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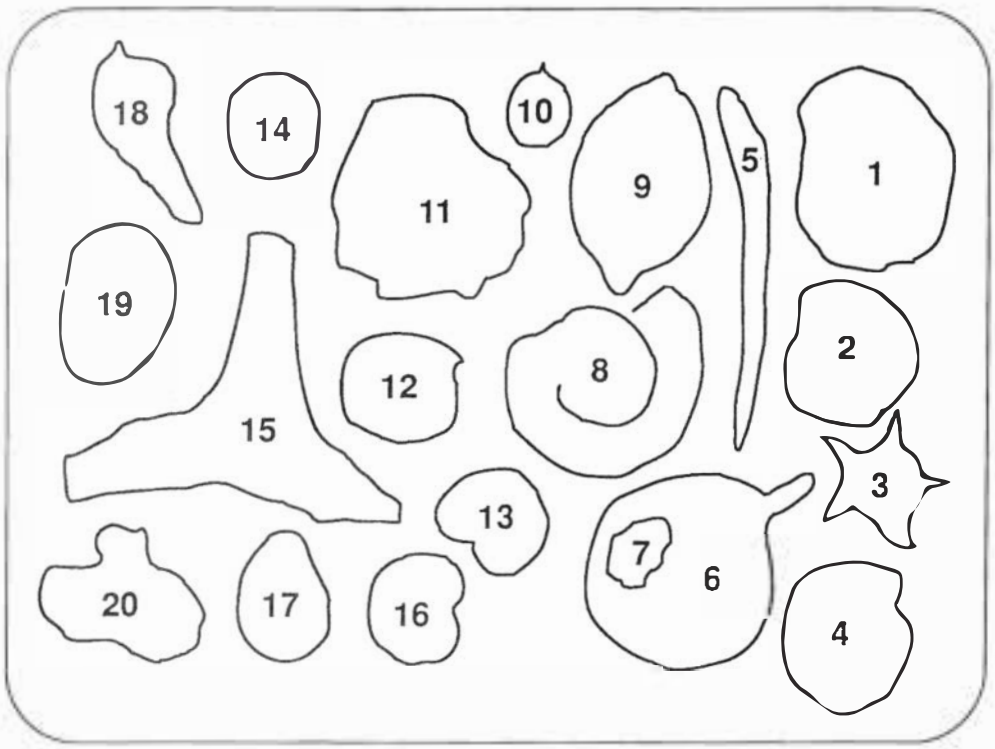
DSIR Marine and Freshwater

The Marine Fauna of New Zealand:

Index to the Fauna: 1. Protozoa

Elliot W. Dawson

New Zealand Oceanographic Institute Memoir 99



Cover photo: A mixed collection of shallow and deep-sea Foraminifera from the SW Pacific, taken during the 1950–52 round the world Danish Deep-Sea Expedition. Most of the species range into the New Zealand region.

Photo: J. Whalan, formerly of DSIR

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by

ELLIOT W. DAWSON

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DEDICATION

In memory of three teachers of the University, Canterbury, New Zealand :

Frederick Wollaston Hutton (1836–1905)
Edward Percival (1893–1959)
Robin Sutcliffe Allan (1900–1967)

who made me aware of Natural History; and

Clifford Wallace Collins (1909–1979)

Librarian of the University for 37 years, who introduced me to the role of bibliography.

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The Marine Fauna of New Zealand: Index to the Fauna 1. Protozoa

ELLIOT W. DAWSON*

ABSTRACT

A list of all marine Protozoa recorded from New Zealand is given, with the bibliographic citation for each original description followed by significant subsequent references. A generic and specific index, with some common synonymy, provide entry into the literature published on each taxon.

INTRODUCTION

"O what an endlesse worke have I in hand,
To count the seas abundant progeny,
Whose fruitfull seede farre passeth those in land ... "

Edmund Spenser (1589)
The Fourth Book of "The Faerie Queene",
Canto XII

Edmund Spenser, despite his somewhat desperate call, had little idea of the true immensity of the world of marine creatures in terms of numbers of species at the least. Estimates of the numbers of marine animals alone amount to some 170,000 species (Nicol, 1971) and an even greater number if marine invertebrate fossils are considered (Valentine, 1970). The diversity of higher taxa is such that of 37 known phyla of living animals, 34 live in the marine realm. A quite conservative guess as to the extent of the marine fauna of New Zealand would be some 8,000 species, of which about 2,000 are molluscs. However, as Heptner (1956) has noted, in some invertebrate groups perhaps only 10% of the species are so far known to science. The real figures are difficult to assess and any figures postulated may be misleading if not qualified, even if there is an obligation for taxonomic specialists to "come forward with counts of species in their groups" according to Hyman (1955: 143). As an illustration, Heptner (1956) noted how the work of the Soviet research vessel *Vityaz* had doubled the known fauna of parts of the Pacific but that, in fact, the addition of 350 new species represented only 0.031% of the world fauna of that group. It would be difficult to predict how many marine invertebrate species still await recognition in New Zealand, especially since many new forms are currently being discovered in such apparently well-known groups as the Mollusca.

The first attempt to enumerate the fauna of New Zealand was made in John Edward Gray's chapter "Fauna in New Zealand" in Dieffenbach's "Travels in New Zealand" (1843). In his total he included 222 species of molluscs, of which only some 98 were actually represented in the British Museum collection, as he called it "The National Collection of the mother country, which should be the richest in the natural curiosities of its different colonies". Gray, like Spenser, probably had no doubt that he, and his colleagues at the British Museum, who had also contributed to the compilation of this chapter of "Dieffenbach", had an "endlesse worke" in attempting to collect and catalogue the fauna of a new country, but neither could scarcely have envisaged the development of systematic zoology in New

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Zealand over the years which have followed; and the "endlesse worke" is not yet done. Every deep-sea haul reveals its novelties and even the lowly intertidal sands and muds themselves are a treasure trove for the student of the meiofauna.

The challenge to continue cataloguing and describing the New Zealand fauna was taken up by that indefatigable pioneer naturalist F.W. Hutton, former soldier, veteran of the Crimea and the Indian Mutiny, one-time provincial geologist, Assistant Geologist in the Geological Survey (1871–1877), Professor of Natural Science at Otago University (1877–1880), and Curator of the Otago Museum, later Professor of Geology and Biology at Canterbury College (now the University of Canterbury) from 1880 to 1892, and subsequently Curator [i.e., Director] of the Canterbury Museum from 1893 until the time of his death in 1905. Under the auspices of the Colonial Museum and Geological Survey of New Zealand, he catalogued the birds in 1871, the fishes (with James Hector) in 1872, the Echinodermata in 1872, molluscs, brachiopods, bryozoans and tunicates in 1873 (with another edition in 1880), Tertiary molluscs, echinoderms, and brachiopods in 1873, and several groups of insects (Diptera, Orthoptera and Hymenoptera) in 1881. The Crustacea were catalogued in a similar fashion by Miers in 1876 following Gray's tradition at the British Museum. Details of these catalogues have been given by Yaldwyn (1982: 5-6). In addition, throughout the *Transactions of the New Zealand Institute* from the first volume of 1864 to Volume 38 issued in 1906, Hutton published lists and revisions of many groups of invertebrates ranging from insects and worms to brachiopods and bryozoans (*see* Royal Society of N.Z., 1978: 65-68).

However, it was not until 1904 that a comprehensive list of the known species making up the fauna of New Zealand appeared. This was the now-classic "Index Faunæ Novæ Zealandiæ", which, although often attributed solely to Hutton (and, indeed, stated by one of his obituarists as his "magnum opus"), consisted of contributions from a number of contemporary biologists. For instance, the section on Mollusca was by Suter, worms by Benham, rotifers by Hilgendorf, Porifera by Kirk, holothurians by Dendy, while Farquhar provided the sections on other echinoderms and on the Hydrozoa. The Crustacea were contributed by Chilton and by Thomson. Hutton's outstanding contribution to the "Index" was, undoubtedly, his biogeographical essay introducing it although much of this had already been published by him in other places.

The "Index" has an interesting history which it is worth recalling here in some detail. But for the determined effort and dedication of scientists of the day in Canterbury and Otago this milestone in the history of New Zealand science would never have appeared, and succeeding generations of naturalists would have been all the poorer for that.

In his preface to the "Index", Hutton stated :

> "Since the publication of Dieffenbach's *Travels in New Zealand*, no list has been published of the animals inhabiting New Zealand and the neighbouring seas, although during the last sixty years our knowledge of them has increased very much. Under these circumstances, most of the zoologists in New Zealand have come to the conclusion that the time has arrived for making such a list — to be called *Index Faunæ Novæ Zealandiæ* — and last year they requested me to undertake the editorship. This I willingly did, as I was already assured of the help of all New Zealand zoologists. The Board of Governors of the New Zealand Institute was asked to publish a small edition of the work; but as it declined to do so, the Philosophical Institute of Canterbury, being generously supported by the Otago Institute, undertook the responsibility."

The Proceedings of the Philosophical Institute of Canterbury [now the Canterbury Branch of the Royal Society of New Zealand] for the third meeting of the year, 3 July 1901, recorded :

> "Dr. Chilton explained the action taken by the Council to promote the publication of an "Index Faunæ Novæ-Zealandiæ" — i.e., a list of all species of animals recorded from New Zealand, with at least one reference for each species.
>
> A petition prepared, asking the Governors of the New Zealand Institute to undertake the publication of the index, was laid on the table for signature."
>
> (*Trans. Proc. N.Z. Institute* 34 : 578; 1902)

At the Institute's Annual Meeting, held on 2 April 1902, it was reported that :

> "The Council of the Institute has met eight times since the last annual meeting. During the year the Council drew up a petition urging upon

the Governors of the New Zealand Institute the desirability of publishing an "Index Faunæ Novæ Zealandiæ," containing a list of all species of animals recorded from New Zealand, with at least one reference for each species, and suggesting that the index should be edited by Captain F.W. Hutton, who has already published numerous catalogues of the different zoological groups, and has a large amount of manuscripts, suitable for the index, already prepared. Copies of the petition were sent to the other Affiliated Societies, and were returned, numerously signed, by the Otago Institute and the Hawke's Bay Philosophical Institute. These, together with the petition from this Institute, were forwarded to the Governors of the New Zealand Institute. In due time a reply was received stating that the Governors had given the matter careful consideration, but, whilst appreciating the value and practical importance of such a work when complete, they "considered that its production at the present time would be premature, more particularly as the classification and nomenclature of the indigenous faunæ of New Zealand is at present undergoing active critical discussion by experts in Europe and America."

(*Trans. Proc. N.Z. Inst. 34* : 580–581; 1902)

The Otago Institute [now the Otago Branch of the Royal Society of New Zealand] met on 9 July 1901, and it was noted that :

"A letter was received from the Philosophical Institute of Canterbury enclosing a petition for presentation to the Board of Governors of the New Zealand Institute, requesting the New Zealand Institute to undertake the publication of an "Index Faunæ Novæ-Zealandiæ," a catalogue, with references, of all the species of animals hitherto described from the New Zealand area.

In order to secure uniformity, it was proposed that Captain Hutton, F.R.S., Curator of the Canterbury Museum, be requested to act as editor.

The Chairman expressed the hope that all the members present would sign the petition. He said that the preparation of the work presented no difficulty, provided that the Government, through the New Zealand Institute, would undertake its publication."

(*Trans. Proc. N.Z. Inst. 34* : 583–584; 1902)

At the first meeting of the year 1904, on 4 May, the President of the Philosophical Institute of Canterbury (Dr Charles Chilton) —

"...announced the arrival of copies of the "Index Faunæ Novæ-zealandiæ," and on behalf of the Council of the Canterbury Institute, and of the Council of the Otago Institute, and of the various contributors to the Index, presented Captain Hutton (the editor of the Index) with a bound volume of congratulatory letters on the occasion of its publication."

(*Trans. Proc. N.Z. Inst. 37*: 610; 1905)

On 8 November 1904, the Council of the Otago Institute noted two items of "extraordinary expenditure" in the Institute's balance-sheet, and it was explained that :

"The second large payment is a sum of £25 for the purchase of fifty copies of the "Index Faunæ Novæ-zealandiæ." The work was published at the expense of the Canterbury Philosophical Institute, and the sum named above represents the amount of financial assistance that your Council felt justified in granting towards the expenses incurred in publishing this highly important work. The Council regrets that the other affiliated institutes did not contribute towards the expense of publication."

(*Trans. Proc. N.Z. Inst. 37* : 619; 1905)

It was reported to the Annual Meeting of the Institute, held on 30 November 1904, that :

"The "Index Faunæ Novæ-zealandiæ" has been completed. The price at which the volume was originally issued to subscribers has now, as always contemplated, been raised to 12s. 6d. The Index not only supplies a much-felt want, but its publication has also been financially satisfactory."

(*Trans. Proc. N.Z. Inst. 37* : 612; 1905)

And it is interesting to note that the price of 12/6 (i.e., $1.25) was, in fact, retained for some 80 years until stocks became exhausted.

Hutton died at sea off South Africa on 27 October 1905, so did not live to see the use that was to be made of his "Index". In fact, it served for many years as the introduction to the variety of the New Zealand fauna achieving its original aim very well indeed.

