(A) Summary and definitions of eco- and morphogroup codes and column headings used in Table S3

Ecogroups are based on geochemical information derived from foraminiferal calcite and geographical information about environmental preference; morphogroups are based upon distinctive architectural features of the test and are separated into two major divisions: those with spines and those without.

Table S1. Eco- and morphogroup codes used in part B of this appendix.

	Code	Description	
Ecogroup	1	Open ocean mixed layer tropical/subtropical, with symbionts	Very heavy δ^{13}C and relatively light δ^{18}O
	2	Open ocean mixed layer tropical/subtropical, without symbionts	δ^{13}C lighter than species with symbionts also with relatively light δ^{18}O
	3	Open ocean thermocline	Light δ^{13}C and relatively heavy δ^{18}O
	4	Open ocean sub-thermocline	Very light δ^{13}C and very heavy δ^{18}O
	5	High latitude	Species that are only found in high latitude sites
	6	Upwelling/high productivity	Species that are only found in site of high productivity or upwelling
Morphogroup	1	Spinose, flat	e.g. *Turborotalita*
	2	Spinose, globular	e.g. *Subbotina, Globigerina, Globoturborotalita*
	3	Spinose, globular with supplementary apertures	e.g. *Globigerinoides, Globigerinatheka, Guembilitriodes*
	4	Spinose, spherical	e.g. *Praeorbulina, Orbulina, Orbulinoides, Globigerinatheka*
	5	Spinose, clavate	e.g. *Beella*
	6	Spinose, planispiral	e.g. *Globigerinella*
	7	Non-spinose, globular	e.g. *Globoquadrina*
	8	Non-spinose, globular, keeled	e.g. *Pulleniatina spectabilis*
	9	Non-spinose, planispiral	e.g. *Pseudohastigerina*
	10	Non-spinose, tubulospinate	e.g. *Hantkenina*
	11	Non-spinose, keeled spines	e.g. *Astrorotalia*
	12	Non-spinose, turborotaliform, keeled	e.g. *Turborotalia, Truncorotalia, Fohsella*
	13	Non-spinose, turborotaliform, non-keeled	e.g. *Hedbergella*
	14	Non-spinose, globorotaliform, keeled	e.g. *Menardella*
	15	Non-spinose, globorotaliform, anguloconical	e.g. some *Truncorotalia*
	16	Non-spinose, globorotaliform, non-keeled	e.g. *Hirsutella*
	17	Non-spinose, muricate, acarininiform	e.g. *Acarinina*
	18	Non-spinose, muricocarinate, keeled	e.g. *Morozovella, Morozovelloides*
	19	Non-spinose, muricocarinate, anguloconical	e.g. *Morozovella, Morozovelloides*

Table S2. Description of column headings in part B of this appendix. Note that statistics taken from the NEPTUNE database were downloaded on 16-08-2009.

Column head	Description
Species name	The name of the morphospecies used in the phylogenies.
Morphological description	A general description of the morphology of the species.
Spinose, wall ultrastructure and aperture	Further details of morphologically diagnostic parts of the test.
Morphogroup, morphogroup reference	The morphogroup that the species was assigned to, with the reference for the decision.
Ecogroup, ecogroup reference	The ecogroup that the species was assigned to, with the reference for the decision.
Geographical range, geographical reference	The geographical range of the species, with associated reference.
Start, end	The first and last occurrence dates of the species in the morphospecies phylogeny; note that the abbreviations FAD and LAD stand for first appearance datum and last appearance datum, respectively.
Date reference	The reference used to infer the start and end dates in the morphospecies phylogeny.
Latest, p95, p5, earliest	The dates of species' observations in the NEPTUNE database: oldest, the 95^{th} percentile, 5^{th} percentile and earliest dates, respectively. these dates are included to facilitate comparison between our (stratophenetic) approach and that of database analysis; we use them to test the completeness of the fossil record of macroperforate planktonic foraminifer species only.
DB comp., Tree comp.	Proportion of whole bins (of 1 million year duration) that have occurrences in NEPTUNE in them and the same statistic between the tree dates: 0 means there are some whole bins, but none have records; 100 means there are some whole bins and all have records; NA means the duration is too short to include any whole bin
ID, LID	ID codes for the morphospecies in the fully bifurcating morphospecies' (ID) and lineage (LID) phylogenies.

(B) Table S3

Summary information used to construct the morphospecies phylogeny, and its subsequent conversion to a lineage phylogeny as documented in the main manuscript. See part C of this appendix for list of references. It also contains species specific analyses of the completeness of the fossil record based on the first and last occurrence dates of our phylogeny and also the Neptune database

	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
1	*Acarinina africana*	Umbilico-convex to weakly biconvex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch sometimes with faint lip	17	Berggren *et al.* (2006*b*)	1	This study	Low to middle latitudes	Berggren *et al.* (2006*b*)	55.30	55.40						0.00	Berggren *et al.* (2006*b*)	t229	T108
2	*Acarinina alticonica*	Biconvex to subspherical, moderate to high trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch bordered by distinct lip	17	Berggren *et al.* (2006*b*)	1	This study	Low to middle latitudes	Berggren *et al.* (2006*b*)	47.00	53.20	35.91	44.88	52.14	52.19	44.44	85.71	Berggren *et al.* (2006*b*)	n246, t247	N119
3	*Acarinina angulosa*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical low arch extending nearly to periphery	17	Berggren *et al.* (2006*b*)	1	This study	Low to middle latitudes	Berggren *et al.* (2006*b*)	46.40	55.70	35.84	37.36	55.57	56.24	54.55	90.00	Berggren *et al.* (2006*b*)	n231, t232	T116

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
4	*Acarinina aspensis*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical opening extending to peripheral margin	17	Berggren *et al.* (2006*b*)	1	This study	Low latitudes	Berggren *et al.* (2006*b*)	48.70	50.40	44.92	46.09	49.33	50.62	85.71	100.00	Berggren *et al.* (2006*b*)	t243	T111
5	*Acarinina boudreauxi*	Planoconvex umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch	17	Berggren *et al.* (2006*b*)	1	This study	Probably widespread currently only known from Indian Ocean	Berggren *et al.* (2006*b*)	43.70	49.80						0.00	Berggren *et al.* (2006*b*)	n259, n261, t262	N133, T135
6	*Acarinina bullbrooki*	Umbilico-convex, low trochospiral, quadrate	Non-spinose	Muricate	Umbilical-extraumbilical low rimmed opening extending toward but not reaching periphery	17	Berggren *et al.* (2006*b*)	1	Boersma (1984); Pearson *et al.* (1993, 2001*a*)	Cosmopolitan	Berggren *et al.* (2006*b*)	40.50	49.00	22.48	36.13	49.36	52.19	90.32	100.00	Berggren *et al.* (2006*b*)	t260	N133, T135
7	*Acarinina coalingensis*	Trochospiral, globular	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical small slit	17	Olsson *et al.* (1999)	1	Pearson *et al.* (1993, 2001*a*)	Cosmopolitan	Olsson *et al.* (1999)	50.10	56.50	42.18	42.49	55.75	56.56	86.67	100.00	Olsson *et al.* (1999)	n283, t284	N126
8	*Acarinina collactea*	Biconvex, low trochospiral	Non-spinose	Muricate	Low-arched slit along base of last chamber	17	Berggren *et al.* (2006*b*)	1	Pearson *et al.* (1993, 2001*a*)	Cosmopolitan	Berggren *et al.* (2006*b*)	30.30	50.45	22.73	28.02	49.88	54.20	87.88	90.48	Berggren *et al.* (2006*b*)	n238, t239	N112, T113
9	*Acarinina cuneicamerata*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical extending almost to periphery bordered by distinct circumumbilical lip	17	Berggren *et al.* (2006*b*)	1	Boersma *et al.* (1987); Pearson *et al.* (2001*a*)	Equatorial Atlantic, Tethyan region and Indian Ocean	Berggren *et al.* (2006*b*)	44.00	50.80	45.43	45.66	50.20	51.33	71.43	57.14	Berggren *et al.* (2006*b*)	t233	T116
10	*Acarinina echinata*	Biconvex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch with narrow lip and two-three low-arched supplementary apertures along umbilical sutures	17	Berggren *et al.* (2006*b*)	1	This study	Low latitudes and southern middle to high latitudes	Berggren *et al.* (2006*b*)	31.80	43.20	18.67	25.76	40.36	41.67	58.33	61.54	Berggren *et al.* (2006*b*)	t250	T121
11	*Acarinina esnaensis*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical long low arch extending nearly to the periphery with very thin lip	17	Berggren *et al.* (2006*b*)	1	This study	Low to high latitudes	Berggren *et al.* (2006*b*)	51.20	56.30	20.94	44.37	57.34	59.15	45.00	100.00	Berggren *et al.* (2006*b*)	n252, t253	N128, T129
12	*Acarinina esnehensis*	Umbilico-convex, low to moderately high spired trochospiral, subquadrate outline	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical long low arch extending with thin lip extending nearly to periphery	17	Berggren *et al.* (2006*b*)	1	This study	Low to high latitudes	Berggren *et al.* (2006*b*)	50.40	55.80						0.00	Berggren *et al.* (2006*b*)	n225, n226	N104, T105
13	*Acarinina interposita*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical arch with thin lip extending almost to periphery	17	Berggren *et al.* (2006*b*)	1	This study	Tethys (Egypt) and in the northern Caucasus	Berggren *et al.* (2006*b*)	50.40	54.00	46.20	46.92	52.61	53.16	75.00	75.00	Berggren *et al.* (2006*b*)	n235, t236	N110
14	*Acarinina mcgowrani*	Moderate trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical opening supplementary apertures frequently occur commonly with bullae	17	Berggren *et al.* (2006*b*)	1	Pearson *et al.* (1993); Wade & Kroon (2002) Wade (2004)	Low to middle latitudes	Berggren *et al.* (2006*b*)	38.00	49.25						0.00	Berggren *et al.* (2006*b*)	n266, t280	N136, T140
15	*Acarinina mckannai*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical elongate opening	17	Olsson *et al.* (1999)	1	Shackleton *et al.* (1985)	Low latitudes	Olsson *et al.* (1999)	56.30	59.25	45.25	49.18	58.66	60.19	87.50	100.00	Olsson *et al.* (1999)	n222, t223	N103
16	*Acarinina medizzai*	Biconvex trochospiral, quadrate to subcircular outline	Non-spinose	Muricate	Umbilical-extraumbilical small indistinct low arch	17	Berggren *et al.* (2006*b*)	1	This study	Cosmopolitan	Berggren *et al.* (2006*b*)	35.80	42.50	38.23	40.85	53.24	56.40	78.95	50.00	Berggren *et al.* (2006*b*)	t240	T114

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
17	*Acarinina nitida*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical narrow opening with slight lip	17	Olsson *et al.* (1999)	1	D'hondt *et al.* (1994)	Low to high southern latitudes	Olsson *et al.* (1999)	56.20	59.50	43.65	49.07	56.97	59.43	76.47	100.00	Olsson *et al.* (1999)	n219, n281, n251, t282	N125, N99
18	*Acarinina pentacamerata*	Weakly biconvex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low slit	17	Berggren *et al.* (2006*b*)	1	This study	Cosmopolitan	Berggren *et al.* (2006*b*)	47.00	52.30	8.10	42.81	52.20	52.72	28.89	100.00	Berggren *et al.* (2006*b*)	n237, n241, t242	N110, N112
19	*Acarinina praetopilensis*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical opening with weak rim	17	Berggren *et al.* (2006*b*)	1	Boersma *et al.* (1987) Pearson *et al.* (1993)	Low to middle latitudes	Berggren *et al.* (2006*b*)	40.00	48.70	43.38	43.61	52.82	53.49	90.91	55.56	Berggren *et al.* (2006*b*)	n267, n275, t276	N136, N142, N144, T148
20	*Acarinina primitiva*	Sub-quadrate, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical asymmetrically placed	17	Berggren *et al.* (2006*b*)	1	This study	Middle to high latitudes, less commonly in low latitudes	Berggren *et al.* (2006*b*)	38.80	50.80	17.44	26.84	51.84	56.12	90.00	100.00	Berggren *et al.* (2006*b*)	n285, t286	N126, T127
21	*Acarinina pseudosubsphaerica*	Spiroconvex, high trochospiral	Non-spinose	Muricate	Umbilical slit or low broad arch	17	Berggren *et al.* (2006*b*)	1	Pearson *et al.* (1993)	Low to middle latitudes	Berggren *et al.* (2006*b*)	42.30	50.40	49.20	49.71	57.39	58.61	100.00	22.22	Berggren *et al.* (2006*b*)	n248, t249	N119, T120
22	*Acarinina pseudotopilensis*	Umbilico-convex to weakly biconvex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch bordered by narrow continuous lip	17	Berggren *et al.* (2006*b*)	1	Boersma *et al.* (1987)	Low latitudes	Berggren *et al.* (2006*b*)	47.25	55.50	35.91	43.70	55.03	59.06	76.00	100.00	Berggren *et al.* (2006*b*)	n256, n258, n264, t265	N130, N131
23	*Acarinina punctocarinata*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch bordered by distinct lip	17	Berggren *et al.* (2006*b*)	1	This study	Cosmopolitan	Berggren *et al.* (2006*b*)	40.50	47.00						0.00	Berggren *et al.* (2006*b*)	t263	T134
24	*Acarinina quetra*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low extending towards (but not reaching) periphery	17	Berggren *et al.* (2006*b*)	1	This study	Low latitudes	Berggren *et al.* (2006*b*)	50.40	54.00	50.23	50.23	50.23	50.23	100.00	25.00	Berggren *et al.* (2006*b*)	t257	T132
25	*Acarinina rohri*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low extending towards peripheral margin	17	Berggren *et al.* (2006*b*)	1	This study	Low latitudes	Berggren *et al.* (2006*b*)	38.20	42.80	36.82	37.80	48.18	48.40	76.92	80.00	Berggren *et al.* (2006*b*)	t279	T147
26	*Acarinina sibaiyaensis*	Umbilico-convex, trochospiral almost planispiral	Non-spinose	Muricate	Umbilical-extraumbilical circular arch with lip to well-developed flange	17	Berggren *et al.* (2006*b*)	1	Kelly *et al.* (1998)	Low latitudes	Berggren *et al.* (2006*b*)	55.30	55.45						0.00	Berggren *et al.* (2006*b*)	n227, t228	N106, T107
27	*Acarinina soldadoensis*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Large arcuate apertures of last-formed chambers with thin bordering lips	17	Olsson *et al.* (1999)	1	Pearson *et al.* (1993, 2001*a*)	Cosmopolitan	Olsson *et al.* (1999)	46.40	56.40	35.91	43.65	56.42	59.06	64.00	100.00	Olsson *et al.* (1999)	n224, n230, n234, n244, t245	N103, N109, N115, N117, T118
28	*Acarinina strabocella*	Biconvex, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical slit with lip	17	Olsson *et al.* (1999)	1	This study	Northern middle latitudes to the Southern Ocean	Olsson *et al.* (1999)	59.30	60.80	48.49	51.88	59.42	59.88	75.00	50.00	Olsson *et al.* (1999)	n217, t218	N99
29	*Acarinina subsphaerica*	Spiroconvex, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical semicircular arch	17	Olsson *et al.* (1999)	1	This study	Cosmopolitan	Olsson *et al.* (1999)	54.20	59.40	51.33	52.06	57.75	60.36	90.00	83.33	Olsson *et al.* (1999)	n220, t221	N102, T100
30	*Acarinina topilensis*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical arch with thin lip	17	Berggren *et al.* (2006*b*)	1	Pearson *et al.* (1993, 2001*a*)	Low to middle latitudes	Berggren *et al.* (2006*b*)	40.30	43.20	39.33	40.18	46.79	47.46	100.00	100.00	Berggren *et al.* (2006*b*)	n277, t278	N144, N145, T146
31	*Acarinina wilcoxensis*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical arch with thin lip	17	Berggren *et al.* (2006*b*)	1	This study	Low to high latitudes	Berggren *et al.* (2006*b*)	50.90	55.70	34.44	43.51	54.26	54.96	61.90	83.33	Berggren *et al.* (2006*b*)	n254, t255	N128, T129
32	*Astrorotalia palmerae*	Low trochospiral, keeled periphery with spines	Non-spinose	Weakly muricate	Umbilical-extraumbilical low slit bordered by thick lip extending to periphery	11	Berggren *et al.* (2006*a*)	1	This study	Low latitudes	Berggren *et al.* (2006*a*)	47.55	49.55						0.00	Berggren *et al.* (2006*a*)	t198	T357

