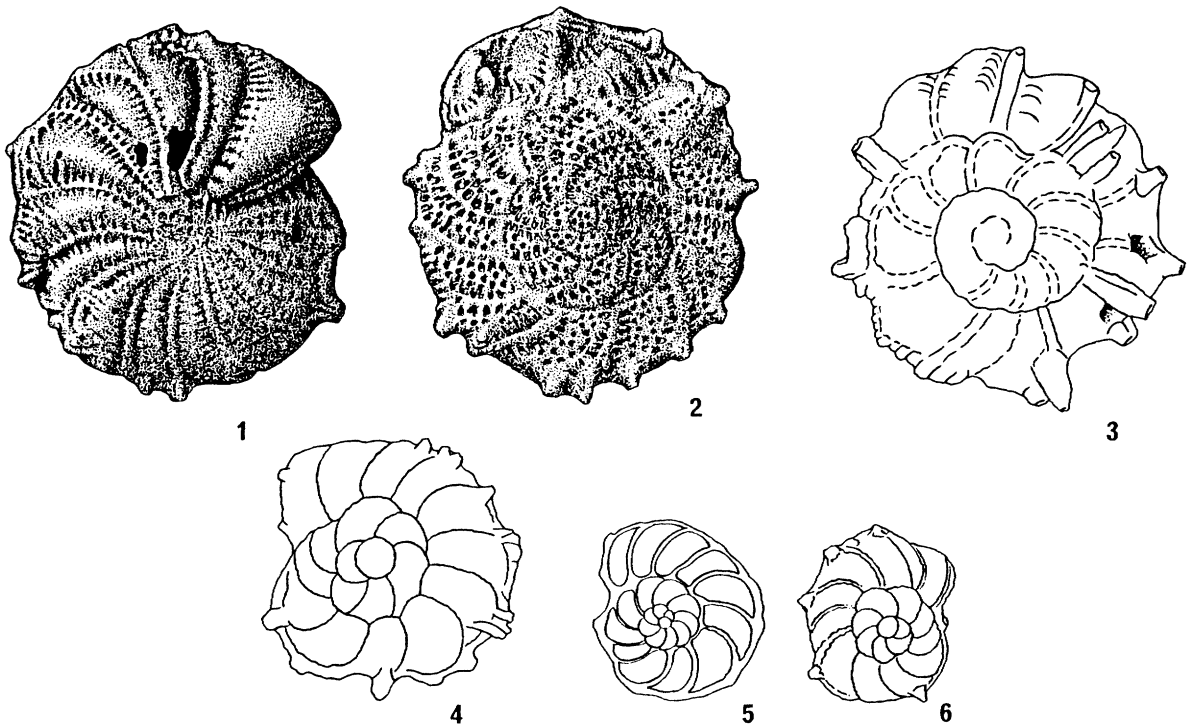


Fig. 2. *Notorotalia waitakiensis*, n. sp. (all figs. $\times 30$) 1, holotype (NZGS TF1636/1), ventral aspect; 2, paratype (TF1636/2), dorsal aspect; 3, paratype (TF1636/6), dorsal aspect; 4-6, paratypes (TF1636,7-9), juveniles.