Attempts have been made, from time to time, to initiate the production of a new edition of the "Index". In particular, it is noted in the Annual Report for 1950 of the Otago Branch of the Royal Society of New Zealand :

> "*Index Faunæ Novæ Zealandiæ.* A request from Professor Marples and Miss Fyfe of the Zoology Department, Otago University, that the Branch lend support to a project for a new edition of Hutton's "Index Faunæ Novæ Zealandiæ" was favourably received by your Council. Correspondence with the Canterbury Branch indicates that it is also interested. A provisional committee consisting of members from both Branches has now been formed to devise ways and means of compiling and publishing a new edition of this most useful work."
>
> (*Trans. R. Soc. N.Z. 80* : xxix–xxx; 1952)

In the minutes of the Annual Meeting of the Council of the Royal Society of New Zealand held on 20 May 1952, there is the record :

> "*Revision of the Index Faunæ Novæ Zealandiæ.* Some observations on the preparation and publication of this work made by Dr. Miller were referred to the Otago Branch's Revision Committee for consideration."
>
> (*Trans. R. Soc. N.Z. 80* : lv; 1953)

There the matter ended : the Council of the Royal Society of New Zealand seems to have been as unwilling to become involved as was its predecessor, the Governors of the New Zealand Institute. However, the need for a new list has not diminished.

Copies of Hutton's "Index" which I have, formerly belonging to W.R.B. Oliver and to E.W. Bennett and annotated by them in many places, show how much this basic list of names was the key to the knowledge and literature of the New Zealand fauna. Indeed, Hutton's "Index" had pride of place, together with Martin's "New Zealand Nature Book" and Hutton and Drummond (i.e., "The Animals of New Zealand") amongst my own first bibliographic aids as a youthful enthusiast in natural history in the days before Powell's "Native Animals of New Zealand" and the host of other beautifully illustrated and informative books which have subsequently appeared.

I was well schooled in my university days in the importance of knowing where knowledge lay, of learning the art of finding out what was known without necessarily having to recall the detail of the knowledge in itself, being instructed in the value of bibliographic references by two of my tutors in particular, as well as by the then University Librarian, C.W. Collins, whose masterly presidential address to the Canterbury Branch of the Royal Society of New Zealand (*see Trans. Proc. R. Soc. N.Z., 77(1)* : xxxi) entitled "The Organisation of Knowledge in Print" still leaves a vivid impression in my mind of the profundity of bibliographic information that awaits every scholar. Interestingly, my two professors differed markedly in their particular retrieval methods : one (R.S. Allan), an inveterate bibliophile and collector, valued his card index, the other (E. Percival), ever direct and practical, carried his index in his head and could recall his sources with remarkable skill. Despite today's almost-frightening advances in the technology of information retrieval — the apparent victory of the floppy disk over the index card — I believe there will always be a place for the individual scholar to integrate, at the personal level, a combination of the written index, the human memory, and the sophisticated "on-line" search now so readily available. Hence I am sure that "BOOK" will always remain more than a mere acronym for a seemingly antiquated method of information retrieval.

My particular interest in wanting to see a new (and expanded) version of the Hutton "Index" reached a point of action when I came to have my first experience of analytical ecology — where it was essential, as the first step, to know how many species had been described in particular taxonomic groups in the New Zealand marine benthic fauna, and in a particular geographic region, what their names were, where else they occurred, where I might find keys, descriptions or illustrations, to aid me in their identification and in trying to ascertain their ecological role — in short, I needed a key to unlock that store of organised knowledge (as C.W. Collins had described it years ago) relating to the marine fauna of New Zealand, accumulated but not necessarily readily accessible, since the days of Gray and Dieffenbach. Accordingly, I developed, beginning in the time before computer-based retrieval, that combination of memory and card index, which my professors had taught me, that enabled me to flesh-out the rather skeletal list formulated in Hutton's "Index" into what I have now found a satisfyingly useful bibliographic

tool. Early in my development of this work, I persuaded my colleague J.V. Eade to bring out a list of the New Zealand Foraminifera with references to the New Zealand literature in particular (Eade, 1967), since I had decided that with someone close at hand knowledgeable on this rather specialist group, it would relieve me of the task of including it in my own "Index". However, I have now greatly expanded the list of the Foraminifera (to include references beyond merely the New Zealand records) as a substantial part of the present list.

I trust, therefore, that my efforts will prove to be as useful in their way as Hutton's "Index" has been to generations of New Zealand biologists since 1904.

SCOPE AND ARRANGEMENT

This list provides a bibliographic introduction to the marine animals of the New Zealand region, defined as that part of the South Pacific bounded by latitudes 24°S and 57°30'S and longitudes 157°E and 167°W (Carter, 1980). This includes the Kermadec Islands in the north, the Chatham Islands to the east and Macquarie Island in the southwest; but I have deliberately excluded Lord Howe and Norfolk Islands in the northwest. The depth range includes abyssal collections made by the *Galathea* in the Kermadec Trench.

The classification and systematic arrangement followed is that of Parker (1982), which might be regarded as an arbitrary and not necessarily generally accepted standard. Because this list is in no way a taxonomic revision, I have not made any judgements on the status or position of any species or families, except where recent revisers have made some comment to which I have felt attention needs to be drawn. Generally, I have arranged families, genera within families, and species within genera, in alphabetical order, except where there is a demonstrated phylogenetic reason for doing otherwise. The perennial question for the "Protozoa" of what constitutes a zoological entity as opposed to one claimed by botanists has happily been resolved by a dual classification based on Parker's "Synopsis" so that the Dinoflagellata, for example, a group of major significance to biological oceanographers, be they zoologists or botanists by choice, can be claimed and appreciated as they deserve.

The basic arrangement for each species is that I have given :

(a) the original bibliographic citation with the original generic name in parentheses if subsequently changed;

(b) significant or useful (perhaps only subjectively determined according to my experience or opinion) subsequent bibliographical references to the species, with changes in generic names noted where appropriate (although the particular authors cited are not necessarily those who proposed the new taxonomic combination);

(c) explanatory or descriptive words in parentheses to indicate the content of the citation (although I have been inconsistent in this);

(d) indication of where reviews, lists of further references and synonymy may be found (as "refs & syn."), or where special comments are given on ecology, distribution etc. by hopefully self-explanatory abbreviations ("distrib.", "ecol." etc.);

(e) full bibliographic references to the authors cited after each major section of the list, or as appropriate; and

(f) an index to genera and species with some (but not complete) indications of synonymy, as a guide for users who find or already know other names, usually from ecological or Hutton-era literature.

I have tried to reduce the number of citations where possible, by quoting references which include bibliographies or literature reviews but, regrettably, some authors' coverages often are inadequate or inaccurate.

Finally, I must state what this list is NOT. It is not a full listing of every reference that has been made to each of the species included; nor does it provide a complete synonymy. In some cases it does provide this information; in some cases, indeed, it lists everything known about a particular species. The user may quickly be able to assess the state of knowledge of some groups by the number of citations and their dates of publication. This, in fact, is one intention of my list. It is still a "working" list of references (which for reasons perhaps not always obvious to the casual user are largely of my own selection). Sometimes mere name changes or listings from faunal survey papers are included simply to highlight the particular nomenclatural combination in use at a certain time, or to draw attention to a published locality which could be of contemporary ecological

interest. For cosmopolitan or other species occurring outside New Zealand I have had to be particularly selective, so that what I have given is often just a guide to further reading. My list, then, is a basic bibliographic tool for all users whether taxonomists, ecologists, biogeographers, teachers, or students seeking a point of entry into the marine zoological literature of New Zealand animals. I have not done everything for the beginner, however; in today's age of computer retrieval of information the user may build upon this list by individual on-line search, but I caution, again, that familiarity with the earlier literature, particularly of systematic zoology, still can only be achieved by intimate manual searching of such well-tested favourites as the "Zoological Record" and "Biological Abstracts".

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SYSTEMATIC LIST

Superkingdom EUKARYOTAE
Kingdom ANIMALIA
Subkingdom PROTOZOA
Phylum SARCOMASTIGOPHORA
Subphylum MASTIGOPHORA

† Class DINOFLAGELLATA/DINOPHYCEAE
[Subclass DINOPHYCIDAE]
Order DINOFLAGELLIDA
Suborder CHYTRIODINIINA
(CHYTRIODINIALES)
Family CHYTRIODINIDAE/
CHYTRIODINIACEAE

Genus **Paulsenella** Chatton, 1920

Paulsenella chaetoceratis (Paulsen, 1911)

Paulsen, 1911: 316, fig. 17 (*Apodinium*) (?); Chatton, 1920: 320 (in n.g. *Paulsenella*), fig. 139; Schiller, 1937: 52, figs 41A–B (descr.); Kiselev, 1950: 121, figs 197a-b; Gaarder, 1954a: 38; Norris, 1961: 183 (NZOI Stn B67, off Kermadec Is, parasitic on spines of a diatom, *Chaetoceros* sp.); Loeblich & Loeblich, 1966: 46 (listed as type species of *Paulsenella* Chatton, 1920: 316); Drebes, 1974: 155–158 (descr. etc.), figs 137–138a; Taylor 1982: 65 (symbiosis); Gaines & Elbrächter, 1987: 236, 249, 254, 255 (nutrition); Cachon & Cachon, 1987: 573, 584 (parasitism); Drebes & Schnepf, 1988: 563–581 (develop., taxon.); Schnepf *et al.*, 1988: 283–290 (food uptake/chloroplasts, etc.); Schnepf, 1988: 2 2–28 (cytokinosis/theca formation); Okolodov, 1988: 50–53 (plant hosts etc.).

Suborder DINOPHYSINA (DINOPHYSIALES)
Family DINOPHYSIDAE/DINOPHYSIACEAE

* Genus **Dinophysis** Ehrenberg, 1839

** **Dinophysis acuminata** Claparède & Lachmann, 1859

Claparède & Lachmann, 1859: 408, pl. 20, fig. 17; Pavillard, 1905: 59, pl. III, fig. 10; Paulsen, 1908: 12 in key), 15 (descr., refs); Lebour, 1917: 184; Jörgensen, 1923: 22, text-fig. 25; Lebour, 1925: 80, pl. XII, figs 2a-c. (descr., distrib.); Kofoid & Skogsberg, 1928: 59, 219, 224 (listed), 228–229 (status), 230, 234, 235, 237, 256; Martin, 1929: 20 (descr.), pl. II, figs 8–9, pl. VIII, fig. 6; Schiller, 1933: 120 (syn.), figs 113a-g; Tai & Skogsberg, 1934: 433–439 (diag., descr., var., etc.) text-fig. 4; Lebour *in* Russell & Yonge, 1936: pl. 40 fig. 6 (colour); Kiselev, 1950: 58 (in key); Gaarder, 1954a: 19; Wood, 1954: 194 (in key), 196 (descr., distrib., syn.), text-figs 38a-c; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities); Solum, 1962: 8–9 (status); Cassie, 1963: 8; Wood, 1964b: 556 (ecol.); Abé, 1967b: 43–48, figs 7a-y (review, morphol., refs, etc., incl. *Dinophysis lachmanni* of Solum, 1962: 9–24, figs 2(1–16), 3–4, 5(4–6), 6–8, 9(1–15)); Wood, 1968: 47 (descr.), fig. 111; Hermosilla, 1973: 8–9 (descr., status, etc.), pl. 1, figs 1–15; Taylor, 1974: 194 (N.Z. records listed); Drebes, 1974: 115 (descr. etc.), fig. 94); Balech, 1976: 85–88, figs 3A–O, T–V (descr., var., syn. incl. *D. boehmi* Paulsen, 1949: 45, *D. borealis* Paulsen, 1949: 46, figs 14K–U, 15(2), and *D. lachmanni* Paulsen, 1949: 46, figs 14A–H, 15 (7)); Burns & Mitchell, 1982c: 289 (morphol., var., etc.), figs 1–18; Dodge, 1982a: 42 (in key), 44–45 (descr., refs & syn., etc.), fig. 3H; Tangen, 1983: 17 *passim* (blooms and shellfish poisoning); Kat, 1983a: 417–427 (mussel poisoning); Kat, 1983b: 81–84 (blooms and diarrhetic mussel poisoning, refs); Han & Yoo, 1983a: 40–41 (refs, dimensions etc.) pl. I, figs 5–6 & 9-

† Note the following summaries : Taylor and Seliger (Eds), 1979 (toxic blooms); Spector (Ed.), 1984: 545 p.; Balech, 1986; Taylor (Ed.) 1987a (monographic preview of general biology); Bujak and Williams, 1981 (evolution of dinoflagellates).

* "Abé (1967b) also suggested as did Balech (1967b), the consolidation of *Phalacroma* and *Dinophysis* under the latter name, a move perhaps less desirable than *Exuviaella* and *Prorocentrum*. (Steidinger & Williams, 1970: 7); Balech (1971a: 50) and Sournia (1973: 61), and also Taylor (1974: 194, 199) in his New Zealand checklist, accepted this proposal, but see Norris and Berner (1970). F.J.R. Taylor (1976: 32) treated the genera as unified as did Dodge (1982a: 39). Sournia (1973: 61) commented : "L'existence d'une homonyme antérieur dans le règne animal (*Phalacroma* Hawle et Corda : Trilobites) est sans importance si l'on considère que *Phalacroma* Stein est végétal; par contre, si l'on tient ce genre pour animal, on lui substituera le nom de *Prodinophysis* Balech." Note generic diagnosis by Sournia (1986: 40).

** Schiller (1933) has noted that this is a very variable species. In his New Zealand checklist, Taylor (1974: 199) cautioned "... these records may not refer to *D. acuminata* sensu Claparède and Lachmann (1859) and Paulsen (1949)".