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
33	*Beella digitata*	Medium to high trochospiral, chambers digitate	Spinose	Irregularly cancellate	Interiomarginal umbilical-extraumbilical wide open arch bordered by a thick lip	5	Kennett & Srinivasan (1983)	4	Coxall *et al.* (2007)	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	5.00	0.11	0.33	4.25	6.07	100.00	100.00	FAD: NEPTUNE; LAD: Kennett & Srinivasan (1983)	n666, t637	N292, T299
34	*Beella megastoma*	Trochospiral becoming streptospiral, chambers rounded to digitate	Spinose	Irregularly cancellate	Interiomarginal umbilical-extraumbilical wide open symmetrical arch bordered by a thin lip	5	Holmes (1984)	4	This study	Low to middle latitudes	Holmes (1984)	0.30	0.00	0.19	0.47	7.52	9.64	70.00	100.00	Bäckström *et al.* (2001)	t667	T294
35	*Beella praedigitata*	Low to medium trochospiral, lobulate periphery	Spinose	Smooth	Interiomarginal umbilical semicircular arch bordered by a pronounced lip	5	Kennett & Srinivasan (1983)	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	0.80	12.40	0.09	1.17	7.75	12.53	92.31	92.31	Chaisson & Pearson (1997)	n635, t636	N292, T299
36	*Catapsydrax africanus*	Globular, low trochospiral with umbilical bulla	Spinose	Cancellate	Three-four infralaminial apertures with continous thickened imperforate rims	2	Olsson *et al.* (2006*c*)	4	Keller (1985)	Low to middle latitudes	Olsson *et al.* (2006*c*)	34.30	39.00	33.40	33.78	40.64	41.03	22.22	0.00	Olsson *et al.* (2006*c*)	t455	T209
37	*Catapsydrax dissimilis*	Globular, low trochospiral with umbilical bulla	Spinose	Cancellate	One or more infralaminial apertures with thickened imperforate rims	2	Kennett & Srinivasan (1983)	4	Keller (1985); Pearson *et al.* (1997*b*); Wade *et al.* (2007); Pearson & Wade (2009).	Low to middle latitudes	Kennett & Srinivasan (1983)	17.30	37.60	14.61	18.52	33.15	40.32	88.89	95.24	Kennett & Srinivasan (1983)	t459	N212, T213
38	*Catapsydrax globiformis*	Nearly spherical, low trochosprial with umbilical bulla	Spinose	Cancellate	Three-four infralaminial apertures with continous thickened imperforate rims	4	Olsson *et al.* (2006*c*)	4	Keller (1985)	Low to middle latitudes	Olsson *et al.* (2006*c*)	34.30	40.40	33.34	33.89	42.43	42.56	70.00	57.14	Olsson *et al.* (2006*c*)	t457	T211
39	*Catapsydrax howei*	Globular, low trochospiral with umbilical bulla	Spinose	Cancellate	Three large circular infralaminial apertures with continous thickened imperforate rims	2	Olsson *et al.* (2006*c*)	4	Keller (1985)	Low to middle latitudes	Olsson *et al.* (2006*c*)	33.70	44.35	33.72	33.81	44.94	48.21	68.75	66.67	Olsson *et al.* (2006*c*)	n453, t454	N207, T208
40	*Catapsydrax parvulus*	Sub-globular, low trochospiral with umbilical bulla	Spinose	Cancellate	Interiomarginal umbilical covered by an arched bulla with a single infralaminal aperture on one side	2	Kennett & Srinivasan (1983)	4	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	10.90	17.10	2.40	8.94	17.09	19.56	61.11	100.00	Kennett & Srinivasan (1983)	t464	T214
41	*Catapsydrax stainforthi*	Sub-quadrate, low trochospiral	Spinose	Cancellate	Interiomarginal umbilical covered by a bulla with an infralaminal aperture over each suture of the final whorl	2	Kennett & Srinivasan (1983)	4	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	16.90	27.50	2.61	13.61	25.26	26.50	56.00	83.33	NEPTUNE	n462, t463	T214
42	*Catapsydrax unicavus*	Low trochospiral, lobulate	Spinose	Cancellate	Infralaminal associated with the bulla has a continuous thickened imperforate rim	2	Olsson *et al.* (2006*c*)	4	Poore & Matthews (1984); Pearson *et al.* (2001*a*)	Cosmopolitan	Olsson *et al.* (2006*c*)	17.30	55.00	0.33	16.98	40.08	49.38	92.00	86.84	Olsson *et al.* (2006*c*)	n452, n456, n458, n460, t461	N206, N210, N212, T213
43	*Clavatorella bermudezi*	Low trochospiral, lobulate later chambers club-shaped	Spinose	Coarsely cancellate	Umbilical-extraumbilical interiormarginal elongate arch bordered by a distinct lip	5	Kennett & Srinivasan (1983)	4	Pearson & Shackleton (1995); Coxall *et al.* (2000)	Low latitudes	Kennett & Srinivasan (1983)	12.10	16.40	2.38	10.80	16.61	18.05	64.71	100.00	Kennett & Srinivasan (1983)	t672	T297
44	*Clavigerinella akersi*	Planispiral or pseudo-planispiral, evolute biumbilicate	Probably spinose	Weakly cancellate or smooth	Equatorial symmetrical high arch with a smooth broad imperforate lip	6	Coxall & Pearson (2006)	4	Coxall *et al.* (2000, 2007)	Low to middle latitudes	Coxall & Pearson (2006)	42.70	47.22						0.00	Coxall & Pearson (2006)	t374	T222

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
45	*Clavigerinella caucasica*	Planispiral or pseudo-planispiral, evolute biumbilicate	Probably spinose	Weakly cancellate or smooth	Equatorial symmetrical distinctly pointed high arch with smooth broad imperforate lips	6	Coxall & Pearson (2006)	4	This study	Known only from Austria and Tanzania	Coxall & Pearson (2006)	44.45	44.60						0.00	Coxall & Pearson (2006)	n377, t378	N223
46	*Clavigerinella colombiana*	Planispiral involute, biumbilicate	Probably spinose	Weakly cancellate or smooth	Equatorial symmetrical narrow arch with a smooth imperforate lip	6	Coxall & Pearson (2006)	4	Coxall *et al.* (2000)	Cosmopolitan on continental shelf settings	Coxall & Pearson (2006)	43.30	47.40						0.00	Coxall & Pearson (2006)	t370	T222
47	*Clavigerinella eocanica*	Planispiral or pseudo-planispiral, evolute biumbilicate	Probably spinose	Weakly cancellate or smooth	Equatorial symmetrical high arch with a smooth broad imperforate lip	6	Coxall & Pearson (2006)	4	Pearson *et al.* (1993); Coxall *et al.* (2000)	Low to middle latitudes	Coxall & Pearson (2006)	34.00	48.10	35.11	35.29	39.82	39.95	60.00	20.00	Coxall & Pearson (2006)	n369, n371, n373, n375, t376	N220, N221, T362
48	*Clavigerinella jarvisi*	Planispiral or pseudo-planispiral, evolute biumbilicate, chambers digitate	Probably spinose	Weakly cancellate or smooth	Equatorial symmetrical high arch with a smooth broad imperforate lip	6	Coxall & Pearson (2006)	4	Coxall *et al.* (2000)	Low to middle latitudes	Coxall & Pearson (2006)	43.30	47.25						0.00	Coxall & Pearson (2006)	t372	T222
49	*Cribrohantkenina inflata*	Planispiral biumilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial symmetrical low or high and narrow arch with an imperforate lip and one or more areal apertures on the final chamber	10	Coxall & Pearson (2006)	2	Wade & Pearson (2008)	Low to middle latitudes	Coxall & Pearson (2006)	33.70	36.40	34.30	34.31	35.42	35.42	100.00	50.00	Coxall & Pearson (2006)	t399	T230
50	*Dentoglobigerina altispira*	High trochospiral	Non-spinose	Cancellate	Umbilically restricted with umbilical teeth projecting into umbilicus	7	Kennett & Srinivasan (1983)	1	Pearson *et al.* (2001*b*)	Low latitudes	Kennett & Srinivasan (1983)	3.00	23.70	0.01	3.25	17.72	50.55	56.86	100.00	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Spezzaferri (1994)	t332	T176
51	*Dentoglobigerina baroemoensis*	Low trochospiral, subquadrate periphery	Non-spinose	Cancellate	Interiomarginal umbilical covered with a distinct narrow protruding umbilical tooth	7	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	3.30	32.00	3.27	6.19	29.36	33.10	100.00	100.00	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Chaisson & Pearson (1997)	t350	T178
52	*Dentoglobigerina binaiensis*	Spiro-convex, low trochospiral, subquadrate	Non-spinose	Cancellate	Interiomarginal umbilical low arch with a very weak umbilical tooth	7	Kennett & Srinivasan (1983)	4	Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	18.80	26.00	9.34	17.77	27.05	30.34	72.73	100.00	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Kennett & Srinivasan (1983)	t339	T170
53	*Dentoglobigerina galavisi*	Trochospiral, globular oval in outline	Non-spinose	Cancellate	Umbilical bordered by thin irregular triangular-shaped lip	7	Olsson *et al.* (2006*b*)	3	Wade & Pearson (2008)	Low to middle latitudes	Olsson *et al.* (2006*b*)	27.20	39.00	17.81	23.14	39.13	41.67	96.00	100.00	FAD: Olsson *et al.* (2006*b*); LAD: B.S. Wade & P. N. Pearson in preparation	n287, n325, n327, n333, n349, n351, t352	N149, N163, N165, N171, N175, N177
54	*Dentoglobigerina globosa*	Trochospiral, periphery lobulate	Non-spinose	Cancellate	Interiomarginal umbilical covered by tooth-like projections	7	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	3.00	27.10	0.01	4.09	25.38	29.66	86.67	92.00	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Kennett & Srinivasan (1983)	n330, t331	T176
55	*Dentoglobigerina globularis*	Low trochospiral, profile subovate with lobate periphral margin, rounded	Non-spinose	Cancellate	Umbilical high arch displaying a triangular tooth	7	Spezzaferri (1994)	3	Pearson *et al.* (1997*b*); Wade *et al.* (2007); Wade & Pearson (2008)	Low to middle latitudes	Spezzaferri (1994)	18.80	34.00	3.27	20.47	31.41	38.45	47.22	93.75	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Spezzaferri (1994)	n328, t329	T176
56	*Dentoglobigerina larmeui*	Low trochospiral, compact, profile subtriangular, slightly lobulate	Non-spinose	Cancellate	Umbilical-extraumbilical low arch with a thick well-developed large asymmetrical tooth	7	Spezzaferri (1994)	3	Pearson & Wade (2009); Pearson *et al.* (1997*b*)	Cosmopolitan	Spezzaferri (1994)	11.20	27.30	3.24	7.33	28.72	32.38	83.33	94.12	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Spezzaferri (1994)	n353, t354	N179, T180
57	*Dentoglobigerina prasaepis*	Large, low trochospiral, profile circular, slightly lobate	Non-spinose	Cancellate	Umbilical middle deep high arch embracing the three previous chambers	7	Spezzaferri (1994)	4	D. R. M. Stewart unpublished data	Cosmopolitan	Spezzaferri (1994)	23.80	33.30	17.81	23.14	34.40	36.86	80.00	100.00	FAD: Olsson *et al.* (2006*b*); LAD: B.S. Wade & P. N. Pearson in preparation	n342, t343	N172, T174

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
58	*Dentoglobigerina pseudovenezuelana*	Globular, trochospiral, subcircular to subquadrate in outline	Non-spinose	Cancellate	Umbilical bordered by thin irregular subtriangular-shaped lip	7	Olsson *et al.* (2006*b*)	3	Wade & Pearson (2008)	Low latitudes	Olsson *et al.* (2006*b*)	27.40	35.40	27.04	29.04	35.43	47.29	52.38	100.00	Kennett & Srinivasan (1983)	t326	T164
59	*Dentoglobigerina rohri*	Large, low trochospiral and streptospiral, profile circular and slightly lobate	Non-spinose	Cancellate	Umbilical low asymmetrical arch	7	Spezzaferri (1994)	4	Pearson & Wade (2009); Poore & Matthews (1984)	Cosmopolitan	Spezzaferri (1994)	24.30	30.00	21.97	22.98	31.32	33.10	100.00	100.00	Spezzaferri (1994)	t345	T173
60	*Dentoglobigerina sellii*	Low trochospiral, compact, profile subcircular to subrectangular, slightly lobate	Non-spinose	Cancellate	Elongate narrow slit with thin but distinct tooth-like lip	7	Spezzaferri (1994)	4	Van Eijden & Ganssen (1995)	Low to middle latitudes	Spezzaferri (1994)	24.10	33.40	2.38	19.44	34.30	41.43	67.50	100.00	B.S. Wade & P. N. Pearson in preparation	n337, t338	N168, T169
61	*Dentoglobigerina* sp		Non-spinose	Cancellate		7	B. S. Wade & P. N. Pearson personal communication	3	This study			32.90	33.90						0.00	Spezzaferri (1994)	n334, n340, t341	N165
62	*Dentoglobigerina tapuriensis*	Low trochospiral, profile subrectangular and slightly lobate	Non-spinose	Cancellate	Slighlty arched slit	7	Spezzaferri (1994)	4	D. R. M. Stewart unpublished data	Cosmopolitan	Spezzaferri (1994)	25.50	33.70	0.33	24.22	34.41	36.86	43.24	100.00	B.S. Wade & P. N. Pearson in preparation	n335, t336	N165, N166, T167
63	*Dentoglobigerina venezuelana*	Low trochospiral, equatorial periphery slightly lobate	Non-spinose	Cancellate	Interiomarginal umbilical low arch with umbilical teeth	7	Kennett & Srinivasan (1983)	4	Gasperi & Kennett (1993); Pearson & Shackleton (1995); Pearson *et al.* (2001*b*); Wade *et al.* (2007); Wade & Pearson (2008); Coxall *et al.* (2007); Pearson & Wade (2009)	Low latitudes	Kennett & Srinivasan (1983)	3.30	33.20	0.01	3.35	28.88	47.29	85.42	100.00	FAD: B.S. Wade & P. N. Pearson in preparation ; LAD: Chaisson & Pearson (1997)	n344, n346, t347	N172, T174
64	*Eoglobigerina edita*	Umbilico-convex, moderately elevated trochospiral	Spinose	Cancellate (weakly developed)	Umbilical-extraumbilical rounded arch bordered by narrow lip	2	Olsson *et al.* (1999)	3	This study	Cosmopolitan	Olsson *et al.* (1999)	61.15	64.90	63.80	63.92	64.97	65.19	100.00	50.00	Olsson *et al.* (1999)	n480, t481	T258
65	*Eoglobigerina eobulloides*	Biconvex, trochospiral	Spinose	Cancellate (weakly developed)	Umbilical to slightly extraumbilical rounded arch bordered by narrow discontinuous lip	2	Olsson *et al.* (1999)	3	Berggren & Norris (1997); D'hondt & Zachos (1993)	Cosmopolitan	Olsson *et al.* (1999)	63.60	64.97	58.63	59.04	64.81	65.26	87.50	100.00	Olsson *et al.* (1999)	n477, n478, t479	N257, T258
66	*Eoglobigerina spiralis*	Biconvex, medium to high trochospiral	Spinose	Cancellate	Interiomarginal umbilical arch boardered by thin discontinuous lips	2	Olsson *et al.* (1999)	3	This study	Cosmopolitan	Olsson *et al.* (1999)	60.90	61.20	53.21	54.97	65.86	65.97	76.92	50.00	Olsson *et al.* (1999)	t482	T258
67	*Fohsella birnageae*	Biconvex, low trochospiral, equatorial profile circular	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical slit with prominent lip	13	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993)	Low latitudes	Kennett & Srinivasan (1983)	16.40	17.00	0.07	0.69	21.37	23.11	66.67	100.00	Norris *et al.* (1993)	t294	N152
68	*Fohsella fohsi*	Biconvex, low trochospiral, equatorial periphery lobulate with distinct keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with prominent lip	12	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	11.90	13.40	8.63	10.12	13.98	23.58	50.00	100.00	Kennett & Srinivasan (1983)	n300, t301	T154
69	*Fohsella lenguaensis*	Biconvex, low trochospiral, equatorial periphery almost circular but slightly lobulate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit with prominent wide lip	13	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993)	Low latitudes	Kennett & Srinivasan (1983)	6.70	13.70	5.81	6.42	11.59	13.52	100.00	100.00	Norris *et al.* (1993)	n307, t309	T155
70	*Fohsella lobata*	Biconvex, low trochospiral, last few chambers distinctly lobulate with keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical slit with small flange-like lip	12	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	11.90	13.30	9.52	9.96	16.45	23.58	53.33	100.00	Kennett & Srinivasan (1983)	n302, t303	T154
71	*Fohsella paralenguaensis*	Biconvex, low trochospiral, equatorial profile ovate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with lip	13	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993)	Low latitudes	Kennett & Srinivasan (1983)	9.30	13.60	7.15	7.18	11.02	11.26	60.00	40.00	Kennett & Srinivasan (1983)	t308	T155