10; Krogh *et al.*, 1985: 501–503 (blooms/toxin levels); Lassus *et al.*, 1985: 159–164 (blooms/hydrogr.); Kat, 1985: 73–77 (as cause of mussel poisoning); Yasumoto, 1985: 259–270 (toxin chemistry); Paulmier & July, 1985: 149–159, figs 1–4; Cawthron Institute, 1985: 6–7, 1 fig; Shimizu, 1985: 1–2; MacKenzie & Gillespie, 1986: 377, 388 (table 3 : Tasman Bay); MacKenzie *et al.*, 1986: 402 (table 1 : Kenepuru Sound); Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound); Bary & Jenkinson, 1987: 30; Edler, 1987: 41 (related to shellfish poisoning); Jenkinson, 1987: 48; Kat, 1987a: 49 (related to shellfish poisoning, duration and concentration of blooms etc.); Kat, 1987b: 137–143 (mussel toxicity etc.); Equinoxe, 1987: 28; Hallegraeff, 1987: 9, fig. 17; Maranda & Shimizu, 1987: 298–302 (toxin production etc.); Taylor, 1987d: 446, 447; Piquion, 1987: 28–29; Chang, 1987b: 30–31, 1 fig. (popular account of diarrhetic shellfish poisoning in N.Z.); Balech, 1988: 39–40 (diag., varieties, refs etc.), pl. 5, figs 5–8; Meixner, 1988: 163–166 (toxin transfer (molluscs); Putt *et al.*, 1988: 435–443 (photosynthesis); Hallegraeff, 1988: 57 (SEM photo.); Hallegraeff & Lucas, 1988: 29, figs 9, 28, 30, tables 1–3, (physiol. and ecol., etc.).

Dinophysis acuta Ehrenberg, 1839

Ehrenberg, 1839: 108, pl. 19, fig. 13; Ehrenberg, 1841: 124, 151, pl. IV, fig. 14; Claparède & Lachmann, 1859: 408, pl. XX, figs 18, 20 (as *D. ventricosa*); Schütt, 1896: 27–28 (descr.), text-figs 39A–C; Lemmermann, 1899: 315 (N.Z. record from French Pass); Jörgensen, 1899: 28, pl. 1, fig. 2.; Pavillard, 1905: 59; Paulsen, 1908: 12 (in key), 14 (descr., refs), textfig. 10; Jörgensen, 1923: 18–19 (review of ecology, etc.), text-fig. 20; Lebour, 1925: 79 (descr., distrib.), pl. XII, fig. 1; Kofoid & Skogsberg, 1928: 207, 208, 219, 220, 224, 226–228, (status), 229, 230, 234–236, 256; Schiller, 1933: 131–133 (descr., refs & syn.), text-figs 124a-j; Tai & Skogsberg, 1934: 442–447 (diag., descr., var., etc.), text-figs 6–7; Balech, 1944: 429 (in *Prodinophysis* n.g. for *Phalacroma* preocc. by Hawke & Corda, 1847, trilobite); Crawford, 1949: 174 (Cook Strait); Kiselev, 1950: 69 (in key), 76 (descr.), figs 114a-c; Gaarder, 1954a: 19; Wood 1954: 194 (in key), 198 (descr., distrib., syn.), text-fig. 43; Hardy, 1956: fig. 15d; Trégouboff & Rose, 1957: 99, pl. 21, fig. 5 (key features); Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities), 48; Fraser, 1962: frontis., fig. 44; Solum, 1962: 31–32 (status, etc.), text-figs 1819; Newell & Newell, 1963: 39, pl. XI, fig. 2; Cassie, 1966: 583; Loeblich & Loeblich, 1966: 26 (listed as type species of *Dinophysis* Ehrenberg, 1839: 157); Sournia, 1973: 61, 66 (listed); Taylor, 1974: 194 (N.Z. records listed); Drebes, 1974b: 115 (descr.), fig. 94b; Balech, 1976a: 80–81 (descr.) figs 1N–W, 2A–D; Taylor, 1978: 217 (Leigh records); Burns & Mitchell, 1982c: 290 (*D. acuta/D. schroederi* Pavillard, separation of species), figs 19–23; Dodge, 1982a: 42 (in key), 45 (descr., refs), fig. 3G, pl. II, fig. e; Dodge & Lee, 1985: 31, fig. 33; Kat, 1985: 73–77 (blooms/toxin source); Krogh *et al.*, 1985: 501–503 (blooms/toxin levels/molluscs); Doeksen, 1986a: 197–205 (tidal foam/blooms); Doeksen, 1986b: 7–12 (green surf/blooms); Edler, 1987: 41 (related to shellfish poisoning); Levandowsky & Kaneta, 1987: 360, 361, 363, 383 (behaviour); Taylor, 1987d: 446; Chang, 1987b: 31 (N.Z.); Hallegraeff & Lucas, 1988: 29; Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989 — see also pp. 467–468).

Dinophysis amandula Sournia, 1973

Sournia, 1973: 18 (new name for *D. amygdala* Balech, 1967: 84 = *Phalacroma ovum* Schütt, not *Dinophysis ovum* Schütt, nor *D. amygdalus* Paulsen. This reference was omitted by Taylor (1974) who listed earlier N.Z. records of *P. ovum* under *D. amygdala* Balech, 1967. Hence : *Dinophysis amygdala* Balech. Balech, 1967: 84; Sournia, 1973: 18 (listed with comment — "(= *Phalacroma ovum* Schütt. Non *Dinophysis ovum* Schütt). Illégitime: homonyme postérieur de *D. amygdalus* Paulsen. Voir *D. amandula*."); Taylor, 1974: 194 (N.Z. records of Cassie, 1960 (Wellington Harbour and Cook Strait) and Cassie, 1961 (New Plymouth–Kawhia) as *Phalacroma ovum* Schütt listed under *D. amygdala* — see Balech, 1967); Balech, 1976b: 189; Burns & Mitchell, 1982c: 290 (as *D. amygdala* (Schütt) Balech = *Phalacroma ovum* (Schütt), figs 24– 26; Chang, 1987b: 31 (listed as *D. amygdala* from N.Z.); Balech, 1988: 50 (diag., taxon., ecol., etc.), pl. 10, figs 16–17.

Dinophysis caudata Kent, 1881

Kent, 1881: 455, 460; Dodge, 1982a: 41 (in key), 45-46, fig. 4B, pl. II, fig. d (descr., refs, incl. Jörgensen, 1923: 24, figs 30–34; Lebour, 1925: 82, fig. 21c; Kofoid & Skogsberg, 1928: 314, figs 44-45; Martin, 1929: 21 (descr.), pl. IV, fig. 14; Schiller, 1933: 153, figs 145a-o; Tai & Skogsberg, 1934: 453, figs 9A–K, 10D–F; Abe, 1967b: 56, figs 14a-d, and the following as *D. tripos* Gourret, 1883: 114, pl. 3, fig. 53; Stein, 1883: pl. XXI, figs 34 (as *D. homunculus*); Paulsen, 1908: 19, fig. 20 (as *D. homunculus* var. *tripos*); Jörgensen, 1923: 29–31 (review of ecol. etc., refs), text-figs 38–39; Lebour, 1925: 8283 (descr., distrib.), text-fig. 22; Kofoid & Swezy, 1921: 218, 224, 226, 231, 236, 239, 321–323; Peters, 1930: 64; Schiller, 1933: 159–160 (descr., refs & syn.), text-figs 156a-g; Tai & Skogsberg, 1934: 456, text-figs 10A–C; Balech, 1944: 436, pl.

4, figs 42–45, pl. 5, figs 46–47; Kiselev, 1950: 69 (in key), 78–79 (descr.), figs 131a-g; Massuti & Margalef, 1950: 52, fig. 60; Gail, 1950: 27, pl. 5, fig. 5 (as *D. caudata* var. *tripos*); Balech, 1951: 1–9 (varieties), text-fig. 1, pls I–IV; Wood, 1954: 193 (in key), 202 (descr., distrib., syn.), text-figs 51a-c; Trégouboff & Rose, 1957: 88 (key features), pl. 21, fig. 10; Cassie, 1961: 18 (N.Z. localities), 48; Wood, 1963b: 20 (refs); Wood, 1964a: 47 (ecol.); Wood, 1964: 557 (ecol.); Wood, 1968: 53 (descr.), fig. 129; Sournia, 1973: 19, 25 (listed); Taylor, 1974: 194 (Cassie's (1961) Hawke Bay record listed); Taylor, 1978: 217 (Leigh record, 1967); Shim *et al.*, 1981: 61, pl. I, figs 6a-c; Burns & Mitchell, 1982c: 293 (N.Z. specimens discuss.), figs 33–34; Taylor, 1987a: 455; Hallegraeff & Lucas, 1988: tables 1–3; Balech, 1988: 45 (diag., taxon., ecol., etc.), pl. 8, figs 2–3; Putt *et al.*, 1988: 435–443 *passim* (photosynthesis patterns).

Dinophysis fortii Pavillard, 1923

Pavillard, 1923: 881; Pavillard, 1916: 58, pl. 3, fig. 4 (as *D. internedia*); Forti, 1922: 110, 112, 190, 209, fig. 119 (as *D. intermedia*); Jörgensen, 1923: 19, 21, 22, 24, 44, 45 (as *D. internedia*); Kofoid & Skogsberg, 1928: 225 (listed), 228, 230, 236, 237, 253 (descr., distrib., refs & syn.), 260, fig. 31 : 7; Schiller, 1933: 134–135 (descr., refs & syn.), text-figs 127a-c; Tai & Skogsberg, 1934: 439–442 (diag. descr,. var., etc.), text-fig. 5, pls 11–12; Kiselev, 1950: 69 (in key), 77 (descr.), figs 115a-c; Gaarder, 1954a: 19; Wood, 1954: 194 (in key), 198–199 (descr., distrib.), text-fig. 45; Trégouboff & Rose, 1957: 100 (key features), pl. 21, fig. 15; Cassie, 1960a: 168 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities), 48; Balech, 1962: 122; Sweeney, 1963: 177–181; Wood, 1964 : 46 (ecol.); Wood, 1964b: 556 (ecol.); Abé, 1967b: 54–56, figs 13a-k (morphol., review, refs & syn., incl. *D. laevis* of Pouchet, 1883, *D. intermedia* of Pouchet, 1883, and *D. ovum* of Martin, 1929); Wood, 1968: 48 (descr.), fig. 114; Steidinger & Williams, 1970: 29 (in key), 49; Lanigan, 1972: 170, fig. on p. 175; Taylor 1978: 217 (Goat Is Bay); Taylor & Durbin, 1978: 221 (March and May 1968, Whangateau Harbour); Yasumoto *et al.*, [1978] 1980: 1405–1411 (diarrhetic shellfish poisoning); Burns & Mitchell, 1982c: 290 (var.), figs 27–28; Murata *et al.*, 1982: 549–552 (causative toxin etc.); Shimizu, 1983: 4-6 (diarrhetic shellfish poisoning, aquaculture etc.); Yasumoto, 1985: 259–270 (toxin chemistry); Osaka & Takabayashi, 1985 773; Shimizu, 1985: 1; MacKenzie & Gillespie, 1985: 771 (Tas- man Bay); MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Iwasaki, 1986: 125; Igarashi, 1986: 137; Osaka, 1987: 125–131 (toxin/predators); Hallegraeff, 1987: 9, fig. 16; Shimizu, 1987: 283, 305 (toxin); Chang, 1987b: 31 (N.Z.); Hallegraeff & Lucas, 1988: 29, figs 2, 20, 29, 30, tables 1–3 (physiol. and ecol. etc., separation into *Phalacroma*); Balech, 1988: 43 (diag., distrib., ecol.), pl. 6, figs 18–19; Tazawa *et al.*, 1989: 81–83 (seasonal acquisition of prey toxins by *Pecten*).

Dinophysis ovum Schütt, 1895

Schütt, 1895: 90, pl. I, fig. 6, 1–9; Paulsen, 1908: 13 (in key), 17, text-fig. 16; Pavillard, 1916: 58, pl. III; Jörgensen, 1923: 22–23, text fig. 26; Lebour, 1925: 81, pl. XII, fig. 3; Kofoid & Skogsberg, 1928: 118–122 (descr., detailed syn., *Phalacroma ovum*), 224 (listed as *D. ovum*), 230, 235–237, 245, 249, 252, 255, text-fig. 11; Martin, 1929: 21 (descr.), pl. II, fig. 10, pl. VIII, fig. 5; Peters, 1930: 64 (in part); Schiller, 1933: 116–117 (descr., refs, etc.), fig. 109; Kiselev, 1950: 69 (in key), 72 (descr.), fig. 108; Wood, 1954: 183 (in key as *Phalacroma ovum*) 186 (descr., distrib., refs, incl. *P. operculoides* Schütt 1895 (in part)), text-fig. 17, 194 (in key), 194–195, text-figs 35a-d (descr., distrib.); Trégouboff & Rose, 1957: 99 (key features), pl. 21, fig. 4; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities), 48; Balech, 1962: 125–126, pl. XVI, figs 205–213 (*Phalacroma*); Cassie, 1963: 8; Wood, 1963b: 19 (refs); Wood, 1964a: 46 (ecol.); Wood, 1964b: 557,567 (ecol.); Klement, 1964: 358 (descr., dimensions); Halim, 1967: 749, pl. IX, fig. 138 (*Phalacroma*); Abe, 1967b: 50-52, figs 10a-p (review, morphol., refs & syn., incl. *D. rotundata* var. *internedia* Lindemann, 1924, *D. brevisulcus* Tai & Skogsberg, 1934 (in part), *D. acuminata* of Balech, 1944 (in part), *D. sphaerica* of Wood, 1953, *D. parva* Schiller, 1928, and *D. antarcticum* Balech, 1958)); Wood, 1968: 50 (descr.), fig. 120; Taylor, 1974: 194 (N.Z. records of Cassie, 1960 (Wellington Harbour) and Cassie, 1961 (Hawke Bay) listed; see also N.Z. records under *D. amandula* Sournia, 1973, *q.v.*); Shim *et al.*, 1981: 61, pl. I, figs 5a-b; Andreis *et al.*, 1982: 226, fig. 4 (thecal surface); Burns & Mitchell, 1982c: 290 (descr. of N.Z. specimens), fig. 29; Dodge, 1982a: 42 (in key), 43 (descr., refs, incl. as syn. *D. brevisulcus* Tai & Skogs-berg, 1934, in part, p. 430, figs 3a-k); Taylor, 1987d: 450; Chang, 1987b: 31; Hallegraeff & Lucas, 1988: 29, fig. 13, tables 1–3 (physiol., ecol. etc., separation into *Phalacroma*).

Dinophysis recurva Kofoid & Skogsberg, 1928

Kofoid & Skogsberg, 1928: 225, 228 (new name for *D. lenticula* of Pavillard, 1916: 59, pl. 3, fig. 6, preoccupied by Bergh, 1883 and Daday, 1888); Lebour, 1925: 81, pl. XII, fig. 4 (as D. *lenticula*); Schiller, 1933 113–114 (descr., etc.), figs 105a-b; Crawford, 1949: 174 (Cook Strait); Kiselev, 1950: 69 (in key), 69–70 (descr.), fig. 104; Gaarder, 1954a: 21; Trégouboff & Rose, 1957: 99 (key features), pl. 21, fig. 2; Wood,

1963a: 7 (descr., distrib.), text-fig. 16; Halim, 1967: 728 (ecol.), pl. IV, fig. 136; Wood, 1968: 50 (descr.), fig. 123; Taylor, 1974: 194 (Crawford's Cook Strait record listed); Balech, 1976: 190–191 (descr.), figs 14–34; Dodge, 1982: 42 (in key), 55 (descr. etc.); Hallegraeff & Lucas, 1988: table 1.

Dinophysis rotundata (Claparède & Lachmann, 1859)

Claparède & Lachmann, 1859: pl. 20, fig. 13 (*Dinophysis*); Schütt, 1895: 90, pl. I, fig. 5; Lemmermann, 1899: 315 (N.Z. record from French Pass); Paulsen, 1908: 17, fig. 18 (*Dinophysis*); Kofoid & Michener, 1911: 290; Jörgensen, 1923: 5-6 (review of ecol., refs, etc.), text-fig. 2; Lebour, 1925: 78 (descr., distrib), pl. XI, figs 3a-c; Kofoid & Skogsberg, 1928: 53, 59, 61, 67, 69–71; Peters, 1930: 63, fig. 30A; Schiller, 1933: 67 (descr., etc.), text-figs 60a-d; Tai & Skogsberg, 1934: 426-429 (diag., descr., syn., etc.), text-figs 2A–L; Lebour *in* Russell & Yonge, 1936: pl. 40, fig. 5 (colour); Kiselev, 1950: 63 (in key), 66 (descr., etc.); figs 101a-c; Massuti & Margalef, 1950: 52, fig. 62; Gaarder, 1954a : 55; Trégouboff & Rose, 1957: 99 (key features), pl. 20, fig. 9; Balech, 1962: 124–125, pl. XVI, fig. 204; Cassie, 1963: 4, 9 (table 2); Halim, 1967: 750 (ecol.), pl. VIII, figs 94–95; Wood, 1968: 118 (descr.), fig. 359; Steidinger & Williams, 1970: 35 (in key), 59, fig. 124; Hermosilla, 1973: 9–10 (descr., as *Dinophysis*), pl. 1, figs 16-19; Sournia, 1973: 23, 63 (listed); Balech, 1976: 91–93, figs 4, O-T (descr., etc.); Burns & Mitchell, 1982c: 290 (in *Dinophysis*, N.Z. specimens determined), figs 30–32; Drebes, 1974: 116 (descr.), fig. 94d; Dodge, 1982: 42 (in key, *Dinophysis*), 55–56 (descr., distrib., refs & syn.), fig. 4I, pl. II, fig. f; Han & Yoo, 1983a: 41 (refs, dimensions etc.), pl. I, figs 8 & 11, pl. II, figs 1-4; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Chang, 1987b: 31 (as *D. rotunda* [sic], N.Z.); Hallegraeff & Lucas, 1988: 27, 29, fig. 14, tables 1–3 (physiol., ecol. etc., separation into *Phalacroma*); Balech, 1988: 46 (diag., taxon., distrib., ecol.), pl. 9, figs 1–4.

Dinophysis sacculus Stein, 1883

Stein, 1883: pl. XX, figs 10–123; Pavillard, 1916: 59, pl. II, fig. 9; Jörgensen, 1923: 22, text-fig. 24; Kofoid & Skogsberg, 1928: 224, 230, 231, 235, 237; Schiller, 1933: 135–137 (descr., syn., etc.), text-figs 129a-d; Kiselev, 1950: 68 (in key), 77 (descr.), figs 116a-d; Massuti & Margalef, 1950: 52, fig. 56; Wood, 1954: 194 (in key), 199 (descr., distrib., syn.), text-fig. 46; Cassie 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. record from Cook Strait); Wood, 1968: 51 (descr.), fig. 124; Taylor, 1974: 194 (Cassie's (1960) record from Wellington Harbour listed).

Dinophysis spinosa Rampi, 1950

Rampi, 1950: 3, text-fig. 7 ("Dana" Stns 3643, 3645, 3650, off N.Z.); Sournia, 1973: 25 (listed); Taylor, 1974: 194 ("Dana" records listed).

Dinophysis tripos Gourret, 1883

Gourret, 1883: pl. 3, fig. 53; Stein, 1883: pl. XXI, figs 3-4 (as *D. homunculus*); Jörgensen, 1923: 29–31 (remarks, distrib., refs etc.), figs 38–39; Cassie, 1961: 1-8 (N.Z. record); Chang, 1987b: 31 (N.Z.); Hallegraeff, 1988: 57 (SEM photo.); Balech, 1988: 45 (taxon., distrib., ecol.), pl. 7, fig. 7, pl. 8, fig. 1.

Dinophysis truncata Cleve, 1901

Cleve, 1901: 925, fig. 7; Kofoid & Skogsberg, 1928: 224, 231, 235, 237; Schiller, 1933: 234–235 (descr., etc.), figs 117a-b; Balech, 1944: 434, pl. 3; Rampi, 1950: 3, fig. 8 ("Dana" Stns 3542, 3644, 3645, off N.Z.), text-fig. 8; Wood, 1954: 194 (in key), 197 (descr., distrib.), text-figs 41a-b; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. record from Cook Strait); Cassie, 1963: 8 (table 2); Taylor, 1974: 194 (N.Z. records of Cassie, 1960 (Cook Strait) and Rampi, 1950 (SE of Kaikoura) listed); Sournia *et al.*, 1979: 195, fig. 43; Burns & Mitchell, 1982c: 294, figs 35–36, 39; Chang, 1987b: 31 (N.Z.).

Dinophysis sp. Burns & Mitchell, 1982

Burns & Mitchell, 1982c: 294 ("Several specimens of a very small *Dinophysis* sp. ... off the east coast of the South Island [NZOI Stns N471 and N482] ... cannot rightly be placed in ... any other presently defined related species."), figs 37–38.

Genus **Histioneis** Stein, 1883

Histioneis hyalina Kofoid & Michener, 1911

Kofoid & Michener, 1911: 296; Kofoid & Skogsberg, 1928: 679-681 (diag., descr.), text-fig. 95: 5, pl. 20, fig. 4; Wood, 1963a: 17 (descr.), text-fig. 50 ("Tropical Pacific Ocean : north of New Zealand"); Wood, 1968 : 78 (descr.), fig. 216; Balech, 1971: 19, pl. 2, figs 26, 29, 31; Taylor, 1974: 194 (Wood's (1963) record listed); Taylor, 1976: 46, pl. 10, fig. 93.

Histioneis paulseni Kofoid, 1907

Kofoid, 1907: 204–205, pl. 15, fig. 94; Kofoid & Michener, 1911: 295; Kofoid & Skogsberg, 1928: 650–652 (diag., descr.), text-fig. 95:8, pl. 20, figs 1–2; Wood, 1963a: 18–19 (descr.), text-fig. 58 ("Tropical Pacific : north of New Zealand"); Norris, 1969: 188–189 (descr.), text-figs 34–36.

Histioneis variabilis Schiller, 1933

Schiller, 1933: 231, text-figs 223a-d (new name for *H. Steinii* Schiller, 1928); Rampi, 1947: 10 (descr.), text-fig. 15; Halim, 1960: 196, pl. 2, fig. 17; Wood, 1963a: 20 (descr.), text-fig. 65 ("North Tasman Sea north of New Zealand"); Wood, 1968: 82 (descr.), fig. 229; Norris 1969: 189–190 (descr.), text-fig. 37; Taylor, 1974: 197 (Wood's (1963) record listed); Balech, 1988: 65 (diag., taxon., distrib., incl. in *H. striata* Kofoid & Michener, 1911: 300), pl. 15, fig. 10.

Suborder GYMNODINIINA (GYMNODINIALES)
Family GYMNODINIIDAE/GYMNODINIACEAE

Genus **Amphidinium** Claparède & Lachmann, 1859

Amphidinium acutissimum Schiller, 1933

Schiller, 1933: 277–278 (descr., etc., incl. *A. acutum* of Schiller, 1928: 132, not of Lohmann, 1920, *q.v.*), figs 263a-b; Wood, 1963a: 22, fig. 68; Wood, 1968: 13 (descr.), fig. 1; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Sournia, 1986: 75 (generic diag.).

Amphidinium acutum Lohmann, 1920

Lohmann, 1920: 140, fig. 43; Schiller, 1933: 278, fig. 264; Trégouboff & Rose, 1957: 103 (key features); Norris, 1961: 17 (NZOI Stn B67, off Kermadec Is); Wood, 1968: 13 (descr.) fig. 2.

Amphidinium aloxalocium Norris, 1961

Norris, 1961: 176–177, text-fig. 14 (NZOI Stn B67 off Kermadec Is); Sournia, 1973: 2 (listed).

Amphidinium amphidinioides (Geitler, 1924)

Geitler, 1924a: 110, figs A–F (*Gymnodinium*); Geitler, 1924b: 359, figs 1a-d; Schiller, 1933: 278–279 (descr., etc.), figs 265a-d (*Amphidinium*); Wood, 1968: 13 (descr.), fig. 3; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Amphidinium emarginatum Diesing, 1866

Diesing, 1866: 98(384) (*A. operculatum* var. *marginata*); Claparède & Lachmann, 1858–61: 411, pl. 20, fig. 11 (as *A. operculatum* variety); Kofoid & Swezy, 1921: 140 (diag., descr., etc), text-fig. 4, 21; Schiller, 1933: 289, fig. 280; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Amphidinium cf. **extensum** Wulff, 1916. Taylor, 1974

Taylor, 1974: 195 (record of Lanigan (1972) from Jellicoe Channel [see below under *Amphidinium* sp. Lanigan, 1972] listed under this identification; cf. Wulff, 1916: 104, pl. 1, figs 8a-d; Lebour, 1925: 30, fig. 8n and Matzenauer, 1933); Taylor, 1978: 216 (listed from Leigh region.

Amphidinium flagellans Schiller, 1928

Schiller, 1928: 136, figs 13a-b; Schiller, 1933: 291 (descr., etc.), figs 283a-b; Wood, 1963a: 23, fig. 72; Wood, 1968: 14 (descr.), fig. 6; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study; as "*flagellum*", ?misprint for *flagellans*).

Amphidinium microcephalum Norris, 1961

Norris, 1961: 177, text-fig. 26 (NZOI Stn B67, off Kermadec Is); Sournia, 1973: 2 (listed).

Amphidinium sphenoides Wulff, 1916

Wulff, 1916: 105, pl. 1, figs 9a-b; Lebour, 1925: 30, fig. 81; Schiller, 1933 : 315–316 (descr., etc.), figs 318a-b; Hulburt, 1957: 197 (in key), 203 (descr.), pl. 1, figs 4, 9, 13; Wood, 1963a: 23, fig. 73; Wood, 1968: 16 (descr.), fig. 15; Dodge, 1982a: 68 (descr., distrib., etc.), fig. 66; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Gaines & Elbrächter, 1987: 242, 246 (nutrition).

Amphidinium sp. Lanigan, 1972

Lanigan, 1972: 170, fig. on p. 176 (Hauraki Gulf); (?) see above under *A.* cf. *extensum* Wulff (*fide* Taylor 1974: 195).

Amphidinium sp. 1. Taylor, 1978

Taylor, 1978: 216 (Goat Is Bay, Leigh area, 4 Dec. 1967); Taylor & Durbin, 1978: 221 (Whangateau Harbour, Leigh area, 4 Dec. 1967).

Amphidinium sp. 2. Taylor, 1978

Taylor, 1978: 216 (Goat Is Bay, Leigh area, Nov. 1968).

Amphidinium sp. Chang, 1983

Chang, 1983b: table 1 (West Coast productivity study).

Amphidinium spp. MacKenzie & Gillespie, 1986

MacKenzie & Gillespie, 1986: 377 (table 3 : Tasman Bay).

Amphidinium sp. 1 Bradford *et al.*, 1987

Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound).