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
72	*Fohsella peripheroacuta*	Biconvex, low trochospiral, equatorial periphery slightly lobulate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with prominent lip	13	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	13.40	14.30	0.31	0.86	15.09	23.58	54.17	100.00	Kennett & Srinivasan (1983)	n297, n305, t306	N152
73	*Fohsella peripheroronda*	Umilico-convex, very low trochospiral, equatorial periphery slightly lobulate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by distinct lip	13	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993); Pearson *et al.* (2001*b*); Coxall *et al.* (2007)	Low latitudes	Kennett & Srinivasan (1983)	13.80	22.00	0.01	8.52	17.50	56.60	36.84	100.00	Norris *et al.* (1993)	n293, n295, t296	N152
74	*Fohsella praefohsi*	Biconvex, low trochospiral, equatorial periphery lobulate with partly developed keel	Non-spinose	Smooth	Umbilical-extraumbilical low arch with prominent lip	12	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	13.10	13.80	8.84	11.48	14.38	17.50	90.00	100.00	Norris *et al.* (1993)	n298, t299	N152
75	*Fohsella robusta*	Biconvex, trochospiral, equatorial periphery almost circular with thick keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical slit with an indistinct lip	12	Kennett & Srinivasan (1983)	3	Keller (1985); Hodell & Vayavananda (1993)	Low latitudes	Kennett & Srinivasan (1983)	11.90	13.10	9.54	9.88	12.98	14.15	100.00	100.00	Kennett & Srinivasan (1983)	t304	T154
76	*Globanomalina archeocompressa*	Umbilico-convex, very low trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical broad very low arch with continuous thin lip	13	Olsson *et al.* (1999)	3	This study	Western equatorial pacific, Gulf of Mexico, south Atlantic Ocean	Olsson *et al.* (1999)	62.80	64.95	59.88	60.50	64.48	64.62	100.00	100.00	Olsson *et al.* (1999)	n16, n4, t3	N3
77	*Globanomalina australiformis*	Biconvex to umbilico-convex, low trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical low arch with thin lip	13	Olsson *et al.* (1999)	3	This study	Southern middle to high latitudes	Olsson *et al.* (1999)	43.80	55.88	29.52	44.65	54.36	56.19	57.14	92.31	Olsson *et al.* (1999)	n33, t34	N13, T14
78	*Globanomalina chapmani*	Biconvex, trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical elongate high arch with lip	13	Olsson *et al.* (1999)	3	Olsson *et al.* (1999)	Cosmopolitan in middle to high latitudes	Olsson *et al.* (1999)	53.70	59.45	46.38	48.10	59.26	62.82	94.12	100.00	Olsson *et al.* (1999)	n11, t12	T12
79	*Globanomalina compressa*	Biconvex, trochospiral, angular periphery	Non-spinose	Smooth	Umbilical-extraumbilical low arch bordered entirely by narrow well defined lip	13	Olsson *et al.* (1999)	3	Olsson *et al.* (1999)	Cosmopolitan	Olsson *et al.* (1999)	60.70	62.90	52.46	54.27	64.75	65.26	78.57	100.00	Olsson *et al.* (1999)	n6, t5	N4
80	*Globanomalina ehrenbergi*	Low trochospire, faintly keeled	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with lip	13	Olsson *et al.* (1999)	3	This study	Cosmopolitan in low to middle latitudes	Olsson *et al.* (1999)	59.38	61.10	55.52	57.07	61.23	61.93	85.71	100.00	Olsson *et al.* (1999)	n10, n8, t7	N4
81	*Globanomalina imitata*	Umbilico-convex, very low trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical high arch bordered by thin continuous lips	13	Olsson *et al.* (1999)	3	This study	Northern Caucasus, S.E. India, Atlantic and Gulf of Mexico coastal plains	Olsson *et al.* (1999)	55.80	62.05	52.46	53.97	62.65	62.98	100.00	100.00	Olsson *et al.* (1999)	n20, n32, t19	N5
82	*Globanomalina luxorensis*	Biconvex, very low trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical high arch with thin lip	13	Olsson & Hemleben (2006)	2	Olsson & Hemleben (2006)	Low to middle latitudes	Olsson & Hemleben (2006)	54.45	55.70						0.00	Olsson *et al.* (1999)	n24, t23	N6
83	*Globanomalina ovalis*	Biconvex, trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical high arch with continuous thin lip	13	Olsson *et al.* (1999)	2	This study	Northern and southern middle latitudes	Olsson *et al.* (1999)	55.30	56.50						0.00	Olsson *et al.* (1999)	n22, t21	N5, N6
84	*Globanomalina planocompressa*	Umbilico-convex, low trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical rounded arch with continuous lip	13	Olsson *et al.* (1999)	3	Olsson *et al.* (1999)	Northern hemisphere and middle to low latitudes	Olsson *et al.* (1999)	62.00	64.90	63.45	63.56	64.84	64.86	100.00	66.67	Olsson *et al.* (1999)	n18, t17	N3, N5
85	*Globanomalina planoconica*	Umbilico-convex, low trochospiral	Non-spinose	Smooth	Umbilical-extraumbilical high arch with thin continuous lip	13	Olsson *et al.* (1999)	3	This study	Low to middle latitudes	Olsson *et al.* (1999)	50.60	56.30	40.98	46.02	55.94	56.19	76.47	85.71	Olsson *et al.* (1999)	n14, t13	T12
86	*Globanomalina pseudomenardii*	Spiroconvex to biconvex trochospiral, keeled periphery	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with lip	12	Olsson *et al.* (1999)	3	Olsson *et al.* (1999)	Low to middle latitudes	Olsson *et al.* (1999)	55.90	59.40	52.96	54.57	59.21	60.32	100.00	100.00	Olsson *et al.* (1999)	t9	T11

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
87	*Globigerina angulisuturalis*	Low trochospiral, deep angular U-shaped sutures on umbilical side	Spinose	Hispid	Interiomarginal umbilical low arch	2	Kennett & Srinivasan (1983)	1	Poore & Matthews (1984)	Low to middle latitudes	Kennett & Srinivasan (1983)	22.50	29.40	6.04	21.34	29.63	30.95	56.00	100.00	FAD: Pearson (1998); LAD: Spezzaferri (1994)	t622	T282
88	*Globigerina bulloides*	Low trochospiral, chambers spherical to subspherical	Spinose	Hispid	Umbilical high symmetrical arch	2	Kennett & Srinivasan (1983)	2	Vergnaud-Grazzini (1976); Durazzi (1981).	Middle latitudes, rare in low latitudes	Kennett & Srinivasan (1983)	0.00	14.80	0.00	0.33	13.20	56.60	56.90	100.00	Kennett & Srinivasan (1983)	n653, t654	T288
89	*Globigerina ciperoensis*	Low to medium trochospiral, chambers spherical	Spinose	Hispid	Umbilical circular opening	2	Kennett & Srinivasan (1983)	2	D. R. M. Stewart unpublished data	Low to middle latitudes	Kennett & Srinivasan (1983)	19.30	31.20	0.07	11.46	30.97	40.08	85.37	100.00	FAD: Pearson (1998); LAD: Kennett & Srinivasan (1983)	n620, t621	N279, T280
90	*Globigerina druryi*	Trochospiral, compact, sub-globular chambers	Spinose	Hispid	Umbilical small low arch bordered by a distinct rim	2	Kennett & Srinivasan (1983)	1	This study	Low latitudes	Kennett & Srinivasan (1983)	0.60	21.50	3.25	5.63	15.95	23.58	76.19	68.18	Kennett & Srinivasan (1983)	t646	T373
91	*Globigerina eamesi*	High trochospiral, subglobular chambers	Spinose	Hispid	Umbilical elongate slit with thin lip	2	Kennett & Srinivasan (1983)	1	This study	Middle latitudesrare in low latitudes	Kennett & Srinivasan (1983)	2.00	26.30	0.54	1.83	20.81	23.24	58.33	48.00	Kennett & Srinivasan (1983)	n644, t645	N291, T372
92	*Globigerina falconensis*	Low trochospiral, slightly compressed, spherical chambers	Spinose	Hispid	Interiomarginal umbilical elongate narrow arch	2	Kennett & Srinivasan (1983)	1	This study	High latitudes	Kennett & Srinivasan (1983)	0.00	18.40	0.00	0.32	13.15	23.85	83.33	94.74	Olsson *et al.* (2006*a*)	t650	T288
93	*Globigerina officinalis*	Low trochospiral, lobulate outline	Spinose	Hispid	Umbilical low to high arch bordered by imperforate rim	2	Olsson *et al.* (2006*a*)	1	Pearson *et al.* (2001*a*)	Low to middle latitudes	Olsson *et al.* (2006*a*)	23.80	43.50	16.71	22.06	38.13	41.56	96.15	90.48	FAD: Olsson *et al.* (2006*a*); LAD: Pearson (1998)	n617, n618, t619	N278, N281, N283, T284
94	*Globigerina praebulloides*	Trochospiral, equatorial periphery elongate	Spinose	Hispid	Umbilical low to moderate asymmetrical arch	2	Kennett & Srinivasan (1983)	1	Pearson *et al.* (1997*b*)	Low to middle latitudes	Kennett & Srinivasan (1983)	4.80	33.80	0.01	2.32	31.30	40.11	85.37	100.00	FAD: Pearson (1998); LAD: Stanley *et al.* (1988)	n623, n647, n643, n649, n651, t652	N281, N283, N285, N286, T288
95	*Globigerina umbilicata*	Low trochospiral, chambers spherical to subspherical	Spinose	Hispid	Umbilical large opening with a thin lip	2	Kennett & Srinivasan (1983)	1	This study	Low latitudes	Kennett & Srinivasan (1983)	0.60	2.50	0.04	0.36	4.19	14.65	53.33	100.00	Kennett & Srinivasan (1983)	t655	T288
96	*Globigerinatheka barri*	Low to medium trochospiral, streptospiral in last whorl, subglobular to globular	Spinose	Cancellate	Primary aperture not visible three small semicircular secondary apertures present mainly covered by a small bulla	3	Premoli Silva *et al.* (2006)	1	This study	Low to middle latitudes	Premoli Silva *et al.* (2006)	36.30	44.00	33.43	33.63	42.79	46.57	78.57	75.00	Premoli Silva *et al.* (2006)	t425	T245
97	*Globigerinatheka curryi*	Low to medium trochospiral, streptospiral in last whorl, subglobular	Spinose	Cancellate	Umbilical low arch with two secondary apertures at the base of the last chamber	3	Premoli Silva *et al.* (2006)	1	This study	Low to middle latitudes	Premoli Silva *et al.* (2006)	41.60	44.41	40.32	40.55	44.69	44.92	40.00	25.00	Premoli Silva *et al.* (2006)	n409, n411, t412	N253
98	*Globigerinatheka euganea*	Low trochospiral becoming streptospiral, with final chamber hemispherical, almost spherical	Spinose	Cancellate	Primary aperture not visible two-four small semicircular secondary apertures at the base of the last chamber	4	Premoli Silva *et al.* (2006)	1	This study	Low to middle latitudes	Premoli Silva *et al.* (2006)	40.20	42.80	38.54	38.54	38.54	38.54	100.00	0.00	Premoli Silva *et al.* (2006)	n413, n415, t416	N253, T254
99	*Globigerinatheka index*	Low trochospiral, subrectangular	Spinose	Cancellate	Umbilical high large symmetrical arch bordered by a thick lip	3	Premoli Silva *et al.* (2006)	1	Boersma *et al.* (1979); Pearson *et al.* (2001*a*); Pearson & Palmer (1999)	Cosmopolitan	Premoli Silva *et al.* (2006)	34.30	43.80	20.94	29.93	42.90	46.74	92.59	100.00	Premoli Silva *et al.* (2006)	n428, t429	N248, T249
100	*Globigerinatheka korotkovi*	High trochospiral, sac like	Spinose	Cancellate	Subcircular arch with one secondary aperture almost identical to the primary aperture with other secondary apertures on spiral side	3	Premoli Silva *et al.* (2006)	1	This study	Low to middle latitudes	Premoli Silva *et al.* (2006)	35.50	44.30	40.32	40.32	40.32	40.32	100.00	10.00	Premoli Silva *et al.* (2006)	t423	T247

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
101	*Globigerinatheka kugleri*	Subtriangular outline, rather lobate	Spinose	Cancellate	Umbilical low arch two-three secondary apertures at the base of the last chamber	3	Premoli Silva *et al.* (2006)	1	Boersma *et al.* (1987); Pearson & Palmer (1999)	Low to middle latitudes	Premoli Silva *et al.* (2006)	39.80	43.95	37.53	39.84	42.88	44.74	75.00	60.00	Premoli Silva *et al.* (2006)	t410	N251, T252
102	*Globigerinatheka luterbacheri*	Low trochospiral to streptospiral, globular	Spinose	Cancellate	Numerous secondary apertures frequently covered by a bulla of variable size	3	Premoli Silva *et al.* (2006)	1	This study	Middle latitudes	Premoli Silva *et al.* (2006)	34.30	40.30	33.43	33.67	41.05	41.16	66.67	57.14	Premoli Silva *et al.* (2006)	t417	T255
103	*Globigerinatheka mexicana*	Very low trochospiral, last chamber hemispherical, almost spherical	Spinose	Cancellate	Three small to medium size arch-shaped apertures at the base of the final chamber	3	Premoli Silva *et al.* (2006)	1	Boersma *et al.* (1987); Wade (2004)	Low to middle latitudes	Premoli Silva *et al.* (2006)	36.00	44.40	35.81	36.69	43.74	44.92	70.00	66.67	Premoli Silva *et al.* (2006)	n419, t420	N241, T242
104	*Globigerinatheka semiinvoluta*	Spherical, with a large hemispherical final chamber	Spinose	Cancellate	Three small to medium size arch-shaped apertures at the base of the final chamber with a rim	3	Premoli Silva *et al.* (2006)	1	Poore & Matthews (1984); Pearson *et al.* (2001*a*); Wade & Kroon (2002)	Low to middle latitudes	Premoli Silva *et al.* (2006)	35.80	38.50	33.20	33.36	37.98	39.12	85.71	75.00	Premoli Silva *et al.* (2006)	t421	T243
105	*Globigerinatheka subconglobata*	Globular to nearly spherical, low trochospiral to streptospiral	Spinose	Cancellate	Umbilical low wide arch with one-two low-arched secondary apertures	3	Premoli Silva *et al.* (2006)	1	Pearson *et al.* (1993)	Cosmopolitan	Premoli Silva *et al.* (2006)	39.60	45.95	36.98	37.70	46.54	46.61	90.91	85.71	Premoli Silva *et al.* (2006)	n408, n418, n422, n424, n426, t427	N239, N240, N244, N246, T247
106	*Globigerinatheka tropicalis*	Globose with subrectangular to subtriangular outline, low trochospiral becoming streptospiral	Spinose	Cancellate	Umbilical high to subcircular medium-sized arch may have lip and is covered by a bulla secondary apertures present	3	Premoli Silva *et al.* (2006)	1	This study	Low to middle latitudes	Premoli Silva *et al.* (2006)	33.80	39.10	33.72	33.92	41.26	41.37	88.89	85.71	Premoli Silva *et al.* (2006)	t430	T250
107	*Globigerinella adamsi*	Planispiral, final chambers distinctly clavate	Spinose	Hispid	Equatorial arch	5	Coxall *et al.* (2007)	4	Coxall *et al.* (2007)		Coxall *et al.* (2007)	0.00	0.70	0.04	0.10	1.10	1.16	100.00	100.00	Coxall *et al.* (2007)	t642	T302
108	*Globigerinella calida*	Low trochospiral, equatorial periphery strongly lobulate	Spinose	Hispid	Umbilical-extraumbilical with a narrow lip	2	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	4.40	0.00	0.12	7.77	8.89	100.00	100.00	Chaisson & Pearson (1997)	n640, t641	N301, T303
109	*Globigerinella obesa*	Low trochospiral, strongly lobulate periphery, spherical chambers	Spinose	Hispid	Interiomarginal umbilical-extraumbilical low to medium arch	2	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low to middle latitudes	Kennett & Srinivasan (1983)	15.60	31.20	0.01	1.97	25.25	32.38	96.97	94.12	FAD: Pearson (1998); LAD: Kennett & Srinivasan (1983)	n628, n624, t625	N298, N366
110	*Globigerinella praesiphonifera*	Initially trochospiral becoming planispiral in final whorl	Spinose	Hispid	Interiomarginal umbilical-extraumbilical opening	2	Kennett & Srinivasan (1983)	3	Pearson *et al.* (2001*b*); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	11.70	23.20	1.85	8.84	22.16	23.60	91.30	100.00	Kennett & Srinivasan (1983)	n626, t627	N298, N366
111	*Globigerinella siphonifera*	Initially trochospiral becoming planispiral, evolute	Spinose	Hispid	Interiomarginal wide equatorial arch without rim or lip	6	Kennett & Srinivasan (1983)	3	Vergnaud-Grazzini (1976)	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	12.50	0.00	0.39	9.05	24.21	72.00	100.00	FAD: Kennett & Srinivasan (1983); LAD: Chaisson & Pearson (1997)	n634, n638, t639	N298, N300, N366, T304
112	*Globigerinoides altiapertura*	Low trochospiral	Spinose	Cancellate	Primary aperture interiomarginal umbilical high distinct arch. One supplementary sutural aperture opposite the primary aperture	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	16.40	22.00	0.07	4.35	22.91	24.71	64.00	100.00	Stanley *et al.* (1988)	n529, t530	N327
113	*Globigerinoides bisphericus*	Bilobate outline, has enveloping last chamber which almost completely hides the umbilicus	Spinose	Cancellate	Only two apertures are present along the suture between the last and earlier chambers though more apertures may remain open on the spire	3	Bolli & Saunders (1985)	1	Keller (1985); Pearson & Shackleton (1995)	Low latitudes	Pearson *et al.* (1997*a*)	15.60	18.20	8.84	14.08	17.67	20.01	84.62	100.00	Pearson & Chaisson (1997)	n549, t550	T338

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
114	*Globigerinoides conglobatus*	Tightly coiled trochospiral, subglobular to subquadrate	Spinose	Cancellate	Primary aperture interiomarginal umbilicallong low asymmetric arch with thin rim. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	0.00	7.50	0.00	0.32	6.58	12.94	92.31	100.00	Kennett & Srinivasan (1983)	t535	T328
115	*Globigerinoides diminutus*	Small, trochospiral, equatorial periphery subquadrate	Spinose	Cancellate	Primary aperture interiomarginal umbilical small circular symmetrical arch. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	14.80	17.30	5.48	12.54	16.36	18.57	57.14	100.00	Stanley *et al.* (1988)	t539	N334
116	*Globigerinoides extremus*	Medium to high trochospiral, final whorl distinctly compressed	Spinose	Cancellate	Primary aperture interiomarginal umbilical distinct arch of medium height. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	1.60	8.30	0.35	2.14	8.20	15.32	81.25	100.00	Kennett & Srinivasan (1983)	t532	T331
117	*Globigerinoides fistulosus*	Trochospiral, final chambers compressed and radially elongate with multiple slender digitate extensions	Spinose	Cancellate	Primary aperture interiomarginal umbilical wide arch with rim. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	2.00	3.60	0.32	1.51	3.34	10.84	45.45	100.00	Chaisson & Pearson (1997)	t564	T340
118	*Globigerinoides mitra*	Largehigh trochospiral, spherical to subspherical chambers	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical large semi-circular opening. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); Pearson *et al.* (2001*b*)	Low latitudes	Kennett & Srinivasan (1983)	12.10	18.00	5.37	7.29	16.65	16.89	83.33	83.33	Stanley *et al.* (1988)	t537	T333
119	*Globigerinoides obliquus*	Trochospiral, chambers spherical except final chamber which is compressed in a lateral oblique manner	Spinose	Cancellate	Primary aperture interiomarginal umbilical highwide arch. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); Pearson *et al.* (2001*b*)	Low latitudes	Kennett & Srinivasan (1983)	1.30	21.95	0.01	2.34	16.73	23.60	100.00	100.00	FAD: Chaisson & Leckie (1993); LAD: Chaisson & Pearson (1997)	n531, n533, t534	N327, N329, T330
120	*Globigerinoides parawoodi*	Low trochospiral, chambers spherical to ovate	Spinose	Cancellate	Primary aperture interiomarginal umbilical medium-sized arch. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Middle latitudes	Kennett & Srinivasan (1983)	16.40	21.50	12.77	12.85	21.98	23.19	100.00	100.00	Kennett & Srinivasan (1983)	t566	T343
121	*Globigerinoides primordius*	Low trochospiral, equatorial profile elongate	Spinose	Cancellate	Primary aperture interiomarginal umbilical low to moderate arch. Supplementary sutural aperture on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); Pearson & Wade (2009); Pearson *et al.* (1997*b*); Poore & Matthews (1984)	Low latitudes	Kennett & Srinivasan (1983)	18.80	27.00	17.08	19.64	26.42	30.30	92.86	100.00	FAD: Spezzaferri (1994); LAD: Chaproniere (1992)	t648	T287
122	*Globigerinoides ruber*	Low to high trochospiral, subspherical chambers	Spinose	Cancellate	Primary aperture interiomarginal umbilicalwide arch with rim. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); Pearson *et al.* (2001*b*); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	0.00	15.10	0.00	0.28	7.50	18.24	100.00	100.00	Stanley *et al.* (1988)	n542, t544	T335

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
123	*Globigerinoides sacculifer*	Low trochospiral, chambers spherical except final one which is sack like	Spinose	Cancellate	Primary aperture interiomarginal umbilicalwide arch with rim. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	0.00	10.90	0.00	0.57	14.59	50.55	49.02	100.00	Chaisson & Pearson (1997)	n562, t563	N339, T341
124	*Globigerinoides seigliei*	Large, medium to high trochospiral, subquadrate outline	Spinose	Cancellate	Primary aperture interiomarginal umbilicalwide arch with rim. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	5.30	9.60	0.76	3.97	10.19	10.86	81.82	100.00	Stanley *et al.* (1988)	t543	T335
125	*Globigerinoides subquadratus*	Trochospiral, outline subquadrate, chambers spherical to subspherical	Spinose	Cancellate	Primary aperture interiomarginal umbilicalwide arch with distinct rim. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	10.80	23.00	0.01	6.56	18.25	23.90	70.83	84.62	Kennett & Srinivasan (1983)	n528, n536, n538, n540, t541	N326, N332, N334, T360
126	*Globigerinoides trilobus*	Trochospiral, chambers spherical, three in final whorl	Spinose	Cancellate	Primary aperture interiomarginal umbilical low slit. Supplementary sutural aperture on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985); Pearson *et al.* (2001*b*); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	0.00	22.60	0.00	0.70	17.37	24.71	100.00	100.00	FAD: Stanley *et al.* (1988); LAD: Chaisson & Pearson (1997)	n548, n560, t561	N337, N339, T341
127	*Globoconella conoidea*	Low trochospiral, umbilical side strongly conical, distinct keel	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low distinct arch with indistinct rim	14	Kennett & Srinivasan (1983)	3	Schneider & Kennett (1996)	Low to middle latitudes	Kennett & Srinivasan (1983)	5.70	16.40	0.02	3.68	13.22	15.06	100.00	91.67	Wei (1994)	n58, t59	N27
128	*Globoconella conomiozea*	Planoconvex, umbilical side strongly vaulted with acute strong keel	Non-spinose	Cancellate	Interiomarginal extraumbilical high arch, bordered by lip	14	Kennett & Srinivasan (1983)	3	Schneider & Kennett (1996)	Low to middle latitudes	Kennett & Srinivasan (1983)	5.50	6.00	0.40	3.48	11.95	13.74	92.86	100.00	Wei (1994)	n60, t61	N27
129	*Globoconella inflata*	Low trochospiral, globular, slightly umbilico-convex	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical	7	Kennett & Srinivasan (1983)	3	Vergnaud-Grazzini (1976)	Low to high latitudes	Kennett & Srinivasan (1983)	0.00	2.60	0.00	0.16	3.39	6.09	100.00	100.00	Wei (1994)	t70	T29
130	*Globoconella miozea*	Trochospiral, biconvex, equatorial periphery lobulate with keel	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low arch with a thickened rim	14	Kennett & Srinivasan (1983)	3	Schneider & Kennett (1996)	Low to middle latitudes	Kennett & Srinivasan (1983)	11.20	18.30	4.12	5.89	16.93	23.93	80.00	100.00	D. R. M. Stewart unpublished data	n56, t57	N27
131	*Globoconella pliozea*	Trochospiral, biconvex, equatorial periphery lobulate with keel, sutures are raised on spiral side	Non-spinose	Cancellate (weakly developed)	Interiomarginal umbilical-extraumbilical slit with a thickened rim	15	Wei (1994)	3	Schneider & Kennett (1996)		Wei (1994)	3.90	5.05	3.56	3.65	4.90	5.91	100.00	100.00	Wei (1994)	t65	T28
132	*Globoconella puncticulata*	Low trochospiral, umbilico-convexconical	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical high arch with rim	7	Kennett & Srinivasan (1983)	3	Schneider & Kennett (1996)	Low to middle latitudes	Kennett & Srinivasan (1983)	2.30	4.60	0.35	1.09	4.68	8.39	77.78	100.00	Wei (1994)	n68, t69	T29
133	*Globoconella sphericomiozea*	Low trochospiral, umbilico-convexsub-conical	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low arch with rim	7	Kennett & Srinivasan (1983)	3	Schneider & Kennett (1996)	Middle latitudes	Kennett & Srinivasan (1983)	4.50	5.40	1.55	2.06	6.36	6.58	100.00	100.00	Wei (1994)	n66, t67	T29
134	*Globoconella terminalis*	Low trochospiral, spiral side flat, umbilical side distinctly conical, keeled	Non-spinose	Cancellate	Interiomarginal extraumbilical elongate arch bordered by a lip	15	Wei (1987)	3	Schneider & Kennett (1996)		Wei (1987)	5.30	5.60						0.00	Wei (1994)	n62, n63, t64	N27
135	*Globoquadrina conglomerata*	Low trochospiral, equatorial periphery slightly lobate	Non-spinose	Cancellate	Interiomarginal umbilical low arch with umbilical teeth	7	Banner & Blow (1960)	3	This study	Low latitudes	B_ (1968)	0.00	4.20	0.00	0.75	12.76	20.63	81.82	100.00		t348	N172, T174

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
136	*Globoquadrina dehiscens*	Umbilico-convex, very low trochospiral	Non-spinose	Coarsely cancellate	Interiomarginal umbilical low arch covered with umbilical tooth	7	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995); Keller (1985)	Low to middle latitudes	Kennett & Srinivasan (1983)	4.80	25.10	0.01	5.65	23.94	50.55	66.67	100.00	B.S. Wade & P. N. Pearson in preparation	t355	T181
137	*Globorotalia flexuosa*	Largetrochospiral, equatorial periphery oval to elongate, final chamber bent sharply to umbilicus, heavy keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by plate-like lip	14	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	0.20	5.70	0.33	1.95	5.76	10.09	63.64	100.00	D. R. M. Stewart unpublished data	t97	N45, T43
138	*Globorotalia merotumida*	Low trochospiral, biconvex, equatorial periphery slightly lobate with distinct keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with thick lip	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	5.80	11.00	3.14	4.68	10.23	19.91	64.71	100.00	D. R. M. Stewart unpublished data	n92, t93	N42
139	*Globorotalia plesiotumida*	Lenticular trochospiral, ovate periphery with keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by lip	14	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	4.50	6.40	2.51	4.03	8.86	11.72	100.00	100.00	D. R. M. Stewart unpublished data	n94, t95	N42, T41
140	*Globorotalia tumida*	Biconvex tumid test, trochospiral, ovate periphery with keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch covered by plate-like lip	14	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995); D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	0.00	5.80	0.00	0.48	5.88	16.66	100.00	100.00	D. R. M. Stewart unpublished data	n96, n98, t99	N45, T43
141	*Globorotalia ungulata*	Small, umbilico-convex, equatorial periphery ovate with thin but distinct keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch covered by lip	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	4.90	0.04	0.38	4.35	10.09	72.73	100.00	FAD: Chaisson & Leckie (1993); LAD: D. R. M. Stewart unpublished data	t100	T46
142	*Globorotalia zealandica*	Low trochospiral, equatorial periphery quadrilobate, compressed	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical distinct rimmed arch	16	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	16.40	18.60	12.54	14.61	20.54	30.10	57.89	100.00	D. R. M. Stewart unpublished data	t674	N25, N26
143	*Globorotaloides eovariabilis*	Biconvex, lobate, flattened to slightly elevated trochspiral	Spinose	Coarsely cancellate	Umbilical-extraumbilical arch with broad lip	2	Olsson *et al.* (2006*c*)	4	Keller (1985)	Southern and Northern high latitudes	Olsson *et al.* (2006*c*)	16.00	47.00	19.83	23.29	33.58	38.98	90.00	58.06	Olsson *et al.* (2006*c*)	n467, n469, n996, n471, t472	N201, N295, N998, T205
144	*Globorotaloides hexagonus*	Very low trochospiral, spiral side almost flat, equatorial periphery lobulate, chambers spherical	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical very low arch covered by distinct apertural plate or thick rim	2	Kennett & Srinivasan (1983)	4	Keller (1985); Pearson *et al.* (2001*b*)	Low latitudes	Kennett & Srinivasan (1983)	0.00	17.30	0.00	0.39	13.44	20.64	100.00	100.00	Kennett & Srinivasan (1983)	n668, t470	N203, T205
145	*Globorotaloides quadrocameratus*	Umbilico-convex, very low trochospiral	Spinose	Coarsely cancellate	Umbilical low opening bordered by narrow thickened lip	2	Olsson *et al.* (2006*c*)	4	Keller (1985)	Low to high latitudes	Olsson *et al.* (2006*c*)	33.70	55.20						0.00	Olsson *et al.* (2006*c*)	n451, n465, t466	N190, N199, T200
146	*Globorotaloides testarugosa*	Very low trochospiral, profile subovate to subcircular, slightly lobate	Spinose	Coarsely cancellate	Umbilical-extraumbilical very low arch sometimes covered by small bulla	2	Spezzaferri (1994)	4	Keller (1985)	Middle latitudes	Spezzaferri (1994)	22.50	32.50	39.75	39.77	40.06	40.08	100.00	0.00	Spezzaferri (1994)	t468	T202
147	*Globorotaloides variabilis*	Very low trochospiral, spiral side almost flat, equatorial periphery lobulate, chambers subangular to ovate	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical very low arch or slit	2	Kennett & Srinivasan (1983)	4	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	4.80	17.10	0.07	3.44	29.88	50.55	68.63	100.00	Kennett & Srinivasan (1983)	t473	T204
148	*Globoturborotalita angulofficinalis*	Moderately low trochospiral globular with lobulate outline	Spinose	Cancellate	Umbilical low round arch bordered by narrow lip	2	Olsson *et al.* (2006*a*)	2	Douglas & Savin (1978)	Low to middle latitudes	Olsson *et al.* (2006*a*)	23.80	34.50	21.97	23.74	31.39	33.13	100.00	91.67	Olsson *et al.* (2006*a*)	t520	T321
149	*Globoturborotalita apertura*	Low trochospiral, chambers spherical to subspherical	Spinose	Cancellate	Umbilical very large semi-circular arch with distinct rim	2	Kennett & Srinivasan (1983)	2	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	1.30	10.90	0.25	1.78	9.30	11.35	100.00	100.00	Stanley *et al.* (1988)	t591	T356

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
150	*Globoturborotalita bassriverensis*	Moderate to low trochospiral, globular	Spinose	Cancellate	Umbilical rounded arch bordered by a narrow lip that is sometimes thickened	2	Olsson *et al.* (2006*a*)	2	Pearson *et al.* (2001*a*)	Low to middle latitudes	Olsson *et al.* (2006*a*)	42.40	55.40						0.00	Olsson *et al.* (2006*a*)	n500, n513, n514, t515	N314, N318
151	*Globoturborotalita bollii*	Small, compact, trochospiral, chambers spherical to ovate	Spinose	Cancellate	Primary aperture interiomarginal umbilical small almost circular opening. Supplementary sutural aperture on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	2.30	12.50	0.07	1.40	14.58	33.74	67.65	100.00	Stanley *et al.* (1988)	n584, t585	T353
152	*Globoturborotalita brazieri*	Low trochospiral, subquadrate outline	Spinose	Hispid	Umbilical very high arch with a thick rim	2	Kennett & Srinivasan (1983)	1	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	15.10	23.80	16.12	16.46	24.72	26.55	100.00	88.89	Kennett & Srinivasan (1983)	n526, t527	N325, T361
153	*Globoturborotalita connecta*	Low trochospiral, compacte, quatorial periphery trilobate	Spinose	Hispid	Low arch with faint rim	2	Kennett & Srinivasan (1983)	1	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	16.80	23.00	3.39	7.92	24.64	26.55	70.83	100.00	Stanley *et al.* (1988)	n546, t547	N337
154	*Globoturborotalita decoraperta*	Compact, low to medium-high trochospiral, outline lobulate, chambers spherical to subspherical	Spinose	Cancellate	Interiomarginal umbilical large semicirular bordered by a rim	2	Kennett & Srinivasan (1983)	2	This study	Low latitudes	Kennett & Srinivasan (1983)	2.00	15.00	0.16	2.30	11.37	23.23	75.00	100.00	FAD: Stanley *et al.* (1988); LAD: Chaisson & Pearson (1997)	n578, t579	N349
155	*Globoturborotalita gnaucki*	Moderately low trochosprial, globular with lobulate outline	Spinose	Cancellate	Umbilical rounded arch bordered by a thin thickened rim	2	Olsson *et al.* (2006*a*)	2	This study	Low to middle latitudes	Olsson *et al.* (2006*a*)	30.30	35.30						0.00	Olsson *et al.* (2006*a*)	n518, t519	T321
156	*Globoturborotalita kennetti*	Low spired, spherical to subspherical chambers	Spinose	Cancellate	Primary aperture centred over suture of final and penultimate chambers. Supplementary sutural apertures on spiral side	3	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	5.30	9.00	3.14	4.58	10.77	10.88	50.00	25.00	Stanley *et al.* (1988)	t586	T353
157	*Globoturborotalita labiacrassata*	Low trochospiral, profile subcircular, slightly lobulate	Spinose	Cancellate	High semicircular arch bordered by thick distinct rim	2	Spezzaferri (1994)	2	This study	South Atlantic and Pacific	Spezzaferri (1994)	16.30	30.40	19.83	21.18	30.40	31.99	100.00	80.00	Spezzaferri (1994)	t524	T323
158	*Globoturborotalita martini*	Moderately low trochosprial, globular with lobulate outline	Spinose	Cancellate	Umbilical rounded arch bordered by a thickened rim	2	Olsson *et al.* (2006*a*)	1	Pearson *et al.* (2001*a*)	Low to middle latitudes	Olsson *et al.* (2006*a*)	30.30	44.00	0.33	23.77	47.69	52.20	50.94	71.43	FAD: Olsson *et al.* (2006*a*); LAD: NEPTUNE	n521, n522, t523	N322
159	*Globoturborotalita nepenthes*	Compactly coiled except for last-formed protuding chamber, low to high spire	Spinose	Cancellate	Broad arch at the umbilical edge of the final chamber bordered by thickened rim	2	Kennett & Srinivasan (1983)	2	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	4.30	12.10	2.18	4.40	10.88	19.38	83.33	100.00	Stanley *et al.* (1988)	t588	T355
160	*Globoturborotalita ouachitaensis*	Moderately low trochosprial, globular with lobulate outline	Spinose	Cancellate	Umbilical rounded arch bordered by a thickened rim	2	Olsson *et al.* (2006*a*)	1	Wade & Pearson (2008)	Low to middle latitudes	Olsson *et al.* (2006*a*)	23.80	43.10	1.43	22.96	33.05	33.77	42.42	52.38	Olsson *et al.* (2006*a*)	n516, t517	N319, T320
161	*Globoturborotalita rubescens*	Small, trochospiral, equatorial periphery lobulate, chambers spherical to subspherical	Spinose	Cancellate	Umbilical small rounded opening bordered by a distinct rim	2	Kennett & Srinivasan (1983)	2	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	3.60	0.00	0.09	5.09	19.72	66.67	100.00	FAD: Chassion & Pearson (1997); LAD: Stanley *et al.* (1988)	n580, t581	N349, T350
162	*Globoturborotalita tenella*	Small, low trochospiral, chambers spherical	Spinose	Cancellate	Primary aperture umbilical large almost circular opening with distinct rim small supplementary aperture on spiral side	2	Kennett & Srinivasan (1983)	2	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	2.40	0.00	0.15	2.07	2.54	100.00	100.00	Kennett & Srinivasan (1983)	t582	N349, T351