Amphidinium sp. 2 Bradford *et al.*, 1987
Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound).

Amphidinium sp. Chang *et al.*, 1990
Chang *et al.*, 1990: table 1 (Northland bloom, 1988), table 3 (record from salmon farm, Big Glory Bay, Stewart Is, January 1989).

Genus **Cochlodinium** Schütt, 1896

Cochlodinium brandtii Wulff, 1916
Wulff, 1916: 108, figs 17a-b: Schiller, 1933: 514–515 (descr., distrib., etc.), figs 554a-b; Lebour, 1925: 65, pl. IX, fig. 8 (incl. *C. angustum* Kofoid & Swezy, 1921: 354, fig. HH, 15, pl. 5, fig. 3); Taylor, 1978: 217 (Leigh record, Nov. 1967); Dodge, 1982a: 75–76 (descr., etc.), fig. 8H; Sournia, 1986: 58 (generic diag.); Taylor, 1987c: 32; Gaines & Elbrächter, 1987: 242 (nutrition).

Cochlodinium sp. Taylor, 1978
Taylor, 1978: 217 (common at Goat Is Bay, Leigh); Taylor & Durbin, 1978: 221 (Whangateau Harbour, Nov. 1967).

Cochlodinium sp. Chang, 1983
Chang, 1983b: table 1 (West Coast productivity study).

Cochlodinium sp. Bradford *et al* ., 1987
Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound).

Cochlodinium sp. Chang *et al.*, 1990
Chang *et al.*, 1990: table 1 (Marlborough Sounds bloom, 1985).

Genus **Cystodinium** Klebs, 1912

Cystodinium sp. Taylor, 1978
Taylor, 1978: 217 (Leigh area).

Genus **Gymnodinium** Stein, 1878

Gymnodinium cinctum Kofoid & Swezy, 1921
Kofoid & Swezy, 1921: 177 (in key), 196–197, text-fig. X, 28, pl. 7, fig. 75; Schiller, 1933: 343 (descr., etc.), fig. 348; Wood, 1963a: 24, fig. 78; Wood, 1968: 63, fig. 167; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Sournia, 1986: 55–56 (generic diag.).

Gymnodinium diamphidium Norris 1961
Norris, 1961: 178–179, text-fig. 12 (NZOI Stn B67, off Kermadec Is); Sournia, 1973: 35 (listed).

Gymnodinium flavum Kofoid & Swezy, 1921
[see also *Gyrodinium aureolum*]
Kofoid & Swezy, 1921: 177 (in key), 208–209, text-fig. X, 7, pl. 9, fig. 100; Schiller, 1933: 358–359 (descr. etc.), fig. 364; Wood, 1963a: 25, fig. 82; Wood, 1968: 64, fig. 171; Sournia *et al.*, 1979: 183–198; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Gaines & Elbräch-ter, 1987: 242 (nutrition); Shimizu, 1987: 306 (toxin); Taylor, 1987c: 418, 426, 430, 452, 472.

Gymnodinium galeaeforme Matzenauer, 1933
Matzenauer, 1933: 595; Schiller, 1937: 512 (descr.), figs. 594a-c; Wood, 1963a : 25, fig. 84; Wood, 1968: 65 (descr.), fig. 172; Taylor, 1978: 217 ("Occasional" in Leigh area, N.Z.).

Gymnodinium grammaticum Pouchet, 1887
Pouchet, 1887: 107, pl. 10, figs 8–9 (*G. punctatum* var. *grammaticum*); Lemmermann, 1899: 359; Schröder, 1900: 13; Kofoid & Swezy, 1921: 177 (in key), 217 (diag., descr., refs), text-fig. X, 22; Lebour, 1925: 35, 38, 39, fig. 11a; Schiller, 1928: 139, text-fig. 15, pl. 5, figs 14–15; Schiller, 1933: 366–367 (descr. etc.), figs. 372a-b; Wood, 1968: 65 (descr.), fig. 175; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Gymnodinium hamulus Kofoid & Swezy, 1921
Kofoid & Swezy, 1921: 179 (in key), 218–219, text-fig. Y, 5, pl. 9, fig. 97; Schiller, 1933: 367–368 (descr. etc.), fig. 373; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Gaines & Elbrächter, 1987: 251 (nutrition).

Gymnodinium hyalinum Schilling, 1891
Schilling, 1891: 60, 61 (descr. from freshwater ponds, Switzerland), pl. 3, fig. 14; Schilling, 1891b: 199–208, pl. 10, figs 1–22; Kofoid & Swezy, 1921: 283 (in key), 311–212 (diag., descr., refs & syn., transf. to n.g. *Gyrodinium*); *not* of Lebour, 1925 : 48, pl. VI, figs. 3–4 (= *G. lucidum* Ballantine *in* Parke & Dixon, 1964: 518, cf. Sournia, 1973); Schiller, 1933: 473–474 (in *Gyrodinium*, descr., refs & syn., freshwater range), fig. 503); Chang, 1983b: table 1 (first N.Z. record from West Coast productivity study, although author not stated [presumably of Schilling]); Gaines & Elbrächter, 1987: 245.

Gymnodinium leptum Norris, 1961

Norris 1961 : 180 (NZOI Stn B 67, off Kermadec Is), text-fig. 25 (coloured); Sournia, 1973: 36 (listed).

Gymnodinium cf. **marinum** Kent, 1880–82. Taylor, 1981

Taylor, 1981: 402 (May-August occurrence, Goat Is Bay, as *G.* cf. *marinum*); cf.

Kent, 1880–82: 444, pl. 25, figs. 60-61; Kofoid & Swezy, 1921: 178 (in key), 232–233 (diag., descr., refs), text-fig. X, 13; Lebour, 1925: 39, fig. 116; Schiller, 1933: 382 (descr., refs etc.), fig. 391; Wood, 1963a: 26, fig. 88; Wood, 1968: 66 (descr.), fig. 176; Dodge, 1982a: 86 (descr., etc.), fig. 9J.

Gymnodinium minor Lebour, 1917

Lebour, 1917: 192–193, text-figs. 8a-b; Kofoid & Swezy, 1921: 178 (in key), 233 (descr., etc.), text-fig. X, 12; Lebour, 1925: 38 (descr.), pl. IV, fig. 3; Norris, 1961: 180 (NZOI Stn B65, off Kermadec Is); Wood, 1963a: 26, text-fig. 89; Hada, 1968: 5, fig. 6; Hada, 1970: 14–15 (descr.), text-fig. 11; *cf.* Balech, 1976: 18-19, fig. 9; Chang, 1983b: table 1 (West Coast productivity study); Gaines & Elbrächter, 1987: 242 (nutrition).

Gymnodinium nanum Schiller, 1928

Schiller, 1928: 142, pl. 5, fig. 17; Schiller, 1933: 389 (descr., etc.), fig. 401; Wood, 1963a: 27, fig. 91; Wood, 1968: 67 (descr.), fig. 180; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Gymnodinium obesum Schiller, 1933

Schiller, 1933: 391–392, figs 405a-g; Wood, 1963a: 27, fig. 92; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Gymnodinium ovum Schütt, 1895

Schütt, 1895: pl. 25, fig. 23; Calkins, 1901: 118, fig. 64A; Kofoid & Swezy, 1921: 283 (in key), 324–325 (diag. descr., etc. in *Gyrodinium*); Schiller, 1933: 487-488 (descr., etc. as *Gyrodinium*), fig. 518; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Gymnodinium punctatum Pouchet, 1887

Pouchet, 1887: 105–107, pl. 10, fig. 7; Kofoid & Swezy, 1921: 244–245 (descr., refs); text-fig. BB, 18; Lebour, 1925: 35, 50; Martin, 1929: 14–15 (descr.), pl. I, figs 3-4; Schiller, 1933: 402 (descr., refs etc.), fig. 420; Wood, 1963a: 27, fig. 94; Wood, 1968: 67 (descr.), fig. 183; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Taylor, 1987d: 425.

Gymnodinium pygmaeum Lebour, 1925

Lebour, 1925: 38, pl. IV, fig. 4; Schiller, 1933: 403 (descr.), fig. 422; Wood, 1963a: 28, fig. 95; Dodge, 1982a: 87, fig. 10F; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Gymnodinium rotundatum Klebs, 1912

Klebs, 1912: 392, 403, 439, fig. 5; Kofoid & Swezy, 1921: 177 (in key), 251 (diag., descr., refs), text-fig. X, 8; Schiller, 1933: 407-408 (descr., refs etc.), figs 427a-j; Wood, 1968: 68 (descr.), fig. 184; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Gymnodinium sanguineum Hirasaka, 1922

Hirasaka, 1922: 161–164, 1 fig; Bary, 1951: 44; Bary, 1953a: 72 (N.Z. occurrences and significance); Bary, 1953b: 393, 397, fig. 1 (N.Z. distrib.), table III (N.Z. records); see also Brongersma-Sanders, 1957: 982; Taylor, 1974a: 195 (N.Z. records listed); Takayama, 1985: 129–140 *passim*, pl. I, fig. 8 (apical groove morphol.); Dodge & Lee, 1985 : 28, figs. 15–17; Hallegraeff, 1987: 4, fig. 6; Taylor, 1987c: 29, 37; Rizzo, 1987: 145, 146, 149, 152, 154 (biochem.); Prézelin, 1987: 177, 189 (photosynthesis); Gaines & Elbrächter, 1987: 226, 234, 235, 254, 256 (nutrition); Levandowsky & Kaneta, 1987: 371–375, 377, 383, 387; Taylor, 1987c: 405-407, 411, 414, 415, 418, 421, 422, 425, 426, 430, 437, 441, 444-446, 459, 460, 464, 466, 470, 475, 476.

Gymnodinium simplex (Lohmann, 1908)

Lohmann, 1908: 264, 265, pl. 17, fig. 17 (*Protodinium*); Kofoid & Swezy, 1921: 177 (in key), 256 (diag., descr., refs & syn.), text-fig. BB, 8; Lebour, 1925: 37, fig. 10; Kofoid, 1931: 18, pl. I, fig. 8; Schiller, 1933: 413-414 (descr., refs etc.), fig. 433; Wood, 1963a: 28, fig. 99; Wood, 1963c: 236–240; Wood, 1968: 68 (descr.), fig. 187; Dodge, 1974: 54, 171, text-fig. 1, pls 1–4; Travers & Travers, 1975: 267; Taylor, 1978: 217 (Goat Is Bay, Leigh records); Taylor & Durbin, 1978: 221 (Whan-gateau Harbour); Taylor, 1981: 393 (ecol.); Dodge, 1982a: 88 (descr., etc.), fig. 10E; Chang, 1983b: 291, table 1, fig. 7D (West Coast productivity study); Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound); Dodge, 1987: 93, 105 (ultrastructure); Withers, 1987: 327, 334, 337, 338, 341 (sterols); Levandowsky & Kaneta, 1987: 385; Taylor, 1987c: 400, 401, 404, 414, 441, 472.

Gymnodinium varians Maskell, 1887

Maskell, 1887: 7 (Wellington district), pl. 1, figs 9a-b; Hutton, 1904: 331 (listed); Kofoid & Swezy, 1921: 176 (in key), 265–266 (diag., descr., refs incl. only other known occurrence, fresh water in Botanical Gardens, Buitenzorg, Java); Schiller, 1933: 425–426

(descr., refs & syn., incl. *G. minimum* Klebs, 1912: 396, 419, 439, figs 7A-B); Chang, 1983b: 291, table 1 (second N.Z. record, West Coast productivity study); Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound); Pollingher, 1987: 503, 513, 516, 519.

(?) Gymnodinium sp. Bary, 1951
Bary, 1951: 44; Bary, 1953b : 397, table II ("yellow water" organism, Queen Charlotte Sound, 1950); see also Brongersma-Sanders, 1957: 982.

Gymnodinium spp. Brewin, 1952
Brewin, 1952: 619 (Otago Harbour); Taylor, 1974a: 195 (listed).

Gymnodinium sp. Rapson, 1954
Rapson, 1954: 492 (Wellington Harbour, Feb. 1936, French Pass, Aug. 1937).

Gymnodinium spp. Cassie & Cassie, 1960
Cassie & Cassie, 1960: 180 (table 1) (Waitarere Beach); Cassie, 1963: 9 (table 2) (S. of N.Z.); Taylor, 1974: 195 (listed).

Gymnodinium sp. Lanigan, 1972
Lanigan, 1972: 170, fig. on p. 196 (Hauraki Gulf).

Gymnodinium sp. 1, Taylor, 1978
Taylor, 1978: 217 (Leigh).

Gymnodinium sp. 2, Taylor, 1978
Taylor, 1978: 217 (Leigh).

Gymnodinium sp. 1, Chang, 1983
Chang, 1983b: table 1 (West Coast productivity study).

Gymnodinium sp. 2, Chang, 1983
Chang, 1983b: table 1 (West Coast productivity study).

Gymnodinium sp. 3, Chang, 1983
Chang, 1983b: table 1 (West Coast productivity study).

Gymnodinium spp. MacKenzie & Gillespie, 1986
MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay).

Gymnodinium spp. MacKenzie *et al.*, 1986
MacKenzie *et al.*, 1986: 402 (table 1 : Kenepuru Sound).

Gymnodinium spp. Chang *et al.*, 1990
Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, January 1989).

Genus **Gyrodinium** Kofoid & Swezy, 1921

Gyrodinium apidiomorphum Norris, 1961
Norris, 1961: 181–182, text-fig. 27 (coloured) (NZOI Stn B67, off Kermadec Is); Sournia, 1973: 37 (listed); Sournia, 1986: 57 (generic diag.).