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
163	*Globoturborotalita woodi*	Low trochospiral, equatorial periphery quadrilobate, chambers spherical to subspherical	Spinose	Cancellate	Interiomarginal umbilical high arch bordered by a thick rim	2	Kennett & Srinivasan (1983)	1	Pearson *et al.* (1997*b*, 2007)	Low to middle latitudes	Kennett & Srinivasan (1983)	2.40	30.60	0.16	2.80	23.78	36.12	83.78	96.55	FAD: Stanley *et al.* (1988); LAD: Chaisson & Pearson (1997)	n525, n545, n565, n567, n577, n583, n587, n589, t590	N324, N336, N342, N344, N348, N352, N354, T356
164	*Guembelitrioides nuttalli*	High spired trochospiral to helicospiral, globular	Spinose	Cancellate	Umbilical high arch supplementary apertures present along sutures on spiral side	2	Olsson *et al.* (2006*c*)	3	Pearson *et al.* (1993)	Low to middle latitudes	Olsson *et al.* (2006*c*)	42.30	46.40	40.32	41.54	48.38	49.89	100.00	100.00	Olsson *et al.* (2006*c*)	n406, t407	N237, T238
165	*Hantkenina alabamensis*	Planispiral ,compact, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial high arch which is narrow at the top becoming broader at the base bordered by imperforate lip	10	Coxall & Pearson (2006)	2	Poore & Matthews (1984); Boersma *et al.* (1987) Coxall *et al.* (2000); Pearson *et al.* (2001*a*); Wade & Kroon (2002)	Low to middle latitudes	Coxall & Pearson (2006)	33.70	39.80	32.79	34.04	40.25	44.74	84.62	100.00	Coxall & Pearson (2006)	n395, t396	N358, T229
166	*Hantkenina australis*	Planispiral, laterally compressed, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial high arch which is narrow at the top becoming broader at the base bordered by imperforate lip	10	Coxall & Pearson (2006)	3	This study	Low to middle latitudes and commonly in high northerly and southerly extremes	Coxall & Pearson (2006)	38.10	42.30	34.41	34.41	34.41	34.41	100.00	0.00	Coxall & Pearson (2006)	t388	T226
167	*Hantkenina compressa*	Planispiral, laterally compressed, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial high narrow arch flaring into lateral lobes at the base bordered by wide flaring lip	10	Coxall & Pearson (2006)	2	Coxall & Pearson (2006)	Low to middle latitudes	Coxall & Pearson (2006)	33.70	41.20						0.00	Coxall & Pearson (2006)	n391, n393, t394	N227, T228
168	*Hantkenina dumblei*	Planispiral, involute, laterally compressed, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial elongated arch widening towards base into weak apertural lobes bordered by imperforate flaring lip	10	Coxall & Pearson (2006)	3	Pearson *et al.* (1993, 2001*a*); Coxall & Pearson (2006)	Low to middle latitudes	Coxall & Pearson (2006)	39.00	43.90	40.08	40.08	40.08	40.08	100.00	20.00	Coxall & Pearson (2006)	n387, n389, t390	N225, N227
169	*Hantkenina lehneri*	Planispiral, involute, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial elongated arch bordered by well-pronounced crenulated pustluose lip	10	Coxall & Pearson (2006)	3	This study	Found in Trinidad-Tanzania and Russia	Coxall & Pearson (2006)	41.40	43.91						0.00	Coxall & Pearson (2006)	t384	N223, T224
170	*Hantkenina liebusi*	Planispiral, involute, laterally compressed, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial elongated arch bordered two-thirds of the way up by a crenulated pustulose lip	10	Coxall & Pearson (2006)	4	Pearson *et al.* (1993, 2001*a*); Coxall *et al.* (2000)	Low to middle latitudes	Coxall & Pearson (2006)	39.70	44.20	34.41	35.58	40.31	40.32	57.14	16.67	Coxall & Pearson (2006)	n383, n385, t386	N223, N225
171	*Hantkenina mexicana*	Planispiral, evolute, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial elongated arch bordered by flaring often crenulated and pustulose lip	10	Coxall & Pearson (2006)	4	Coxall *et al.* (2000); Pearson *et al.* (2001*a*)	Low latitudes	Coxall & Pearson (2006)	43.80	44.41						0.00	Coxall & Pearson (2006)	n381, t382	N223, N241
172	*Hantkenina nanggulanensis*	Planispiral, biumbilicate, strongly inflated, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial high narrow arch flaring into lateral lobes at the base or open and triangular	10	Coxall & Pearson (2006)	2	Wade & Pearson (2008)	Low to middle latitudes	Coxall & Pearson (2006)	33.70	38.10						0.00	Coxall & Pearson (2006)	n397, t398	T230
173	*Hantkenina primitiva*	Planispiral, somewhat evolute, laterally compressed, biumbilicate, chambers tubulospinose	Probably non-spinose	Smooth	Equatorial high narrow arch flaring into lateral lobes at the base bordered by wide flaring lip	10	Coxall & Pearson (2006)	3	This study	Cosmopolitan, most common in shelf environments	Coxall & Pearson (2006)	33.70	40.00	32.79	32.83	34.41	34.42	66.67	14.29	Coxall & Pearson (2006)	t392	N227, T228

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
174	*Hantkenina singanoae*	Planispiral to pseudo-planispiral, laterally compressed, biumbilicate, chambers proto-tubulospinose	Probably non-spinose	Smooth, weakly cancellate	Equatorial high arch with a smooth broad lip	10	Coxall & Pearson (2006)	3	This study	Found only in Tanzania and Austria so far	Coxall & Pearson (2006)	44.40	44.50						0.00	Coxall & Pearson (2006)	n379, t380	N223
175	*Hedbergella holmdelensis*	Biconvex, very low trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with narrow lip	7	Olsson *et al.* (1999)	3	This study	Cosmopolitan	Olsson *et al.* (1999)	64.90	70.60	63.56	64.21	65.88	65.95	100.00	100.00	Olsson *et al.* (1999)	n150, n2, t1	N1, N3
176	*Hedbergella monmouthensis*	Umbilico-convex, very low trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with distinct narrow lip	7	Olsson *et al.* (1999)	3	Berggren & Norris (1997)	Cosmopolitan	Olsson *et al.* (1999)	64.85	69.20	52.78	52.81	65.90	66.00	28.57	100.00	Olsson *et al.* (1999)	n356, n151, n152, t153	N198, N2, N256, T67
177	*Hirsutella bermudezi*	Very small, low trochospiral, equatorial periphery subcirular, slightly biconvex	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with distinct thin lip	16	Kennett & Srinivasan (1983)	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	2.00	0.76	1.33	14.97	15.31	43.75	100.00	D. R. M. Stewart unpublished data	t149	T124
178	*Hirsutella challengeri*	Low trochospiral, unequally biconvex, equatorial periphery lobate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical distinct arch with a prominent lip	16	Kennett & Srinivasan (1983)	4	This study	Middle latitudes	Kennett & Srinivasan (1983)	10.00	15.15	6.53	7.83	10.88	10.90	40.00	16.67	D. R. M. Stewart unpublished data	n102, t103	T33
179	*Hirsutella cibaoensis*	Low trochospiral, biconvex, equatorial periphery subquadrate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by a thin lip	16	Kennett & Srinivasan (1983)	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	4.40	7.20	3.81	4.45	8.58	9.92	100.00	100.00	D. R. M. Stewart unpublished data	n108, n132, t133	N52, N54, T53
180	*Hirsutella evoluta*	As H. margaritae but larger with a more symmetrical profile	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit bordered by a pronounced lip	16	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	This study	3.90	4.80	2.99	3.06	5.05	6.28	100.00	100.00	D. R. M. Stewart unpublished data	t141	N48
181	*Hirsutella gigantea*	Large, medium to low trochospiral, equatorial periphery slightly lobulate with keel-like rim	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit bordered by a pronounced lip	14	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	D. R. M. Stewart unpublished data	14.99	8.80	11.32	11.37	12.39	12.49	100.00	28.57	D. R. M. Stewart unpublished data	t661	N47, N51
182	*Hirsutella hirsuta*	Large, high trochospiral, highly convex on spiral side, concave on umbilical side	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by a thin lip	15	Kennett & Srinivasan (1983)	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	3.00	0.00	0.09	6.81	8.30	100.00	100.00	D. R. M. Stewart unpublished data	t146	T50
183	*Hirsutella juanai*	Small, very low trochospiral, biconvex, equatorial periphery slightly lobate	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch or slit bordered by a thin lip	16	Kennett & Srinivasan (1983)	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	4.80	10.90	4.19	5.39	8.61	9.29	100.00	85.71	D. R. M. Stewart unpublished data	t104	T33
184	*Hirsutella margaritae*	Low trochospiral, compressed, spiral side convex, umbilical side concave with thin keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit bordered by a pronounced lip	14	Kennett & Srinivasan (1983)	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	2.95	5.89	2.25	3.43	6.57	14.69	84.62	100.00	D. R. M. Stewart unpublished data	n139, n142, n144, t145	N48, T50
185	*Hirsutella praemargaritae*	Medium to low trochospiral, equatorial periphery slightly lobulate with keel-like rim	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit bordered by a pronounced lip	14	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	This study	5.70	8.20	6.23	6.24	6.41	6.42	100.00	25.00	D. R. M. Stewart unpublished data	n136, t137	N48

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
186	*Hirsutella praescitula*	Low trochospiral, biconvex, equatorial periphery subangular	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by a thin lip	16	Kennett & Srinivasan (1983)	4	Pearson *et al.* (2001*b*)	Low to middle latitudes	Kennett & Srinivasan (1983)	14.80	18.30	6.04	11.92	18.42	23.85	77.78	100.00	D. R. M. Stewart unpublished data	n55, n71, n101, n105, n631, t106	N25, N26, N32
187	*Hirsutella primitiva*	As H. margaritae but smaller and lacking a complete keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit bordered by a pronounced lip	14	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	This study	4.80	5.90	3.56	3.84	6.29	6.61	100.00	100.00	D. R. M. Stewart unpublished data	n138, t140	N48
188	*Hirsutella scitula*	Medium to low trochospiral, equatorial periphery slightly lobulate with keel-like rim	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit bordered by a pronounced lip	14	Kennett & Srinivasan (1983)	4	Shackleton & Vincent (1978); D. R. M. Stewart unpublished data	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	15.00	0.00	0.31	12.26	56.60	34.48	100.00	D. R. M. Stewart unpublished data	n660, n135, n107, n147, t148	N122, N47, N51, T123
189	*Hirsutella theyeri*	Large, thin, planoconvex to biconvex, markedly flaring chambers in final whorl with a thin discontinous peripheral keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by a distinct but thin lip	14	Kennett & Srinivasan (1983)	4	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	3.50	0.31	0.35	2.36	3.17	100.00	100.00	D. R. M. Stewart unpublished data	t143	T49
190	*Igorina albeari*	Biconvex, trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low slit with distinct thin lip	12	Olsson *et al.* (1999)	1	Berggren & Norris (1997)	Tropical to subtropical	Olsson *et al.* (1999)	55.90	60.05	55.21	55.98	60.31	60.36	66.67	66.67	Olsson *et al.* (1999)	t166	T73
191	*Igorina anapetes*	Low trochospiral, subcircular, subtriangular chambers	Non-spinose	Muricate	Continous circumumbilical low arching slit	7	Berggren *et al.* (2006*a*)	1	This study	Low to middle latitudes	Berggren *et al.* (2006*a*)	43.60	45.40						0.00	Berggren *et al.* (2006*a*)	t175	T74
192	*Igorina broedermanni*	Umbilico-convex to weakly biconvex, low trochospiral	Non-spinose	Smooth	Low slit extending towards peripheral margin	7	Berggren *et al.* (2006*a*)	1	Pearson *et al.* (1993, 2001*a*)	Low to middle latitudes	Berggren *et al.* (2006*a*)	43.70	55.60	36.82	42.63	51.66	54.30	78.95	92.31	Berggren *et al.* (2006*a*)	n173, t174	T74
193	*Igorina lodoensis*	Biconvex, low trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with narrow lip	7	Berggren *et al.* (2006*a*)	1	This study	Low to middle latitudes	Berggren *et al.* (2006*a*)	50.50	55.80						0.00	Berggren *et al.* (2006*a*)	n171, t172	T74
194	*Igorina pusilla*	Biconvex, low trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by a thin lip	7	Olsson *et al.* (1999)	1	This study	Low to middle latitudes	Olsson *et al.* (1999)	59.50	60.95	31.23	53.62	60.18	60.61	33.33	100.00	Olsson *et al.* (1999)	n165, n167, t168	N72
195	*Igorina tadjikistanensis*	Biconvex, trochospiral	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by a thin lip	7	Olsson *et al.* (1999)	1	Berggren & Norris (1997)	Low to middle latitudes	Olsson *et al.* (1999)	55.40	60.00	48.07	49.27	60.21	60.85	84.62	100.00	Olsson *et al.* (1999)	n169, t170	T74
196	*Menardella archeomenardii*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with distinct lip	14	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995); D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	14.20	15.60	0.01	0.19	14.99	15.73	43.75	100.00	D. R. M. Stewart unpublished data	n72, t73	N30, T31
197	*Menardella exilis*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	1.90	5.70	0.76	1.21	4.50	6.94	100.00	100.00	D. R. M. Stewart unpublished data	n85, t86	T38
198	*Menardella fimbriata*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	0.20						0.00	D. R. M. Stewart unpublished data	t91	T44
199	*Menardella limbata*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with lip	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	2.30	11.40	0.94	2.52	10.11	16.44	76.47	100.00	D. R. M. Stewart unpublished data	n79, n77, n83, t84	N35, N37, T39

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
200	*Menardella menardii*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with thick lip	14	Kennett & Srinivasan (1983)	3	Shackleton & Vincent (1978); Pearson & Shackleton (1995); D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	0.00	12.31	0.00	0.54	11.07	17.41	89.47	100.00	D. R. M. Stewart unpublished data	n76, n88, n89, t90	N34, N40, T44
201	*Menardella miocenica*	Lenticular, planoconvex, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with thin lip	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	2.40	3.30	0.40	2.14	5.27	9.27	90.00	100.00	FAD: Chassion & Pearson (1997); LAD: D. R. M. Stewart unpublished data	t82	T39
202	*Menardella multicamerata*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with distinct lip	14	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	2.20	6.50	1.35	2.54	7.58	20.33	60.00	100.00	D. R. M. Stewart unpublished data	t78	T36
203	*Menardella pertenius*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Umbilical-extraumbilical low-arched slit with flaring lip forming a thin plate extending over the umbilical area	14	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	1.70	3.20	0.40	1.91	6.41	7.29	100.00	100.00	FAD: Chassion & Pearson (1997); LAD: D. R. M. Stewart unpublished data	t87	T38
204	*Menardella praemenardii*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with distinct lip	14	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995); D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	12.30	14.60	2.38	9.16	14.94	18.07	88.24	100.00	FAD: Chassion & Pearson (1997); LAD: D. R. M. Stewart unpublished data	n74, t75	N34
205	*Menardella pseudomiocenica*	Lenticular, low trochospiral, prominent keel and densely perforate surface	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit with lip	14	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	2.40	7.50	0.39	2.29	7.02	7.66	100.00	100.00	FAD: Chassion & Leckie (1993); LAD: D. R. M. Stewart unpublished data	n80, t81	T39
206	*Morozovella acuta*	Umbilico-convex, trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical slit with triangular circumumbilical teeth	18	Olsson *et al.* (1999)	1	Shackleton *et al.* (1985)	Low to middle latitudes	Olsson *et al.* (1999)	54.45	59.15	49.74	53.81	58.34	58.43	70.00	83.33	Olsson *et al.* (1999)	t188	T78
207	*Morozovella acutispira*	Biconvex, trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low arch	18	Olsson *et al.* (1999)	1	Berggren & Norris (1997)	Low to middle latitudes	Olsson *et al.* (1999)	56.35	59.40	56.02	56.02	59.87	60.36	80.00	75.00	Olsson *et al.* (1999)	t182	N79, T82
208	*Morozovella aequa*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low slit	18	Olsson *et al.* (1999)	1	Lu & Keller (1996); Berggren & Norris (1997)	Cosmopolitan	Olsson *et al.* (1999)	50.80	56.50	47.90	50.23	58.08	58.31	83.33	71.43	Olsson *et al.* (1999)	n199, t251	N83, N84, T85
209	*Morozovella allisonensis*	Low to medium trochospiral, subcircular	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low arch	18	Berggren & Pearson (2006)	1	Kelly *et al.* (1998)	Low latitudes	Berggren & Pearson (2006)	55.30	55.50						0.00	Berggren & Pearson (2006)	t657	T369
210	*Morozovella angulata*	Umbilico-convex, trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low arch with weakly developed lip	18	Olsson *et al.* (1999)	1	Douglas & Savin (1978); Boersma & Premoli Silva (1983); Shackleton *et al.* (1985)	Low to middle latitudes	Olsson *et al.* (1999)	59.30	60.95	6.16	56.34	60.55	61.06	14.29	100.00	Olsson *et al.* (1999)	n177, n189, t190	N101, N76, N83
211	*Morozovella apanthesma*	Umbilico-convex, low trochospiral, weakly keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical arch with narrow continuous intraperiumbilical lip	18	Olsson *et al.* (1999)	1	Lu & Keller (1996); Berggren & Norris (1997)	Northern middle latitudes to the Southern Ocean	Olsson *et al.* (1999)	54.45	60.00	51.71	52.76	58.86	59.06	55.56	66.67	Olsson *et al.* (1999)	n191, n192, t193	N83

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
212	*Morozovella aragonensis*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	Umbilical-extraumbilical low arch extending to peripheral margin	19	Berggren & Pearson (2006)	1	Boersma *et al.* (1987); Pearson *et al.* (1993, 2001*a*)	Low latitudes	Berggren & Pearson (2006)	43.60	52.30	1.58	43.65	51.31	51.96	21.57	90.00	Berggren & Pearson (2006)	t214	T95
213	*Morozovella caucasica*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	Umbilical-extraumbilical low slit extending to periphery	19	Berggren & Pearson (2006)	1	This study	Low latitudes	Berggren & Pearson (2006)	45.15	50.80	43.72	44.89	48.06	49.26	100.00	83.33	FAD: Berggren & Pearson (2006); LAD: NEPTUNE	t210	T97
214	*Morozovella conicotruncata*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low slit	18	Olsson *et al.* (1999)	1	Boersma & Premoli Silva (1983); Berggren & Norris (1997)	Low latitudes	Olsson *et al.* (1999)	59.30	60.80	56.02	56.10	60.37	60.61	100.00	100.00	Olsson *et al.* (1999)	n178, t179	N80
215	*Morozovella crater*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low slit with thin lip	19	Berggren & Pearson (2006)	1	This study	Low latitudes	Berggren & Pearson (2006)	43.90	53.50	48.12	48.25	49.46	49.57	100.00	18.18	Berggren & Pearson (2006)	n209, t211	N98, T96
216	*Morozovella edgari*	Low to moderately conical trochospiral, weakly lobulate peripheral outline	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low arch	19	Berggren & Pearson (2006)	1	Kelly *et al.* (2001)	Low latitudes	Berggren & Pearson (2006)	54.00	54.90	31.23	33.55	55.71	55.84	12.00	100.00	Berggren & Pearson (2006)	t659	T371
217	*Morozovella formosa*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch extending to periphery	19	Berggren & Pearson (2006)	1	This study	Low latitudes	Berggren & Pearson (2006)	50.40	54.00	51.22	51.22	51.24	51.24	100.00	25.00	Berggren & Pearson (2006)	t203	T92
218	*Morozovella gracilis*	Umbilico-convex, low trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low arch	18	Olsson *et al.* (1999)	1	This study	Cosmopolitan	Olsson *et al.* (1999)	50.80	55.70	46.18	50.08	54.72	54.84	33.33	33.33	Olsson *et al.* (1999)	n201, t202	T92
219	*Morozovella lensiformis*	Biconvex to umbilico-convex, low trochospiral-keeled periphery	Non-spinose	Muricate	Umbilical-extraumbilical low slit extending to periphery	19	Berggren & Pearson (2006)	1	Boersma *et al.* (1987)	Low latitudes	Berggren & Pearson (2006)	50.60	54.00	43.72	48.30	53.16	53.27	54.55	75.00	Berggren & Pearson (2006)	n208, n212, t213	N94, T95
220	*Morozovella marginodentata*	Biconvex, low trochospiral	Non-spinose	Muricate	Umbilical-extraumbilical low arch	18	Berggren & Pearson (2006)	1	This study	Low latitudes	Berggren & Pearson (2006)	51.60	55.55	49.74	50.64	55.47	55.83	85.71	100.00	Berggren & Pearson (2006)	t205	T91
221	*Morozovella occlusa*	Biconvex to umbilico-convex, trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical arch with distinct lip	18	Olsson *et al.* (1999)	1	Shackleton *et al.* (1985); Lu & Keller (1996)	Low to middle latitudes	Olsson *et al.* (1999)	54.45	59.35	49.98	54.15	58.18	60.38	66.67	83.33	Olsson *et al.* (1999)	t184	N79, T81
222	*Morozovella pasionensis*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	A low slit extending al.ong peri-intraumbilical margin to peripheral margin of last chamber	18	Olsson *et al.* (1999)	1	Shackleton *et al.* (1985); Lu & Keller (1996)	Low latitudes	Olsson *et al.* (1999)	54.45	59.50						0.00	Olsson *et al.* (1999)	n181, n183, t185	N79, T82
223	*Morozovella praeangulata*	Umbilico-convex, trochospiral	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical slit with intraperiumbilical lip	18	Olsson *et al.* (1999)	1	Shackleton *et al.* (1985)	Low to middle latitudes	Olsson *et al.* (1999)	60.00	61.15	58.28	58.29	58.60	58.63	100.00	0.00	Olsson *et al.* (1999)	n176, n215, t216	N101, N76
224	*Morozovella subbotinae*	Umbilico-convex, low trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical small slit with weak lip	18	Olsson *et al.* (1999)	1	D'hondt *et al.* (1994)	Low to middle latitudes	Olsson *et al.* (1999)	50.80	55.90	35.84	43.60	55.92	63.48	44.83	100.00	Olsson *et al.* (1999)	n200, n204, n206, t207	N88, N89, N90, T93
225	*Morozovella velascoensis*	Umbilico-convex, trochospiral, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low arch	19	Olsson *et al.* (1999)	1	Berggren & Norris (1997)	Low to middle latitudes	Olsson *et al.* (1999)	54.45	59.90	47.90	52.51	59.11	60.36	92.86	100.00	Olsson *et al.* (1999)	n180, n186, n656, n658, t187	N368, N370, N80, T78
226	*Morozovelloides bandyi*	Planoconvex to lenticular, low trochospiral, keeled periphery	Non-spinose	Muricate	Umbilical-extraumbilical low flat arch	17	Pearson & Berggren (2006)	1	Boersma *et al.* (1987); Pearson *et al.* (1993, 2001*a*)	Cosmopolitan	Pearson & Berggren (2006)	42.30	48.10	36.82	38.37	47.92	48.29	92.31	100.00	Pearson & Berggren (2006)	n268, t269	N137, N139, T141
227	*Morozovelloides coronatus*	Low trochospiral, spiral side weakly convex, umbilical side distinctly convex, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low slit	19	Pearson & Berggren (2006)	1	Wade *et al.* (2001); Wade & Kroon (2002)	Low latitudes	Pearson & Berggren (2006)	40.10	45.40						0.00	Pearson & Berggren (2006)	n272, t273	N137, N139, T143

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
228	*Morozovelloides crassatus*	Low trochospiral, asymmetrically biconvex, elongate ovalweakly to moderately lobulate, keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low slit	17	Pearson & Berggren (2006)	1	Boersma *et al.* (1987); Pearson *et al.* (1993, 2001*a*); Wade *et al.* (2001); Wade & Kroon (2002); Wade *et al.* (2008)	Low latitudes	Pearson & Berggren (2006)	38.00	45.90	39.33	40.02	51.47	51.96	84.62	62.50	Pearson & Berggren (2006)	n270, t271	N137, N139, T143
229	*Morozovelloides lehneri*	Low trochospiral, biconvex, elongate oval, strongly lobulate, strongly fimbriate keeled periphery	Non-spinose	Muricate	Interiomarginal umbilical-extraumbilical low slit	17	Pearson & Berggren (2006)	1	Boersma *et al.* (1987); Pearson *et al.* (2007)	Low latitudes	Pearson & Berggren (2006)	40.10	44.65	37.76	40.23	42.69	42.90	50.00	40.00	Pearson & Berggren (2006)	t274	T138
230	*Neogloboquadrina acostaensis*	Low trochospiral, equatorial periphery strongly lobulate	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low arch with distinct rim or plate covering much of the umbilicus	7	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	1.70	10.90	0.16	2.09	9.43	34.21	40.00	100.00	Kennett & Srinivasan (1983)	n311, n320, t312	N157, N160, T161
231	*Neogloboquadrina continuosa*	Low trochospiral, equatorial periphery lobulate, chambers subspherical to ovate	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low arch bordered by a distinct rim	7	Kennett & Srinivasan (1983)	3	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	7.80	23.20	0.01	5.22	27.85	31.14	96.88	100.00	FAD: Chaisson & Leckie (1993); LAD: Stott & Webb (1989)	n53, n310, n318, t319	N156, N157, N160, N23
232	*Neogloboquadrina dutertrei*	Trochospiral, globose, spiral side flat to slightly convex	Non-spinose	Cancellate	Umbilical-extraumbilical broad deep opening with tooth-like umbilical plates often present	7	Kennett & Srinivasan (1983)	3	Kahn (1979); Shackleton & Vincent (1978)	Low latitudes	Kennett & Srinivasan (1983)	0.00	6.90	0.00	0.35	5.19	10.47	100.00	100.00	FAD: Chaisson & Leckie (1993); LAD: Kennett & Srinivasan (1983)	t324	T158
233	*Neogloboquadrina humerosa*	Low trochospiral, equatorial periphery lobulate, chambers ovate	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low to medium arch with distinct rim	7	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	1.60	9.70	0.03	1.47	7.78	10.77	100.00	100.00	Chaisson & Pearson (1997)	n322, t323	T158
234	*Neogloboquadrina pachyderma*	Low trochospiral, lobulate rounded periphery	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical low arch with a thick apertural rim	7	Kennett & Srinivasan (1983)	5	Vergnaud-Grazzini (1976)	Low to high latitudes	Kennett & Srinivasan (1983)	0.00	10.80	0.00	0.29	6.91	24.10	73.08	100.00	Chaisson & Pearson (1997)	t321	T159
235	*Orbulina suturalis*	Almost spherical, final chamber not entirely enveloping earlier test	Spinose	Hispid	Areal apertures-supplementary apertures al.ong sutures separating earlier and final chambers	4	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	15.10	0.64	3.76	14.72	23.93	79.17	100.00	Kennett & Srinivasan (1983)	n557, t630	T338
236	*Orbulina universa*	Completely spherical with final chamber entirely enveloping earlier test	Spinose	Hispid	Numerous small openings of two distinct sizes	4	Kennett & Srinivasan (1983)	4	Vergnaud-Grazzini (1976)	Low to high latitudes	Kennett & Srinivasan (1983)	0.00	15.05	0.00	0.45	12.03	23.58	75.00	100.00	Kennett & Srinivasan (1983)	t559	T338
237	*Orbulinoides beckmanni*	Low trochospiral becoming streptospiral with final chamber hemispherical, almost spherical	Spinose	Cancellate	Primary aperture an umbilical arch later replaced by smaller multiple irregularly arched sutural apertures. Bulla may be present	4	Premoli Silva *et al.* (2006)	1	This study	Low latitudes	Premoli Silva *et al.* (2006)	40.00	40.50	38.54	38.70	40.26	40.28	66.67	100.00	Premoli Silva *et al.* (2006)	t414	T254
238	*Paragloborotalia acrostoma*	Low trochospiral, equatorial periphery subquadrate to oval	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical high arch bordered by a rim	2	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	12.60	23.20	2.73	2.81	23.59	23.90	40.91	58.33	Kennett & Srinivasan (1983)	t441	T194

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
239	*Paragloborotalia bella*	Low trochospiral, equatorial periphery quinquelobate, chambers ovate	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical low arch with a thick lip	2	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	13.90	18.60	16.46	16.47	17.06	17.07	100.00	33.33	Kennett & Srinivasan (1983)	t444	T194
240	*Paragloborotalia griffinoides*	Very low trochospiral, globular	Spinose	Coarsely cancellate	Umbilical-extraumbilical high arch bordered by narrow or thickened continuous lip	2	Olsson *et al.* (2006*c*)	4	Pearson *et al.* (2001*a*)	High latitudes, high productivity/upwelling	Olsson *et al.* (2006*c*)	33.70	55.45						0.00	Olsson *et al.* (2006*c*)	n432, t434	N191, T192
241	*Paragloborotalia incognita*	Small, low trochospiral, equatorial periphery quadrilobate	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical fairly high arch bordered by a thick rim	2	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	16.40	20.90	15.46	16.68	22.90	23.84	100.00	100.00	Kennett & Srinivasan (1983)	t449	T197
242	*Paragloborotalia kugleri*	Low trochospiral, equatorial periphery slightly lobate	Non-spinose	Cancellate	Interiomarginalumbilical-extraumbilicaldistinct arch with lip	16	Kennett & Srinivasan (1983)	1	Keller (1985)	Low latitudes	Kennett & Srinivasan (1983)	21.50	23.80	5.74	9.25	25.60	36.86	65.62	100.00	Kennett & Srinivasan (1983)	n290, n291, t292	N150, N151, T153
243	*Paragloborotalia mayeri*	Low trochospiral, equatorial periphery ovate	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical fairly high arch bordered by a thick rim	2	Kennett & Srinivasan (1983)	3	Pearson *et al.* (2001*b*); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	11.50	28.00	3.25	10.72	32.36	39.01	89.19	100.00	Kennett & Srinivasan (1983)	n439, t440	T194
244	*Paragloborotalia nana*	Very low trochospiral, globular	Spinose	Coarsely cancellate	Umbilical-extraumbilical bordered by narrow or thickened continuous lip	2	Olsson *et al.* (2006*c*)	3	Pearson & Wade (2009)	Low to middle latitudes	Olsson *et al.* (2006*c*)	15.10	47.50	11.59	16.82	35.05	37.00	96.15	66.67	Olsson *et al.* (2006*c*)	n435, n445, n447, t448	N193, N195, T197
245	*Paragloborotalia opima*	Very low trochospiral, compact, profile subquadrate and slightly lobate	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical low to moderately high arch sometimes bordered by a rim	2	Spezzaferri (1994)	3	Wade *et al.* (2007)	Cosmopolitan	Spezzaferri (1994)	27.10	30.30	17.10	23.04	31.45	36.86	70.00	100.00	Spezzaferri (1994)	t446	T196
246	*Paragloborotalia pseudokugleri*	Low trochospiral, profile subcircular and lobate	Non-spinose	Cancellate	Umbilical-extraumbilical low arch	16	Spezzaferri (1994)	1	Pearson & Wade (2009); Poore & Matthews (1984); Pearson *et al.* (1997*b*).	Low to middle latitudes and high productivity/upwelling	Spezzaferri (1994)	23.50	37.20	6.04	17.26	26.30	33.15	50.00	40.00	Spezzaferri (1994)	n288, t289	N150
247	*Paragloborotalia semivera*	Low trochospiral, equatorial periphery ovate, chambers spherical	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical low arch bordered by a rim	2	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	15.50	30.50	12.15	15.73	29.19	30.89	94.74	100.00	Kennett & Srinivasan (1983)	n436, t437	T194
248	*Paragloborotalia siakensis*	Low trochospiral, equatorial periphery ovate, chambers subspherical	Spinose	Coarsely cancellate	Interiomarginal umbilical-extraumbilical low elongate arch bordered by a distinct rim	2	Kennett & Srinivasan (1983)	3	Pearson & Wade (2009)	Low latitudes	Kennett & Srinivasan (1983)	11.40	30.30	0.01	9.77	29.59	38.45	79.49	100.00	Kennett & Srinivasan (1983)	n438, n442, t443	T194
249	*Parasubbotina aff_pseudobulloides*	Umbilico-convex, low trochospiral	Spinose	Cancellate (weakly developed)	Umbilical-extraumbilical high arch with continuous thin lip	2	Olsson *et al.* (1999)	4	Pearson *et al.* (2001*a*); D'hondt & Zachos (1993)	Cosmopolitan	Olsson *et al.* (1999)	64.80	65.00						0.00	Olsson *et al.* (1999)	n357, t358	N182
250	*Parasubbotina eoclava*	Very low trochospiral	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical high arch bordered by well-developed asymmetric flange	2	Olsson *et al.* (2006*c*)	6	Coxall *et al.* (2003)	Low to middle latitudes and high productivity/upwelling	Olsson *et al.* (2006*c*)	44.00	49.25						0.00	Olsson *et al.* (2006*c*)	n367, t368	N218, T219
251	*Parasubbotina griffinae*	Biconvex, very low trochospiral	Spinose	Cancellate	Umbilical-extraumbilical low arch with narrow continuous lip	2	Olsson *et al.* (2006*c*)	6	H. K. Coxall unpublished data	Low to middle latitudes and high productivity/upwelling	Olsson *et al.* (2006*c*)	37.30	48.40	40.59	40.59	40.61	40.61	100.00	8.33	Olsson *et al.* (2006*c*)	n401, t403	N232, T233