Gyrodinium aureolum Hulburt, 1957
Hulburt, 1957: 208 (in key), 209–210 (descr.), 217 (diag.), pl. 2, figs 8–9; Helm *et al.*, 1974: 857–869 (cycles of abundance/lugworm mortality); Tangen, 1976: 123–133 (blooms/organism mortality); Cross & Southgate, 1980: 1071–1073 (blooms/rocky fauna mortalities); Jones *et al.*, 1982: 771–782 (red tide/salmon mortality); Roberts *et al.*, 1983: 741–743 (salmon mortality); Brockmann *et al.*, 1985: 239–244 (nutrient dynamics); Dahl & Brockmann, 1985: 233–238 (growth); Hurst *et al.*, 1985: 427–432 (toxin assays); Lindahl, 1985: 231–232 (blooms/hydrogr.); Lindahl, 1986: 27–33 (blooms/hydrogr., growth); Partensky & Sournia, 1986: 251–275 (toxicity/ecol.); MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Hallegraeff, 1987: 6, fig. 10; Kristiansen, 1987: 739–748 (nitrates); Potts & Edwards, 1987: 293–297 (impact on fish); Turner *et al.*, 1987: 98–102 (toxicity); Shimizu, 1987: 306 (toxin); Gill & Harris, 1987: 785–801 (predation/copepods); Levandowsky & Kaneta, 1987: 388 (behaviour); Taylor, 1987c: 418, 446, 452, 462, 464, 469; Chang, 1987a: 18–19 (N.Z. bloom); Boustead *et al.*, 1987: 2–3 (blooms and salmon farming, N.Z.); Boalch, 1987: 94–97 (irruptions/blooms); Richardson & Kullenberg, 1987: 19–26 (blooms); Dahl *et al.*, 1987: 66–73 (blooms); Gowen, 1988: 89–93 (toxic blooms); Sangfors, 1988: 296 (chemical pollution/eutrophication); Kite & Dodge, 1988: 131–138 (chloroplasts/ultrastructure)); Wranes, 1988: 71–74 (red tide/bird mortality); Dixon & Syret, 1988: 297–302 (laboratory culture); Dixon & Holligan, 1989: 105–118 (growth/nitrogen assimilation); Chang *et al.*, 1990: 467, table 1 (N.Z. bloom records listed).

Gyrodinium biconicum Kofoid & Swezy, 1921
Kofoid & Swezy, 1921: 283 (in key; as "*biconium*"), 286–287, text-figs cc, 12, pl. 4, figs 4–6; (?)Schiller, 1928: 143, fig. 19; (?)Schiller, 1933: 337, fig. 342; Wood, 1963a: 24, fig. 76; Chang, 1983b: 291 (table 1 [first N.Z. record] (as *Gymnodinium*); Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound); Gaines & Elbrächter, 1987: 242 (nutrition).

Gyrodinium kofoidi Norris, 1961

Norris, 1961: 187, text-fig. 8 (NZOI Stn B67, off Kermadec Is); Sournia, 1967: 38 (listed).

Gyrodinium phorkorium Norris, 1961

Norris, 1961: 183, text-fig. 13 (NZOI Stn B67, off Kermadec Is); Sournia, 1967: 38 (listed).

Gyrodinium sp. Brewin, 1952

Brewin, 1952: 619 (Otago Harbour).

Gyrodinium sp. MacKenzie & Gillespie, 1986

MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay).

Gyrodinium sp. MacKenzie *et al.*, 1986

MacKenzie *et al.*, 1986: 402 (table 1 : Kenepuru Sound).

Gyrodinium sp. Bradford *et al.*, 1987

Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound).

Gyrodinium sp. Chang *et al.*, 1990

Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, January 1989).

Family POLYKRIKIDAE/POLYKRIKACEAE

Genus **Polykrikos** Bütschli, 1873

Polykrikos kofoidii Chatton, 1914

Chatton, 1914: 161; Kofoid & Swezy, 1921: 398–400 (diag., descr.), text-fig. F,1, pl. 4, fig. 4; Martin, 1929: 19 (descr.), pl. IV, figs 3-4, pl. VIII, fig. 9; Massuti & Margalef, 1950: 49, fig. 46; Norris, 1964: 274 (Wellington Harbour); Wood, 1968: 120 (descr., distrib.), fig. 367; Taylor, 1974: 195 (Jellicoe Channel, Taylor unpubl. and Wellington Harbour record of Norris (1964) listed); Morey-Gaines & Ruse, 1980: 230–232, figs 1-4 (encystment and reprod.); Kimor, 1981: 164–173 *passim* (role in ecosystem); Dodge, 1982a: 104 (gamete stage may be *Gyrodinium pellucidum* (Wulff, 1916)), 117 (in key), 118 (descr., etc.), fig. 14D; Sournia, 1986: 60 (generic diag.); Greuet, 1987: 126 (organelles); Gaines & Elbrächter, 1987: 243 (nutrition); Pfiester & Anderson, 1987: 635 (reprod.).

Polykrikos schwartzii Bütschli, 1873

Bütschli, 1873: 673–676, pl. XXVI, fig. 72; Bergh, 1882: 256–259, pl. 16, fig. 72 (as *P. auricularia*); Kent, 1882: 858 (*P. schwartzi*), 860 (as *P. auricularia* Bergh); Pouchet, 1883: 450-452 (as *P. auricularia*); Paulsen, 1908: 107 (refs), text-fig. 149; Chatton, 1914: 157–194, text-figs 1–18, pl. 9 (cnidocysts); Lebour, 1917: 198; Kofoid & Swezy, 1921: 398 (in key), 400–402 (descr., distrib., etc., detailed refs & syn.), text-fig. F 4; Chodat & Weil, 1924: 580 (morphol. of flagellum and nucleus); Lebour, 1925: 67, text-fig. 16c, pl. X, figs 2a-b; Kofoid, 1931: 30–31, text-fig. U; Schiller, 1933: 550–551, figs 58a-c (descr., refs & syn., incl. *P. auricularia* Bergh); Lebour *in* Russell & Yonge 1936: pl. 40, fig. 7 (colour); Sommer & Clark, 1946: 100 (toxic nature); Kiselev, 1950: 115 (descr.), figs. 191a-b, 192; Chatton, 1952: 337, fig. 241; Hardy, 1956: fig. 15h; Hulburt, 1957: 215–216 (geogr. range); Brongersma-Sanders, 1957: 981 (review of red-water blooming, etc. see figs. 36, distrib. maps); Trégouboff & Rose, 1957: 107 (key features); Newell & Newell, 1953: 39, pl. X, fig. 3; Norris, 1964: 274 (Wellington Harbour record); Halstead, 1965: 160 (review of toxic nature, etc.), pl. VI, fig. 1; Russell, 1965: 265 (table 1) (toxic nature); Loeblich & Loeblich, 1966: 49 (listed as type species of *Polykrikos* Bütschli, 1873: 673); Steidinger *et al.*, 1967: pl. III, fig. h; Dragovich, 1969: fig. 5a; Throndsen, 1969: 170; Steidinger & Williams, 1970: 36 (in key), 60, figs. 131a-b; Greuet, 1972: 1239 (trichocyst, structure, etc.); Iwasaki, 1972: 606–609, (nutrition, growth etc.), figs; Sarjeant, 1974: 17, fig. 11a; Taylor, 1974: 195 (Wellington Harbour record of Norris (1964) listed as *P. schwarzii* [sic]); Drebes, 1974b: 126 (descr., etc.), fig. 10G; Reid, 1978: 220–222 (cyst), 227 (descr., refs), pl. 1; Shim *et al.*, 1981: 63-64, pl. III, fig. 12 (as *swarzi*); Harland, 1981: 65–79 (cysts); Dodge, 1982: 117 (descr. etc.), figs 14A & G; Harland, 1983: 373, 387, text-fig. 42, pl. 48, figs 10–12 (new cyst, distrib. etc.); Takayama, 1985: 129–140 *passim*, pl. II, fig. 17 (apical groove morphol.); Dodge & Lee, 1985 : 30, fig. 26; Baldwin, 1987: 550, fig. 24 (dimensions etc., distrib. Marlborough Sounds); Taylor, 1987c: 46; Greuet, 1987: 126–128, 130, 133 (organelles); Gaines & Elbrächter, 1987: 227 (nutrition); Sweeney, 1987: 270 (bioluminescence etc.); Goodman, 1987: 668 (cysts in sediments); Hallegraeff, 1988 : 51 (SEM photo.); Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Suborder NOCTILUCINA (NOCTILUCALES)

Family NOCTILUCIDAE/NOCTILUCACEAE

Genus **Noctiluca** Suriray *in* Lamarck, 1816

Noctiluca scintillans (Macartney, 1810) *

Macartney, 1810: 264–265, pl. 15, figs 9–12 (*Medusa*); Harvey, 1917: 235–253 (specific gravity, luminescence etc.); Kofoid & Swezy, 1921: 407–411 (diag., descr., syn., discuss.), text-figs KK, 16; Pratje, 1921a: 433–446 (biochem.); Pratje, 1921b: 198 (morphol., physiol.); Lebour, 1925: 69, text-figs 17a-d; Kofoid, 1931: 31–33 (descr., etc.), text-figs V–BB' Schiller, 1933: 553 (descr., refs & syn. as *N. miliaris* Suriray, 1816: 470, incl. *Medusa scintillans* Macartney, 1810: 264–265, pl. XV, figs 9–12), figs 582a-e; Gross, 1934: 178–196 (biol., development); Brongersma-Sanders, 1948: 1–112 *passim* (mortality, upwelling and oil geology); Massuti & Margalef, 1950: 47, fig. 36; Bhimachar & George, 1950: 339–350 (fisheries mortality); Davis, 1953: 189–192 (flotation mechanism); Prasad, 1953: 40–47 (swarming, use as indicator species); Wood, 1954: 220–221 (refs & syn.), figs 83a-b; Gaarder, 1954: 34; Nicol, 1958: 535–549, figs 1–9 (luminescence, refs); Eckert & Findlay, 1962: 494–495 (physiol. varieties); Halstead, 1965: 160 (toxic nature — see also Aiyar, 1936); Eckert, 1965: 1140–1145 (bioluminescence control); Bityikov, 1966: 403–406 (stimulation of luminescence); Eckert & Reynolds, 1967: 1429–1458 (bioluminescence origin); Eckert & Sibaoka, 1968: 258–282 (bioluminescence mechanism); Le Fèvre & Grall, 1970: 287– 306, figs (swarming); Grindley & Heydorn, 1970: 210–213 (red water cause and effect); Zingmark, 1970: 122–126 (reprod.), figs 1–18; Uhlig, 1972: 387–399 (develop.); Fung & Trott, 1973: 472–476 (red tide); Taylor, 1974a: 195 (Jellicoe Channel and Leigh records (unpubl.) listed); Drebes, 1974b: 127–129 etc., as *N. miliaris*), figs 108–109; Mikulich & Kuzmina, 1975: 56–74; Taylor, 1976: 186–187, pl. 39, figs 478–479 (refs & syn. incl. discussion of name); Taylor, 1978: 217 ("Rare" in Leigh area); *cf.* Sweeney, 1978: 116–120 (ultrastructure); Takayama, 1979: 273–274, figs (feeding behaviour, as *N. scintillans*); Kimor, 1979: 568–572 (predation on copepod eggs); Shim *et al.*, 1981: 64, pl. III, figs 13a-c; Kimor, 1981: 164–173 *passim* (role in ecosystem); Uhlig, 1981: 93–115 (mass culture); Filimonov & Tyul'kova, 1981: 192 (bioluminescence etc.); Dikarev *et al.*, 1982: 137140 (lipid composition), figs 1–2; Zhirmunsky & Konovalova, 1982: 3–6 (summary of red tides 1980– 82, Peter the Great Bay, Soviet Far East); Ilyichev *et al.*, 1982: 6–8 (distrib. of red tide); Propp *et al.*, 1982: 9–14 (hydrochemistry, hyrdrophysiol. etc.); Dikarev, 1982: 14–17 (lipid composition, refs etc., taxon.); Vyshkvartsev *et al.*, 1982: 18–20 (1982 red tide, Peter the Great Bay), 1 col. pl.; Dodge, 1982a: 135–136 (descr., refs & syn. etc.), figs. 16A–C; Taylor, 1982: 73 (table II), 78–79 (symbiosis); Mullin *in* Rassoulzadegan 1982: 193 (feeding); Uhlig *in* Heinbokel, 1982: 215, 217 (reprod.); Uhlig & Sahling, 1982: 277284, figs 1–5 (rhythms and distrib.); Han & Yoo, 1983a: 43, pl. II, fig. 7 (as *N. miliaris*); Takayama, 1984a: 25–29, (refs), fig. 1, pl. I; Takayama, 1984b: 4450 (organ functions); Balch & Haxo, 1984: 515–525 (spectral properties); Uhlig & Sahling, 1985: 779–780 (blooming); Vyshkvartsev, 1985: 62–68 (factors inducing growth); Takayama, 1985: 135 (table 1, apical groove morphol.); Dodge & Lee, 1985: 27, figs 7–9; Devassy & Sreekumaran Nair, 1987: 121–128, fig. 1 (blooms/fisheries effects); Metivier & Soyer-Gobillard, 1986: 163–170 (tentacle motility); Hayashi *et al.*, 1986: 337–343 (biochem.); Tuncer, 1986a: 276 (metals concentration/bloom); Tuncer, 1986b: 42 (metals/bloom); Hanslik, 1986: 43–44 (physiol.); Laborde *et al.*, 1986: 197–199 (bloom dynamics/ hydrogr, etc.); Pérès *et al.*, 1986: 85–116 (dynamics/ red tide, refs); Sournia, 1986: 50–51 (generic diag.); Nawata & Sibaoka, 1986: 49–58 (feeding physiol.); Uhlig & Sahling, 1986: 41–43 (bloom dynamics); Boalch, 1987: 94–97 (blooms); Jenkinson, 1987: 47; Daan, 1987: 9–17 (egg predation/copepods); Hanslik, 1987: 39-40 (diet); Metivier *et al.*, 1987: 42–49 (protein chemistry); Nicholas *et al.*, 1987: 189–196 (bioluminescence/physiol.); Nawata & Sibaoka, 1987: 125–133 (feeding/physiol.); Hallegraeff, 1987: 4, fig. 2; Taylor, 1987a: 4; Taylor, 1987c: 39; Gaines & Elbrächter, 1987: 231, 240, 241, 243, 256 (nutrition); Sweeney, 1987: 20, 271 (bioluminescence etc.); Shimizu, 1987: 283 (toxin); Withers, 1987: 337, 338, 341 (sterols); Taylor, 1987d: 423, 444; Trench, 1987: 560 (symbiosis); Uhlig, 1987: 37 (population dynamics); Pfiester & Anderson, 1987: 622, 624, 626, 634, 636, 640 (reprod.); Metivier & Soyer-Gobillard, 1988: 359–379 (cytoskeleton, cytoplasmic inclusions); Katti *et al.*, 1988: 380–381 (green tide); Uhlig & Sahling, 1988: 43–45 (population dynamics); Uye & Matsuda, 1988: 280–286 (phosphorus content); Melkonian & Hohfeld, 1988: 601–612 (ultrastructure); Narusevich *et al.*, 1988: 26-30 (autotrophy); Oami *et al.*, 1988: 179–185 (tentacle physiol.); Schaumann *et al.*, 1988: 77–91 (bloom/hydrology etc.); Evstigneev, 1988: 65–72 (heavy metals/luminescence); Marine Observer, 1988: 66 (biolumin-