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
252	*Parasubbotina inaequispira*	Very low trochospiral, globular	Spinose	Cancellate	Umbilical-extraumbilical low arch bordered by narrow continuous lip	2	Olsson *et al.* (2006*c*)	6	Pearson *et al.* (2001*a*); H. K. Coxall unpublished data	Low to middle latitudes and high productivity/upwelling	Olsson *et al.* (2006*c*)	45.40	55.50	21.81	39.11	52.87	57.20	51.35	90.91	Olsson *et al.* (2006*c*)	n364, n366, n400, n404, t405	N215, N217, N231, N235, T236
253	*Parasubbotina prebetica*	Very low trochospiral, symmetrical elongate chambers	Spinose	Cancellate	Umbilical-extraumbilical low arch bordered by broad lip	2	Olsson *et al.* (2006*c*)	6	This study	Known only from Spain	Olsson *et al.* (2006*c*)	50.90	51.70						0.00	Olsson *et al.* (2006*c*)	t365	T216
254	*Parasubbotina pseudobulloides*	Umbilico-convex, low trochospiral	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical high rounded arch with narrow lip	2	Olsson *et al.* (1999)	4	D'hondt & Zachos (1993); Berggren & Norris (1997)	Cosmopolitan	Olsson *et al.* (1999)	59.70	64.90	33.95	56.51	64.84	65.26	39.39	100.00	Olsson *et al.* (1999)	n359, t360	T183
255	*Parasubbotina pseudowilsoni*	Very low trochospiral, globular lobulate outline	Spinose	Cancellate	Umbilical low arch bordered by narrow lip of varying thickness	2	Olsson *et al.* (2006*c*)	3	This study	Low to middle latitudes	Olsson *et al.* (2006*c*)	40.50	47.60						0.00	Olsson *et al.* (2006*c*)	t476	T189
256	*Parasubbotina varianta*	Umbilico-convex, very low trochospiral	Spinose	Cancellate	Umbilical-extraumbilical rounded high arch bordered by fairly broad continuous lip	2	Olsson *et al.* (1999)	3	Olsson *et al.* (1999); Pearson *et al.* (2001*a*)	Cosmopolitan	Olsson *et al.* (1999)	43.00	62.80	40.69	42.91	64.75	64.78	92.00	90.00	Olsson *et al.* (1999)	n361, n363, n431, n450, n474, t475	N182, N184, N186, N187, N188, T189
257	*Parasubbotina variospira*	Moderate to high trochospire	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical arch teeth common	2	Olsson *et al.* (1999)	3	Olsson *et al.* (1999); Pearson *et al.* (2001*a*)	Low latitudes	Olsson *et al.* (1999)	59.30	61.00						0.00	Olsson *et al.* (1999)	t362	T185
258	*Planoglobanomalina pseudoalgeriana*	Evolute to partially involute, asymmetrical to fully planispiral	Non-spinose	Smooth	Equatorial asymmetric to symmetric oval opening bordered by a broad lip	9	Olsson & Hemleben (2006)	2	This study	Low to middle latitudes	Olsson & Hemleben (2006)	45.20	50.80						0.00	Olsson & Hemleben (2006)	t15	T12
259	*Planorotalites capdevilensis*	Weakly to moderately biconvex, trochospiral, keeled periphery	Non-spinose	Muricate	Umbilical-extraumbilical arch bordered by distinct lip	17	Berggren *et al.* (2006*a*)	2	Pearson *et al.* (2001*a*)	Low to middle latitudes	Berggren *et al.* (2006*a*)	38.00	50.40						0.00	Berggren *et al.* (2006*a*)	t195	N86, T87
260	*Planorotalites pseudoscitula*	Biconvex, low trochospiral, keeled periphery	Non-spinose	Muricate	Umbilical-extraumbilical low slit with distinct lip that extends to periphery	17	Berggren *et al.* (2006*a*)	2	Pearson *et al.* (2001*a*)	Low to middle latitudes	Berggren *et al.* (2006*a*)	46.40	55.90	45.44	45.88	52.37	53.86	100.00	80.00	Berggren *et al.* (2006*a*)	n194, n196, t197	N86, T87
261	*Praemurica inconstans*	Umbilico-convex, very low trochospiral	Non-spinose	Cancellate	Interiomarginal umbilical-extraumbilical slit with distinct lipped rim	7	Olsson *et al.* (1999)	2	Berggren & Norris (1997); Boersma & Premoli Silva (1983)	Cosmopolitan	Olsson *et al.* (1999)	60.90	62.80	28.65	58.05	64.21	65.26	28.95	100.00	Olsson *et al.* (1999)	n158, t159	N68
262	*Praemurica lozanoi*	Asymmetrically biconvex, trochospiral	Non-spinose	Cancellate	Interiomarginal umbilical high arch	7	Berggren *et al.* (2006*a*)	2	Pearson *et al.* (2001*a*)	Low to middle latitudes	Berggren *et al.* (2006*a*)	43.00	60.75	43.52	44.48	48.42	48.43	33.33	11.11	Berggren *et al.* (2006*a*)	t164	T75
263	*Praemurica pseudoinconstans*	Biconvex low trochospiral	Non-spinose	Cancellate (weakly developed)	Umbilical high rounded arch bordered by narrow lip broadening towards umbilicus	7	Olsson *et al.* (1999)	2	This study	Low to middle latitudes	Olsson *et al.* (1999)	61.15	64.80						0.00	Olsson *et al.* (1999)	n156, t157	N68
264	*Praemurica taurica*	Umbilico-convex, low trochospiral	Non-spinose	Cancellate (weakly developed)	Umbilical-extraumbilical low to high arch bordered by narrow lip broadening towards umbilicus	7	Olsson *et al.* (1999)	2	Berggren & Norris (1997); D'hondt & Zachos (1993)	Cosmopolitan	Olsson *et al.* (1999)	63.80	64.90						0.00	Olsson *et al.* (1999)	n154, t155	N68
265	*Praemurica uncinata*	Umbilico-convex, low trochospiral	Non-spinose	Cancellate (weakly developed)	Interiomarginal extraumbilical-umbilical low arch exending to peripheral margin	7	Olsson *et al.* (1999)	2	Berggren & Norris (1997); Shackleton *et al.* (1985)	Low to middle latitudes	Olsson *et al.* (1999)	60.70	61.20	58.02	59.27	63.00	64.08	100.00	100.00	Olsson *et al.* (1999)	n160, n161, n162, t163	N68, N69, N70, T71
266	*Praeorbulina circularis*	Subspherical to spherical	Spinose	Cancellate	Numerous small apertures along basal suture	4	Kennett & Srinivasan (1983)	1	Pearson *et al.* (1997*a*)	Low to middle latitudes	Kennett & Srinivasan (1983)	14.90	15.70	11.99	12.11	15.14	15.20	100.00	100.00	Kennett & Srinivasan (1983)	n629, t558	T338

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
267	*Praeorbulina curva*	Subspherical to spherical	Spinose	Cancellate	Four-eight small sutural supplementary apertures	4	Kennett & Srinivasan (1983)	1	Pearson *et al.* (1997*a*)	Low to middle latitudes	Kennett & Srinivasan (1983)	15.00	15.90	0.07	13.45	16.56	23.15	29.17	100.00	Kennett & Srinivasan (1983)	n553, t554	T338
268	*Praeorbulina glomerosa*	Subspherical to spherical	Spinose	Cancellate	Several small cresentric and slit-like openings along basal suture	4	Kennett & Srinivasan (1983)	1	Pearson *et al.* (1997*a*)	Low to middle latitudes	Kennett & Srinivasan (1983)	15.00	15.80	6.60	13.45	15.69	16.51	72.73	100.00	Kennett & Srinivasan (1983)	n555, t556	T338
269	*Praeorbulina sicanus*	Subspherical to spherical	Spinose	Cancellate	Two-three irregular narrow slits at the base of the final chamber	4	Kennett & Srinivasan (1983)	1	Pearson *et al.* (1997, 2001*b*)	Low to middle latitudes	Kennett & Srinivasan (1983)	14.80	16.40	0.01	4.34	16.76	20.39	80.95	100.00	Kennett & Srinivasan (1983)	n551, t552	T338
270	*Protentella nicobarensis*	Small, low trochospiral, outline deeply lobulate, later chambers clavate	Spinose	Cancellate	Umbilical-extraumbilical nearly circular arch varying in height bordered by distinct uniform imperforate lip	5	Kennett & Srinivasan (1983)	6	This study	Low latitudes	Kennett & Srinivasan (1983)	4.00	29.39	3.76	3.76	3.76	3.76	100.00	0.00	Kennett & Srinivasan (1983)	t633	T367
271	*Protentella prolixa*	Small, almost planispiral, biumbilicate, later chambers becoming clavate	Spinose	Cancellate	Nearly equatorial basal high arch bordered by a distinct thick lip	6	Kennett & Srinivasan (1983)	6	This study	Low latitudes	Kennett & Srinivasan (1983)	11.40	29.40	15.47	15.65	17.29	17.34	100.00	15.79	Kennett & Srinivasan (1983)	n731, t632	T367
272	*Protentelloides dalhousiei*	Extremely low trochospiral becoming planispiral in final whorl	Spinose	Cancellate	Has two types of aperture (1) Hantkenina type (2) large low-arched slit with a distinct rim	6	Zhang & Scott (1995)	6	This study	Low latitudes	Zhang & Scott (1995)	25.70	23.80						0.00	Zhang & Scott (1995)	t999	T999
273	*Protentelloides primitiva*	Extremely low trochospiral becoming planispiral in final whorl	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical slit-like opening	6	Zhang & Scott (1995)	6	This study	Low latitudes	Zhang & Scott (1995)	26.30	23.80						0.00	Zhang & Scott (1995)	n997, t998	T999
274	*Pseudoglobigerinella bolivariana*	Nearly involute, asymmetrically planispiral	Spinose	Cancellate	Asymmetrical equatorial low to high arch with imperforate rim	6	Olsson *et al.* (2006*c*)	6	Pearson *et al.* (2006)	Low latitudes and high productivity/upwelling	Olsson *et al.* (2006*c*)	43.10	48.10	1.48	12.36	43.54	44.92	11.36	16.67	Olsson *et al.* (2006*c*)	t402	T234
275	*Pseudohastigerina micra*	Involute, planispiral	Non-spinose	Smooth	Equatorial symmetrical high arch with narrow lip	9	Olsson & Hemleben (2006)	2	Poore & Matthews (1984); Boersma *et al.* (1987); Pearson *et al.* (2001*a*)	Low to high latitudes	Olsson & Hemleben (2006)	32.20	48.10	24.28	32.87	49.18	52.37	89.66	100.00	Olsson & Hemleben (2006)	n29, t30	N8, T9
276	*Pseudohastigerina naguewichiensis*	Involute, planispiral	Non-spinose	Smooth	Equatorial moderately high arch bordered by thick prominent lip	9	Olsson & Hemleben (2006)	2	Wade & Pearson (2008)	Low to high latitudes	Olsson & Hemleben (2006)	32.00	35.80	30.01	31.80	37.03	38.74	100.00	100.00	Olsson & Hemleben (2006)	t31	T10
277	*Pseudohastigerina sharkriverensis*	Involute, planispiral	Non-spinose	Smooth	Equatorial low arch bordered by narrow lip commonly bipartite in adult specimens	9	Olsson & Hemleben (2006)	2	This study	Middle latitudes only	Olsson & Hemleben (2006)	39.30	48.00	44.37	44.47	45.71	45.82	100.00	22.22	Olsson & Hemleben (2006)	t26	T7
278	*Pseudohastigerina wilcoxensis*	Involute, planispiral	Non-spinose	Smooth	Symmetrical to slightly asymmetic high circular arch with narrow lip or matched bipartite openings	9	Olsson & Hemleben (2006)	2	This study	Low to high latitudes	Olsson & Hemleben (2006)	43.30	55.30	28.25	37.29	53.70	54.84	55.56	69.23	Olsson & Hemleben (2006)	n28, n25, t27	N6, N8
279	*Pulleniatina finalis*	Involute, planispiral with a very broadly rounded periphery	Non-spinose	Smooth	Extra-umbilical high arch	7	Bolli & Saunders (1985)	3	This study	Low latitudes	This study	0.00	4.25	0.04	0.21	4.55	11.10	50.00	80.00	Chaisson & Pearson (1997)	t317	T365
280	*Pulleniatina obliquiloculata*	Trochospiral becoming streptospiral, very smooth surface, globular	Non-spinose	Smooth	Umbilical-extraumbilical low archoften pustulate	7	Kennett & Srinivasan (1983)	3	Shackleton & Vincent (1978); Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	0.00	5.60	0.00	0.35	4.46	14.03	75.00	100.00	Chaisson & Pearson (1997)	n662, t316	N364, T162
281	*Pulleniatina praecursor*	Trochospiral initially becoming streptospiral, broadly rounded chambers, spherical test covered in thick cortex	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilicala medium arch at the base of the final chamber	7	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	1.75	6.80	0.72	1.41	5.74	10.09	72.73	83.33	Banner & Blow (1967)	n700, n313, t701	N364, T162

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
282	*Pulleniatina praespectabilis*	Convexly rounded initial portion of the trochospire as seen in lateral view, with a well rounded pseudo keel	Non-spinose	Smooth	Extraumbilical medium to low arch without lip or rim	7	Bolli & Saunders (1985)	3	This study	Low latitudes	Bolli & Saunders (1985)	4.40	4.60	4.02	4.19	5.65	5.81	100.00	100.00	Banner & Blow (1967)	t664	T365
283	*Pulleniatina primalis*	Trochospiral initially becoming streptospiral, broadly rounded chambers, spherical test covered in thick cortex	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch at the base of the final chamber	7	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	1.30	5.70	0.33	2.31	6.40	10.26	100.00	100.00	Chaisson & Pearson (1997)	t314	N364, T162
284	*Pulleniatina spectabilis*	Planoconvex, low to medium trochospiral, later becoming streptospiral, with pseudocarinate periphery	Non-spinose	Smooth	Extraumbilical medium to low arch without lip or rim	8	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	4.20	5.20	3.70	3.83	5.11	5.53	100.00	100.00	Banner & Blow (1967)	n663, n315, t665	T365
285	*Sphaeroidinella dehiscens*	Large, trochospiral, equatorial periphery ovoid or spherical with smooth secondary cortex	Non-spinose	Cancellate with smooth cortex	Primary aperture interiomarginal umbilical two sutural supplementary apertures bordered by crenulated lip	7	Kennett & Srinivasan (1983)	3	Shackleton & Vincent (1978)	Low latitudes	Kennett & Srinivasan (1983)	0.00	5.60	0.03	0.53	4.87	13.08	92.86	100.00	FAD: Kennett & Srinivasan (1983); LAD: Chaisson & Pearson (1997)	t576	T347
286	*Sphaeroidinellopsis disjuncta*	Low trochospiral, equatorial periphery trilobate to quadrilobate, chambers spherical to ovate	Non-spinose	Cancellate	Interiomarginal umbilical bordered by thickened rim	7	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	12.10	18.10	8.49	11.05	16.53	22.54	73.33	100.00	Kennett & Srinivasan (1983)	n568, n569	N345
287	*Sphaeroidinellopsis kochi*	Large, compressed low trochospiral, equatorial periphery lobulate, chambers spherical to subspherical	Non-spinose	Cancellate	Umbilical large irregular opening with a thickened lip	7	Kennett & Srinivasan (1983)	3	This study	Low latitudes	Kennett & Srinivasan (1983)	3.60	14.40	1.96	3.83	12.82	14.85	100.00	100.00	FAD: Kennett & Srinivasan (1983); LAD: Chaisson & Pearson (1997)	t571	T346
288	*Sphaeroidinellopsis paenedehiscens*	Large, low trochospiral, ovate to smoothly rounded periphery, sutures obscured by thick secondary cortex	Non-spinose	Cancellate with smooth cortex	An elongate umbilical opening following the line of suture of final chamber bordered by crenulated lip which is an extension of secondary cortex	7	Kennett & Srinivasan (1983)	3	Pearson & Shackleton (1995)	Low latitudes	Kennett & Srinivasan (1983)	2.30	7.10	1.86	3.11	8.04	15.79	86.67	100.00	FAD: Kennett & Srinivasan (1983); LAD: Chaisson & Pearson (1997)	n574, t575	T347
289	*Sphaeroidinellopsis seminulina*	Compact, low trochospiral, subglobular, sutures obscured by secondary cortex	Non-spinose	Cancellate with smooth cortex	Umbilical elongate opening bordered by thickened crenulated rim	7	Kennett & Srinivasan (1983)	3	D. R. M. Stewart unpublished data	Low latitudes	Kennett & Srinivasan (1983)	2.30	16.40	0.06	3.25	13.71	23.58	79.17	100.00	FAD: Kennett & Srinivasan (1983); LAD: Chaisson & Pearson (1997)	n570, n572, t573	N345, T347
290	*Subbotina angiporoides*	Non-umbilicate, spherical, quadrilobate	Spinose	Cancellate	A low indistinct interiomarginal slit bordered by a thick lip	2	Olsson *et al.* (2006*a*)	3	Poore & Matthews (1984); Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (2006*a*)	28.50	42.30						0.00	FAD: Olsson *et al.* (2006*a*); LAD: B.S. Wade & P. N. Pearson in preparation	t492	T359
291	*Subbotina cancellata*	Low trochosprial, tightly coiled	Spinose	Coarsely cancellate	Umbilically directed aperture bordered by broad somewhat irregular lip	2	Olsson *et al.* (1999)	3	Coxall *et al.* (2000)	Unknown, but found in North and South Atlantic	Olsson *et al.* (1999)	56.80	61.20	6.80	43.66	64.94	64.98	5.08	0.00	Olsson *et al.* (1999)	n486, n487, t488	N305, N310
292	*Subbotina corpulenta*	Moderately high trochospiral with lobulate outline	Spinose	Cancellate	Umbilical generally without lip	2	Olsson *et al.* (2006*a*)	3	Coxall *et al.* (2000); Wade & Pearson (2008)	Low to middle latitudes	Olsson *et al.* (2006*a*)	32.10	47.25	22.37	24.88	49.81	52.37	80.65	93.75	FAD: Olsson *et al.* (2006*a*); LAD: B.S. Wade & P. N. Pearson in preparation	t599	T268
293	*Subbotina crociapertura*	Low trochospiral, globular with oval outline	Spinose	Cancellate	Umbilical-extraumbilical high circular arch bordered by a prominent lip	2	Olsson *et al.* (2006*a*)	4	Coxall *et al.* (2000); Pearson *et al.* (2001*a*)	Low latitudes	Olsson *et al.* (2006*a*)	40.00	46.40	47.15	47.20	51.45	53.16	57.14	0.00	Olsson *et al.* (2006*a*)	t611	T363

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
294	*Subbotina eocaena*	Low trochospiral, globular	Spinose	Cancellate	Umbilical-extraumbilical high circular arch bordered by thin irregular lip	2	Olsson *et al.* (2006*a*)	4	Boersma *et al.* (1987); Coxall *et al.* (2000); Pearson *et al.* (2001*a*); Wade *et al.* (2007); Wade & Pearson (2008)	Low to middle latitudes	Olsson *et al.* (2006*a*)	32.20	50.70	30.91	33.87	51.51	53.86	100.00	100.00	FAD: Olsson *et al.* (2006*a*); LAD: B.S. Wade & P. N. Pearson in preparation	n596, n600, n602, t603	N267, N269, N271, T272
295	*Subbotina gortanii*	High trochospiral, globular outline	Spinose	Cancellate	Umbilical bordered by a thickened narrow rim	2	Olsson *et al.* (2006*a*)	4	Coxall *et al.* (2000); Pearson *et al.* (2001*a*)	Low to middle latitudes	Olsson *et al.* (2006*a*)	27.20	39.10	19.29	23.61	36.13	41.01	91.30	92.31	FAD: Olsson *et al.* (2006*a*); LAD: B.S. Wade & P. N. Pearson in preparation	t614	N77, T266
296	*Subbotina hagni*	Biconvex, low trochosprial	Spinose	Cancellate	Umbilical-extraumbilical low arch with thin irregular lip	2	Olsson *et al.* (2006*a*)	3	Coxall *et al.* (2000)	Low to middle latitudes	Olsson *et al.* (2006*a*)	34.30	48.10	32.39	33.61	42.60	48.65	70.59	66.67	Olsson *et al.* (2006*a*)	n597, t598	T268
297	*Subbotina hornibrooki*	Low trochospiral, globular	Spinose	Cancellate	Umbilical bordered by narrow continuous lip	2	Olsson *et al.* (2006*a*)	3	Coxall *et al.* (2000)	Low to middle latitudes	Olsson *et al.* (2006*a*)	52.50	55.60	47.51	47.54	48.61	48.66	100.00	0.00	Olsson *et al.* (2006*a*)	n498, t499	N308, T309
298	*Subbotina jacksonensis*	Low trochospiral, globular with oval outline	Spinose	Cancellate	Umbilical and may be obscured by ultimate chamber	2	Olsson *et al.* (2006*a*)	3	Coxall *et al.* (2000)	Low to middle latitudes	Olsson *et al.* (2006*a*)	33.70	43.80	0.89	1.63	32.95	33.51	58.82	9.09	Olsson *et al.* (2006*a*)	t601	T270
299	*Subbotina linaperta*	Low trochospiral, globular	Spinose	Cancellate	Umbilical-extraumbilical bordered by thin even lip	2	Olsson *et al.* (2006*a*)	3	Poore & Matthews (1984) Pearson *et al.* (1993); Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (2006*a*)	33.70	52.00	27.44	31.47	48.94	55.84	93.10	100.00	FAD: Olsson *et al.* (2006*a*); LAD: B.S. Wade & P. N. Pearson in preparation	n491, n493, t494	N310, T313
300	*Subbotina patagonica*	Globular, very low trochospiral	Spinose	Cancellate	Umbilical rounded arch bordered by a thickened rim that may display a lip	2	Olsson *et al.* (2006*a*)	4	Pearson & Palmer (1999); Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (2006*a*)	45.15	57.00	29.52	38.10	56.20	59.46	67.74	100.00	Olsson *et al.* (2006*a*)	n489, t490	N310
301	*Subbotina roesnaesensis*	Very low trochospiral, tripartite	Spinose	Cancellate	Umbilical low arch with narrow lip of varying width	2	Olsson *et al.* (2006*a*)	3	Coxall *et al.* (2000)	Low to middle latitudes	Olsson *et al.* (2006*a*)	43.20	55.60						0.00	Olsson *et al.* (2006*a*)	n595, n607, n609, n615, t616	N264, N265, N276, N278
302	*Subbotina senni*	Moderately elevated trochospiral, globular	Spinose	Cancellate	Umbilical bordered by thickened rim not always visible	2	Olsson *et al.* (2006*a*)	5	Pearson *et al.* (1993, 2001*a*); Coxall *et al.* (2000)	Low to middle latitudes	Olsson *et al.* (2006*a*)	38.00	50.60	20.94	38.28	51.60	53.49	64.71	100.00	Olsson *et al.* (2006*a*)	t608	T277
303	*Subbotina sp1*		Spinose	Cancellate		2	B. S. Wade & P. N. Pearson personal communication	3	Coxall *et al.* (2000)			32.60	34.10						0.00	B.S. Wade & P. N. Pearson in preparation	n604, t605	N273, T274
304	*Subbotina sp2*		Spinose	Cancellate		2	B. S. Wade & P. N. Pearson personal communication	3	Coxall *et al.* (2000)			27.20	33.80						0.00	B.S. Wade & P. N. Pearson in preparation	t606	T275
305	*Subbotina triangularis*	Low trochospiral, triangular	Spinose	Cancellate	Umbilical to slightly extraumbilical with broad lip	2	Olsson *et al.* (1999)	2	D'hondt *et al.* (1994); Coxall *et al.* (2000)	Low to middle latitudes	Olsson *et al.* (1999)	55.55	61.10	47.06	52.65	64.78	64.98	100.00	100.00	Olsson *et al.* (1999)	n594, t505	N262, T263
306	*Subbotina triloculinoides*	Trochospiral, trilobate	Spinose	Cancellate	Umbilical to slightly extraumbilical with well-developed delicately notched lip	2	Olsson *et al.* (1999)	3	Berggren & Norris (1997); Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (1999)	59.30	64.30	52.46	54.26	64.44	65.26	100.00	100.00	Olsson *et al.* (1999)	t484	T260
307	*Subbotina trivialis*	Umbilico-convex, low trochospiral	Spinose	Cancellate	Umbilical low arch with thin lip	2	Olsson *et al.* (1999)	3	Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (1999)	61.00	64.92	52.46	57.55	64.81	64.88	53.85	100.00	Olsson *et al.* (1999)	n483, n485, n592, t593	N259, N261, N262
308	*Subbotina utilisindex*	Low trochosprial, trilobateglobular	Spinose	Cancellate	Low interiomarginal umbilical-extraumbilical slit bordered by a narrow lip	2	Olsson *et al.* (2006*a*)	4	Poore & Matthews (1984); Coxall *et al.* (2000); Wade & Kroon (2002)	Cosmopolitan	Olsson *et al.* (2006*a*)	30.30	35.40	20.94	27.61	44.53	45.13	61.54	100.00	FAD: Olsson *et al.* (2006*a*); LAD: B.S. Wade & P. N. Pearson in preparation	t495	T313
309	*Subbotina velascoensis*	Trochospiral	Spinose	Cancellate	Umbilical-extraumbilical slit bordered by thin squared-off lip that does not extend full length of aperture	2	Olsson *et al.* (1999)	3	Berggren & Norris (1997); Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (1999)	54.45	59.20	43.72	49.43	58.55	60.61	83.33	100.00	Olsson *et al.* (1999)	n496, t497	N306, T307

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
310	*Subbotina yeguaensis*	Moderately elevated trochospiral, globular	Spinose	Cancellate	Umbilical low round opening bordered by broad lip	2	Olsson *et al.* (2006*a*)	4	Boersma *et al.* (1987); Coxall *et al.* (2000)	Cosmopolitan	Olsson *et al.* (2006*a*)	33.70	50.40	14.84	29.62	51.67	53.86	65.00	88.89	Olsson *et al.* (2006*a*)	n610, n612, t613	N77, T266
311	*Truncorotalia cavernula*	Small, very low trochospiral, spiral side almost flat, umbilical side distinctly convex	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical high rounded arch with a distinct rim	15	Kennett & Srinivasan (1983)	4	This study	Middle latitudes	Kennett & Srinivasan (1983)	0.00	0.90	0.11	0.11	0.11	0.11	100.00	100.00	D. R. M. Stewart unpublished data	t131	T65
312	*Truncorotalia crassaconica*	Ventroconical, steep conical umbilical side, keeled, heavily pustulate test	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit	15	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	This study	3.50	4.30						0.00	D. R. M. Stewart unpublished data	t111	T57
313	*Truncorotalia crassaformis*	Low trochospiral, spiral side almost flat, umbilical side strongly convex	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	Kennett & Srinivasan (1983)	4	D. R. M. Stewart unpublished data	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	5.70	0.01	0.41	4.35	6.76	100.00	100.00	D. R. M. Stewart unpublished data	n109, n110, n112, t114	N56, N58, N59, T61
314	*Truncorotalia crassula*	Very low trochospiral, spiral side almost flat, umbilical side convex	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch with lip	15	Kennett & Srinivasan (1983)	4	Shackleton & Vincent (1978)	Low latitudes	Kennett & Srinivasan (1983)	0.90	5.55	0.00	0.60	5.12	6.02	100.00	100.00	FAD: D. R. M. Stewart unpublished data; LAD: Jenkins & Orr (1972)	t134	T55
315	*Truncorotalia excelsa*	Ventroconical, steep conical umbilical side, spiral side flat to slightly concave, acutely keeled, heavily pustulate test	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit	15	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	1.85	0.23	0.23	0.23	0.23	100.00	50.00	D. R. M. Stewart unpublished data	n126, t127	T66
316	*Truncorotalia hessi*	As *T. crassaformis* but more subquadrangular in equatorial view and final chamber is more reduced	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	0.40	1.80	0.35	0.52	1.85	2.54	100.00	100.00	D. R. M. Stewart unpublished data	t120	T60
317	*Truncorotalia oceanica*	As *T. crassaformis* but has greater chamber rounding and a less conical umbilical side than T. ronda	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	0.00	5.50	0.43	0.77	3.09	3.27	100.00	66.67	D. R. M. Stewart unpublished data	n115, t116	N58, N59, T61
318	*Truncorotalia pachytheca*	As *T. truncatulinoides* but with more rounded chambers and less conical umbilical side	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by lip	15	D. R. M. Stewart unpublished data	4	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	1.80						0.00	D. R. M. Stewart unpublished data	t128	T66
319	*Truncorotalia ronda*	As *T. crassaformis* but more rounded peripheral margin and relatively thickened test	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	1.00	4.00	0.10	0.63	3.23	4.26	100.00	100.00	D. R. M. Stewart unpublished data	n117, n118, t119	N58, N59
320	*Truncorotalia tenuitheca*	As *T. tosaensis* with sharper curvature and less incision of spiral sutures	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	D. R. M. Stewart unpublished data	4	This study	Low latitudes	Kennett & Srinivasan (1983)	1.30	3.40	0.43	1.72	3.05	3.14	100.00	100.00	D. R. M. Stewart unpublished data	n121, t122	N62
321	*Truncorotalia tosaensis*	Low trochospiral, strongly umbilico-convex with flat spiral side, commonly 5 chambers in final whorl	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	Kennett & Srinivasan (1983)	4	Shackleton & Vincent (1978)	Low latitudes	Kennett & Srinivasan (1983)	1.20	3.20	0.28	0.73	3.41	5.80	100.00	100.00	Chaisson & Leckie (1993)	n123, t124	N62, T63
322	*Truncorotalia truncatulinoides*	Low trochospiral, strongly umbilico-convex with distinct keel	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low arch bordered by lip	15	Kennett & Srinivasan (1983)	4	Vergnaud-Grazzini (1976); Shackleton & Vincent (1978)	Low latitudes	Kennett & Srinivasan (1983)	0.00	1.90	0.00	0.11	2.49	11.10	66.67	100.00	D. R. M. Stewart unpublished data	n125, n129, t130	N64, T66

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
323	*Truncorotalia viola*	As *T. crassaformis* but has keel and more angular chambers	Non-spinose	Smooth	Interiomarginal umbilical-extraumbilical low-arched slit bordered by lip	15	D. R. M. Stewart unpublished data	4	This study	Low to middle latitudes	Kennett & Srinivasan (1983)	1.40	3.50	0.66	0.83	3.01	6.13	71.43	100.00	D. R. M. Stewart unpublished data	t113	N59
324	*Turborotalia altispiroides*	High trochospiral, globular to spherical	Spinose	Cancellate	A broad arch overhanging the umbilicus	7	Pearson *et al.* (2006)	2	Pearson *et al.* (2001*a*)	Cosmopolitan	Pearson *et al.* (2006)	37.20	40.80						0.00	Pearson *et al.* (2006)	t46	N15, T16
325	*Turborotalia ampliapertura*	Moderately high trochospiral, compact globular	Spinose	Cancellate	Umbilical-extraumbilical high arch	7	Pearson *et al.* (2006)	2	Pearson *et al.* (2007)	Cosmopolitan	Pearson *et al.* (2006)	30.30	35.00	0.33	29.47	34.55	38.98	38.46	100.00	Pearson *et al.* (2006)	n50, t52	N21, T22
326	*Turborotalia cerroazulensis*	Moderate trochospiral, rounded-conical shape	Spinose	Cancellate	Umbilical-extraumbilical broad arch sometimes slit-like	15	Pearson *et al.* (2006)	2	Pearson *et al.* (2007)	Cosmopolitan	Pearson *et al.* (2006)	33.80	41.80	32.94	33.73	40.81	40.89	100.00	88.89	Pearson *et al.* (2006)	n40, t41	N15, N17, N18, T19
327	*Turborotalia cocoaensis*	Large, low to moderate trochospiral, compressed conical to slightly biconvex	Spinose	Cancellate	Umbilical-extraumbilical broad arch usually with an imperforate pustose lip	12	Pearson *et al.* (2006)	3	Pearson *et al.* (2007)	Cosmopolitan	Pearson *et al.* (2006)	33.80	38.60	32.03	33.51	38.73	39.36	100.00	100.00	Pearson *et al.* (2006)	n42, t43	T20
328	*Turborotalia cunialensis*	Low trochospiral, dorso-ventrally strongly compressed, biconvex	Spinose	Cancellate	Extraumbilical almost circular broad arch	12	Pearson *et al.* (2006)	2	This study	Cosmopolitan	Pearson *et al.* (2006)	33.80	34.10	34.00	34.14	34.73	35.04	100.00	100.00	Pearson *et al.* (2006)	t44	T20
329	*Turborotalia euapertura*	Trochospiral	Spinose	Cancellate	Umbilical large opening	7	Wade *et al.* (2007)	4	Pearson *et al.* (1997*b*, 2007)	Cosmopolitan	This study	30.25	32.65	20.58	23.79	33.18	34.49	100.00	100.00	NEPTUNE	t51	T22
330	*Turborotalia frontosa*	Trochospiral	Spinose	Cancellate	Umbilical-extraumbilical broad high arch with pronounced imperforate lip	7	Pearson *et al.* (2006)	4	Boersma *et al.* (1987); Pearson (1993); Pearson *et al.* (2001*a*)	Cosmopolitan	Pearson *et al.* (2006)	40.80	48.70	28.25	39.57	48.46	52.15	48.00	88.89	Pearson *et al.* (2006)	n35, n37, t38	N15
331	*Turborotalia increbescens*	Moderate to high trochospiral, compact and rounded	Spinose	Cancellate	Umbilical-extraumbilical very broad arch with an irregular imperforate lip	13	Pearson *et al.* (2006)	2	Pearson *et al.* (2007)	Cosmopolitan	Pearson *et al.* (2006)	30.30	39.20	30.22	30.48	36.04	38.45	88.89	80.00	Pearson *et al.* (2006)	n49, t54	N17, N21, T24
332	*Turborotalia pomeroli*	Large, high to moderate trochospiral	Spinose	Cancellate	Umbilical-extraumbilical irregular arch with an occasional imperforate lip	7	Pearson *et al.* (2006)	2	Boersma *et al.* (1987); Pearson *et al.* (2001*a*)	Cosmopolitan	Pearson *et al.* (2006)	34.60	43.20	21.87	24.15	41.34	41.60	66.67	70.00	Pearson *et al.* (2006)	n39, n45, n47, t48	N15, N17, N18
333	*Turborotalia possagnoensis*	Trochospiral, compressed	Spinose	Cancellate	Umbilical-extraumbilical broad arch usually with a thin imperforate lip	7	Pearson *et al.* (2006)	2	Poore & Matthews (1984)	Cosmopolitan	Pearson *et al.* (2006)	40.80	43.95	40.32	40.78	45.08	46.04	85.71	100.00	Pearson *et al.* (2006)	t36	N15
334	*Turborotalita carcoselleensis*	Low trochospiral, lobulate outline	Spinose	Cancellate	Umbilical wide arch bordered by an imperforate rim or narrow thickened lip	1	Olsson *et al.* (2006*a*)	2	This study	Low to middle latitudes	Olsson *et al.* (2006*a*)	35.90	44.40	34.40	34.40	40.07	40.28	100.00	60.00	Olsson *et al.* (2006*a*)	n501, t502	N315
335	*Turborotalita clarkei*	Small, slightly compressed trochospiral, final chamber distinctly spinose, can be heavily encrusted	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical very low arch	1	Brummer & Kroon (1988)	2	This study	Low latitudes	Brummer & Kroon (1988)	0.00	1.60						0.00	Hemleben *et al.* (1989)	t512	T317
336	*Turborotalita cristata*	Minute, very low trochospiral, equatorial periphery distinctly lobulate, short conical spine along periphery	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical low arch bordered by thin lip	1	Kennett & Srinivasan (1983)	2	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	4.50	3.45	3.56	4.21	4.23	100.00	40.00	NEPTUNE	n510, t511	T317
337	*Turborotalita humilis*	Minute, low trochospiral, equatorial periphery almost circular, tongue-like extension of the final chamber over the umbilicus	Spinose	Cancellate	Interiomarginal umbilical-extraumbilical except when covered by tongue-like extension. Several infralaminal apertures present	1	Kennett & Srinivasan (1983)	2	This study	Low latitudes	Kennett & Srinivasan (1983)	0.00	6.00	0.00	1.06	12.76	25.15	74.07	100.00	Kennett & Srinivasan (1983)	n508, t509	T317

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	Species name	Morphological description	Spinose	Wall ultrastructure	Aperture	Morphogroup	Morphogroup reference	Ecogroup	Ecogroup reference	Geographical range	Geographical reference	Start	End	Latest	p95	p5	Earliest	DB comp.	Tree comp.	Date reference	ID	LID
338	*Turborotalita praequinqueloba*	Very low trochospiral, lobulate outline, globular	Spinose	Cancellate	Umbilical wide arch bordered by an imperforate rim or narrow thickened lip	1	Olsson *et al.* (2006*a*)	2	This study	Low latitudes	Olsson *et al.* (2006*a*)	22.40	36.00						0.00	Olsson *et al.* (2006*a*)	n503, t504	N315
339	*Turborotalita quinqueloba*	Small, slightly compressed, trochospiral, final chamber distinctly spinose	Spinose	Cancellate	An elongate slit often at the end of a flap-like structure of the final chamber	1	Kennett & Srinivasan (1983)	5	Pearson & Wade (2009)	Low to high latitudes	Kennett & Srinivasan (1983)	0.00	25.40	0.00	0.25	14.25	33.32	73.53	92.31	Kennett & Srinivasan (1983)	n506, t507	N315, T316

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