* "This species is frequently referred to as *N. miliaris* although Macartney's specific name has priority. Taylor (1976) suggests that the simplest solution to the problem of nomenclature is to accept the priority of *scintillans* especially as this has been used by two major works: Kofoid & Swezy (1921) and Lebour (1925); Schiller (1933) together with many recent authors have preferred *N. miliaris*." (Dodge, 1982a: 136).

escence); Vigues *et al.*, 1988: 101–110 (protein content); Zaitev *et al.*, 1988: 65–67 (populations); Park *et al.*, 1988: 1–26 *passim* (succession, etc.); Balech, 1988: 26 (diag., taxon., distrib., ecol.), pl. 1, fig. 11; Sargunum *et al.*, 1989: 289–290 (bloom); Pfiester, 1989: 249–272 (life cycles/review); Oami & Naitoh, 1989a: 1-8 (tentacle physiol.); Oami & Naitoh, 1989b: 833–850 (effector responses); Adnan, 1989: 53–56 (red tides/mass mortality of fish); Evstigneev, 1989: 72–77.

Family PRONOCTILUCIDAE/ PRONOCTILUCACEAE

Genus **Pronoctiluca** Fabreé-Domergue, 1888

Pronoctiluca acuta (Lohmann, 1913)

Lohmann, 1913: 362, fig. 17a (*Rhynchomonas*); Lohmann, 1920: 216, figs 63–64; Schiller, 1933: 271–273 (descr. etc.), figs 260a-c; Wood, 1954: 217, fig. 76; Wood, 1968: 120 (descr.), fig. 369; Taylor, 1974: 195 (Jellicoe Channel record (unpubl.) listed); Elbrächter, 1979: 17–18 (descr., syn.), fig. 48.

Order PERIDINIINA/PERIDINIALES Family CERATIIDAE/CERATIACEAE

+* Genus **Ceratium** Schrank, 1793

Ceratium arietinum Cleve, 1900

Cleve, 1900: 13, pl. VII, fig. 3; Jörgensen, 1899: 44, pl. 2, fig. 12; Cleve, 1902: 13; Karsten, 1905b: 142, pl. XX [1], fig. 7 (status, as *C. tripos a*); Karsten, 1907: 406; Jörgensen, 1911: 32 (in key), 48–49 (descr., distrib., refs & syn.), 97, 106, 108, pl. V, figs 102–105; Jörgensen, 1920: 62-66 (review of ecology, forms, etc.), text-figs 60–62; Peters, 1932: 41, fig. 16, pl. 4, fig. 22; Nielsen, 1934: 21–22, text-fig. 45, map 2; Schiller, 1937: 403 (descr., syn.), fig. 444 (in subgenus *Euceratium*, Section Tripos); Graham & Bronikovsky, 1944: 31–32, text-figs 16A-K, chart 27, text-table 29, appendix-table 32 (ecol., etc.); Kiselev, 1950: 237 (in key, subgenus *Eucratium*), 252 (descr.), figs 420a-b; Massuti & Margalef, 1950: 58, fig. 106; Gaarder, 1954a: 9, text-fig. 10; Wood, 1954: 270 (in key) 294–295 (descr., distrib., forms, syn.), text-fig. 221a; Trégouboff & Rose, 1957: 115, pl. 26, fig. 4; Cassie, 1960a: 168 (E. of N.Z.); Cassie, 1961: 18, 46 (N.Z. localities); Halim, 1963: 497; Wood, 1963b: 4 (refs); Wood, 1964a: 36 (ecol.); Wood, 1964b: 549 (ecol.); López, 1966: 330 (in subgenus *Euceratium*), 422 (in key), text-fig. 2(27); Sournia, 1966: 465 (varieties and transitional stages); Sournia, 1967: 429 (status, etc.), 430–431, text-fig. 52; Halim, 1967: 712 (ecol., forms), pl. I, fig. 3; Wood, 1968: 23 (descr.), fig. 37; Subrahmanyan, 1968: 12 (in key), 54 (descr., distrib., refs & syn.), text-figs 95–97; Taylor, 1974: 196 (N.Z. records listed); Travers & Travers, 1975: 265 (varieties); Taylor, 1976: 7879 (identif., refs etc.), pl. 16, figs 162, 165; cf. Muñoz & Avaria, 1980: 7 (in key), 23 (diag.), pl. 5, fig. 2; Burns & Mitchell, 1982a: 57, figs 1–3 (N.Z. specimens); Dodge, 1982a: 227 (in key), 235 (descr., etc. incl. *C. bucephalum* Cleve, 1897: 302, fig. 5 and Lebour, 1925: 151, figs 47b-c); Dowidar, 1983: 14 (forms *detortum* (Stuwe) and *gracilentum* Jörgensen), pl. III, fig. 10; Balech, 1988: 143 (diag., taxon., distrib., in subgenus *Tripoceratium* Kofoid), pl. 61, figs 4–5.

Ceratium axiale Kofoid, 1907

Kofoid, 1907: 170, pl. 4, fig. 26; Jörgensen, 1911: 32 (in key), 46, pl. V, fig. 96 (descr., distrib.); Peters, 1932: 42, pl. 2, fig. 12h; Nielsen, 1934: 20, 35 (table 8), text-fig. 42 (N.Z. record); Schiller, 1937: 402, text-fig. 442 (descr., refs) (in subgenus *Euceratium*, Section Tripos); Graham & Bronikovsky, 1944: 30, text-figs 15D–E, Chart 25, text-table 27, appendix-table 29 (ecol., etc.); Wood, 1954: 270 (in key), 293–294 (descr., distrib.), text-fig. 219; Wood 1964b: 549 (ecol.); Wood, 1968: 23 (descr.), fig. 38; Subrahmanyan, 1968: 12 (in key), 523 (descr., distrib., refs), text-fig. 93.

Ceratium azoricum Cleve, 1900

Cleve, 1900: 13, pl. XVII, figs 6–7; Karsten, 1905: 141, pl. XX[1] figs 3-4 (status, etc., as *C. tripos azoricum* and *C. tripos azoricum* f. *reducta* Karsten); Karsten, 1907: 405, 406; Paulsen, 1908: 76, fig. 99; Jörgensen, 1911: 32 (in key), 47 (descr., distrib., etc.), 98, pl. V,

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+ All species of *Ceratium* occurring in the New Zealand region have been arranged in alphabetical order rather than within the sequence of subgenera and sections set out by Sournia (1967) — see also "taxonomic comment 16" by Taylor (1974: 199) regarding treatment of varieties. Use of the index to the present "Reference List" will allow references to be located for the various combinations of epithets that have been used. Balech's (1988) recent account of South Atlantic Ceratiidae/Ceratiaceae should be consulted for subgeneric groupings.

* Note also reviews of ecology by Williams (1971) and of biogeography and ecology in the South Pacific by Bary (1970) and useful discussion on taxonomy by F.J.R. Taylor (1976: 55–56) and Dodge (1982a: 222-227, with key); generic diagnosis in Sournia (1986: 67–70).

figs 97–98; Jörgensen, 1920: 69–70, text-fig. 66 (review of ecol.); Lebour, 1925: 151 (descr.), text-fig. 48; Peters, 1932: 43, fig. 17, pl. 3, fig. 14h; Nielsen, 1934: 20, 35 (table 8), text-fig. 43 (N.Z. record); Schiller, 1937: 405, fig. 447 (descr., syn., etc.) (in subgenus *Euceratium*, Section Tripos); Graham & Bronikovsky, 1944: 301, figs 16M–P, chart 26, text-table 28, appendix-table 30 (ecol., etc.); Kiselev, 1950: 237 (in key, subgenus *Euceratium*), 252 (descr.), figs 413a-b; Massuti & Margalef, 1950: 58, fig. 108; Gaarder, 1954a: 9; Wood, 1954: 270 (in key), 295 (descr., distrib.), text-figs 222a-b; Trégouboff & Rose, 1957: 115, pl. 26, fig. 6; Cassie, 1961: 18, 47 (N.Z. record from Hawke Bay); Wood 1964b: 549; López, 1966: 330 (in subgenus *Euceratium*), 419, 422 (in key), text-fig. 58; Halim, 1967: 712 (ecol.), pl. I, fig. 4; Wood, 1968: 23 (descr.), fig. 39; Subrahmanyan, 1968: 12 (in key), 56 (descr., distrib., refs), 57, 91, text-fig. 102; Yamaji, 1971: 99, pl. 48, fig. 1; Tu & Chiang, 1972: 138, fig. 11; Hermosilla, 1973: 61 (in key), 67–68 (descr., observs, distrib., refs), pl. 36, figs 1–4; Taylor, 1974: 196 (N.Z. records listed); Taylor, 1976: 79–80 (discuss., var., refs), pl. 15, fig. 160; Muñoz & Avaria, 1980: 8 (in key), 25–26 (diag., syn.), pl. 11, fig. 11, pl. 13, fig. 1; Burns & Mitchell, 1982a: 57–60, fig. 4 (N.Z. specimen); Dodge, 1982: 226 (in key), 232 (descr. etc.), fig. 29F; Dowidar, 1983: 14, pl. IV, fig. 7; Balech, 1988: 137 (diag., distrib., ecol., in subgenus *Tripoceratium*), pl. 57, fig. 6.

Ceratium bigelowi Kofoid, 1907

Kofoid, 1907: 170, pl. 3, fig. 22; Jörgensen, 1911: fig. 44; Böhm, 1931: 14, 43, fig. 37b; Nielsen, 1934: 13, fig. 18; Schiller, 1937: 376, fig. 414b; Graham & Bronikovsky, 1944: figs. 11 I, K–N; Wood, 1963: 39, fig. 143; Subrahmanyan, 1968: 11, 289 (descr., refs), text-figs 46–47; Taylor, 1974: 196 (first N.Z. record, from Goat Is Bay, Leigh, listed); Taylor, 1976: 65 (features, refs), pl. 13, figs 134–135; Taylor, 1978: 216 (Leigh record, Dec. 1967); Dowidar, 1983: 12, pl. II, fig. 6; Balech, 1988: 135–136 (diag., taxon., ecol., distrib.), pl. 55, figs 14–15.

Ceratium breve (Ostenfeld & Schmidt, 1902)

Ostenfeld & Schmidt, 1902: 164, fig. 13 (as *C. tripos* var. *brevis*); Jörgensen, 1911: figs 84–86; Böhm, 1931: 18, 22 (varieties and forms), figs 17–18; Schiller, 1937: 391–392 (descr., distrib., syn.), figs 429a-b; Taylor, 1976: 11, 80 (descr., refs & syn., etc.), 84, 86, pl. 14, figs 141–146; Shim *et al.*, 1981: 73, pl. XII, fig. 40; Dodge, 1982: 226 (in key), 232; Burns & Mitchell, 1982a: 60, figs. 59 (" ... clear evidence of a resident population in New Zealand coastal waters. This is therefore the first record of the species from New Zealand."); Dowidar, 1983: 13–14, pl. II, fig. 10, pl. III, fig. 12; Balech, 1988: 140 (diag., taxon., distrib., ecol., as *C. tripos breve*), pl. 60, figs 1–2.

Ceratium buceros (Zacharias, 1906) forma **denticulatum** (Jörgensen, 1920)

Jörgensen, 1920: 97, fig. 91 (as *C. horridum buceros* var. *denticulatum*), 96, figs 87–90 (as *C. horridum* Gran, in part); Zacharias, 1906: 551, fig. 15 (as *C. buceros*); Jörgensen, 1911: 78 (as *C. tenue* var. *buceros* Zacharias); Schiller, 1937: 415–417 (descr., forms, refs & syn.), fig. 457c (in subgenus *Euceratium*, Section Macroceros Pavillard, 1907); Kiselev, 1950: 272, fig. 498; Wood, 1954: 271 (in key), 303 (distrib.), text-fig. 231c; Cassie, 1961: 18, 47 (N.Z. record from Hawke Bay); Wood, 1963: 5 (refs); Wood, 1964a: 37 (ecol.); Wood, 1964b: 549–550 (ecol.); Sournia, 1967: 479 (syn.) (= *C. horridum buceros* var. *denticulatum*); Halim, 1967: 713 (ecol.), pl. II, fig. 17, pl. III, fig. 29; Wood, 1968 : 24 (descr.), fig. 43; Lanigan, 1972: 170, fig. on p. 175 (Hauraki Gulf as *C. buceros*); Taylor, 1973: 491 (Hauraki Gulf ecol.); Taylor, 1974: 197 (N.Z. records, incl. Cassie (1961) from Hawke Bay, presumably included with "*C. horridum* (Cleve) Gran var. *horridum*" and "var. *buceros* (Zach.) Sournia" see his "taxonomic comment 21" regarding gradations between *horridum* and *buceros* — "the permutations between the epithets of these species and varieties are considerable.").

Ceratium buceros (Zacharias, 1906) forma **molle** (Kofoid, 1907)

Kofoid, 1907: 304, pl. 27, fig. 27 (as *C. molle*); Karsten, 1905b: 22, fig. 33b (as *C. tripos flagelliferum* var. *angusta*); Jörgensen, 1911: 62 (in key), 80, 81–82 (descr., distrib.), 106, 109; Jörgensen, 1920: 96 (in part as *C. horridum buceros* var. *molle*); Nielsen, 1934 28, 35 (table 8), text-fig. 71 (N.Z. occurrence); Schiller, 1937: 417 (descr., syn.), text-fig. 457a (in subgenus *Euceratium*, Section Macroceros); Gaarder, 1954a: 10 (as *C. buceros* f. *molle*); Wood, 1954: 271 (in key), 303 (features, distrib.), text-fig. 231g; Yamaji, 1959: fig. on p. 115 (as *C. molle*); Cassie, 1960a: 168 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities); López, 1966: 333 (in subgenus *Euceratium*), 423 (in key), text-figs 2 (39–40), 39–40; Sournia, 1967: 477–479 (status, distrib., refs & syn., etc.), text-fig. 95 (as var. of *C. horridum* (Cleve, 1897), *q.v.*); Subrahmanyan, 1968: 65 (*C. molle* Kofoid of Steemann Nielsen, 1939, incl. in syn. of *C. horridum* Gran, 1902); Taylor, 1974: 197 (N.Z. records incl. within *C. horridum* var. *horridum* see his "taxonomic comment 21", p. 199); Balech, 1988: 149 (diag., taxon., distrib., ecol., as *C. horridum molle*), pl. 65, figs 8–9.

Ceratium candelabrum (Ehrenberg, 1859)

Ehrenberg, 1859: 272 (*Peridinium*); Ehrenberg, 1860b: 792; Stein, 1883: pl. XV, figs 15–16; Gourret, 1883: 46 (as *C. dilatatum* var. *parvum*), 47 (as *G. globatum*), pl. 4, fig. 67; Pavillard, 1905: 55; Paulsen, 1908: 88, fig. 120; Jörgensen, 1911: 5, 12 (in key), 16, 96, pl. II, fig. 21 (descr., distrib., refs & syn., forms incl. *C. furca* var. *contorta* Pouchet, 1883, *C. furca* var. *depressa* Pouchet, 1883, *C. globatum* Gourret, 1883, *C. dilatatum* var. *parvum* Gourret, 1883); Lebour, 1925: 143–145, textfigs 45b-c, pl. XXX, fig. 2; Böhm, 1931: 8, fig. 3; Peters, 1932: 29, fig. 8, pl. 3, fig. 14b; Nielsen, 1934: 8–9 (ecol., refs), text-figs 6–7, table 1; Schiller, 1937: 364–366 (descr., var., refs & syn.), text-figs 401-403 (in subgenus *Biceratium*, Section Candelabra); Kiselev, 1950: 236 (in key, subgenus *Biceratium*), 242 (descr.), figs 408a-b; Massuti & Margalef, 1950: 58 (in key), fig 82; Wood, 1954: 269 (in key) 272 (descr., syn.); Trégouboff & Rose, 1957: 114, pl. 25, fig. 4; Cassie, 1961: 18, 47 (N.Z. record from Bay of Plenty); Newell & Newell, 1963: 40, pl. XI, fig. 12; Mulford, 1963: 87 (*C. candelabrum*), 88 (as *C. contortum*); Halim, 1963: 496; Wood, 1963b: 5-6 (refs); Klement, 1964: 353–354 (dimensions, etc.), pl. 2, fig. 2; Wood, 1964a: 37 (ecol.); Wood, 1964b: 550 (ecol.); Sournia, 1966: 464, table I (varieties and transitional stages); Lopez, 1966: 330 (in subgenus *Biceratium*), 333, 339–344, 362–367, 411-413, 421 (in key), 424, figs 3 (52–58), 52–58, 73–75, 88–89, pl. 1, figs 1–7, tables 1–4; Sournia, 1967: 390, 392–394, text-fig. 14 (history, morphol., syn., incl. *Ceratium candelabrum* f. *commune* Böhm, 1931, f. *hiemale* Böhm, 1931, f. *eucandelabrum* Böhm, var. *genuinum* Pavillard, 1931, var. *a curvatulum* Jörgensen, 1920 (in part)); Halim, 1967: 713–714 (ecol., pl. II, fig. 18; Wood, 1968: 25 (descr.), fig. 44; Subrahmanyan, 1968: 8, 10 (in key), 17–18 (descr., distrib., refs & syn), text-figs 16–20 (includes in syn. the following variety: *Ceratium candelabrum* (Ehrenberg 1859) var. *depressum* Pouchet, 1883: 417, text-figs 1a-b, pls 18–19 (as *C. furca* var. *depressa*); Gourret, 1883: 41, pl. 1, fig. 5 (as *C. depressa*), 46, pl. 4, fig. 68 (as *C. dilatata*); Paulsen, 1908: 74 (in key), 88 figs, text-fig. 120; Jörgensen, 1911: 6, pl. II, fig. 21 (descr., refs & syn., as *C. candelabrum* (Ehrenberg) incl. *C. furca* var. *depressa* Pouchet, 1884, var. *contorta* Pouchet, 1883 and *C. dilatatum* var. *parvum* Pouchet, 1883); Jörgensen, 1920: 13–15 (review of ecol., etc.); Nielsen, 1934: 35 (table 8) (N.Z. record); Schiller, 1937: 366 (descr., refs & syn. as forma *depressum*), text-fig. 403; Dakin & Colefax, 1940: 60, fig. 69; Graham & Bronikovsky, 1944: 17–18 (ecol., etc.), fig. 6, chart 5, text-table 6, appendix-table 5; Kiselev, 1950 242; Wood, 1954: 273 (descr., distrib., syn.), text-fig. 187b; Yamaji, 1959: pl. 4 (coloured); Sournia, 1967: 394, text-fig. 17 (refs & syn., incl. *C. candelabrum* var. *dilatatum* Gourret, 1883, var. *a curvatulum* Jörgensen, 1920 (in part), var. *algerense* Schiller, 1929, and transitions between varieties)); Steidinger & Williams, 1970: 27 (in key), 44, fig. 153; Sournia, 1973: 7; Taylor, 1974: 197 (N.Z. records of var. *depressum* listed under *C. candelabrum* (Ehrenberg) Stein); Ricard, 1974: 134 (SEM morphology), pl. 5, figs 38–40 (*C. candelabrum* var. *depressum*) pl. 5, figs 41–43 (*C. candelabrum* var. *candelabrum*); Travers & Travers, 1975: 265 (varieties etc.); Taylor, 1976: 59-60 (discuss., varieties, refs etc., in subgenus *Biceratium*), pl. 12, figs 124–126; Burns & Mitchell, 1980: 149, figs 1–2 (SEM photographs of N.Z. specimen); Muñoz & Avaria, 1980: 5 (in key), 11 (diag.), pl. 3, fig. 4 (as *C. candelabrum* var. *depressum*); Dodge, 1982a: 225 (in key), 227–228 (descr., etc.); fig. 28A, pl. VII, fig. d; Carbonell, 1982: 77–78 (as var. *depressum*, refs), pl. I, figs 4a-b; Wongrat, 1982: 2, 24–25, 66, pl. I, figs 13, map 2; Dowidar, 1983: 9 (comment on var.), pl. II, fig. 2; Balech, 1988: 128 (diag., taxon., distrib., ecol.), pl. 56, figs 17–18, pl. 57, figs 4–5.

Ceratium claviger Kofoid, 1907

Kofoid, 1907: 170, pl. 4, fig. 27; Jörgensen, 1911: 62 (in key), 80 (descr., distrib.), 106, 109, pl. IX, figs 168–169; Nielsen, 1934: 28, 35 (table 8), fig. 70 (N.Z. record); Schiller, 1937: 415, text-fig. 456e (as *C. buceros* f. *claviger*) (in subgenus *Euceratium*, Section Macroceros); Wood, 1954: 271 (in key), 303 (features, distrib.), text-figs 23e-f (as *C. buceros* forrna *claviger*); Trégouboff & Rose, 1957: 116, pl. 26, fig. 20 (as *C. buceros* forma *claviger*); Sournia 1967: 480 (syn.); Subrahmanyan, 1968: 65 (incl. in syn. of *C. horridum* Gran, 1902, *q.v.*); Sournia, 1973: 10; Taylor, 1974: 197 (N.Z. records listed under *C. horridum* var. *horridum* see his "taxonomic comment 21", p. 199; but cf. Balech, 1988: 148) re *C. h. horridum*).

Ceratium concilians Jörgensen, 1920

Jörgensen, 1920: 724, text-fig. 69; Gourret, 1883: 35, pl. 2, fig. 33 (as *C. tripos* var. *contortum*); Jörgensen, 1911: 50, pl. V, fig. 108, (as *C. gibberum* f. *sinistrum*); Böhm, 1931: 24, fig. 21; Peters, 1932: 44, fig. 5, pl. 2, fig. 8; Nielsen, 1934: 22, 35 (table 8), 54 (table 21), text-fig. 49, map 7 (N.Z. record, variability); Schiller, 1937: 396–397 (descr., refs & syn.), text-figs 435a-b (in subgenus *Euceratium*, Section Tripos); Graham & Bronikovsky, 1944: 33 (ecol., etc.), figs 17 H–I, chart 30, text-table 32, appendix-table 35; Massuti & Margalef, 1950: 58, fig. 104; Wood, 1954: 270 (in key), 290 (descr., distrib., syn.), text-fig. 213: Trégouboff & Rose, 1957: 115, pl. 26, fig. 2; Wood, 1964: 550 (ecol.); López, 1966: 330 (in subgenus *Eucera-*

tium), 422 (in key), text-figs 2(28), 28; Sournia, 1967: 449-450 (status, refs & syn. etc.); Halim, 1967: 714, 716 (ecol.); Wood, 1968: 26 (descr.), fig. 47; Subrahmanyan, 1968: 11 (in key), 45-46 (descr., distrib., refs & syn., incl. *C. tripos* var. *contortum* Gourret, 1883), text-figs 74–75; Steidinger & Williams, 1970: 44, fig. 15; Taylor, 1974: 197 (Nielsen's N.Z. records listed); Muñoz & Avaria, 1980: 7 (in key), 278 (diag., syn.), pl. 5, fig. 3; Wongrat, 1982: 7, 41-42, 67, pl. IV, figs 8–9, map 9; Dowidar, 1983: 16, pl. III, fig. 6; Balech, 1988: 146 (diag., taxon., distrib., ecol.), pl. 63, fig. 5.

Ceratium declinatum declinatum Karsten, 1907

Karsten, 1907: 406 [299], pl. 48, figs 2a-b; Jörgensen, 1911: 6, 32 (in key), 42-43 (descr., distrib., refs & syn.), 45, pl. IV, figs 87–89; Jörgensen, 1920: 668, text-figs 63-65 (review of ecol., forms, etc.); Böhm, 1931: 22, fig. 19 (forms, etc.); Peters, 1932: 434, pl. 4, fig. 23; Nielsen, 1934: 22, 35 (table 8), 53 (table 9), text-figs 46-47 (N.Z. record, var., ecol., refs); Schiller, 1937: 404-406 (descr., forms, etc.), text-figs 445a-d (in subgenus *Euceratium*, Section Tripos); Graham & Bronikovsky, 1944: 323 (ecol., etc.), figs 16Q-T, 17A–C, chart 28, text-table 30, appendix-table 33; Kiselev, 1950: 237 (in key, subgenus *Euceratium*), 249 (descr., refs), fig. 425; Massuti & Margalef, 1950: 58, fig. 102; Wood, 1954: 270 (in key), 293 (descr., distrib., syn.), textfigs 218a-c; Trégouboff & Rose, 1957: 115, pl. 26, fig. 5; Halim, 1963: 497, fig. 12; Wood, 1964a: 38 (ecol.); Wood, 1964b: 551 (ecol.); López, 196 : 330 (in subgenus *Euceratium*), 423 (in key), text-figs 2(32), 32; Sournia, 1967: 438–440 (variability, distrib., refs & syn.), text-fig. 66: Steidinger *et al.*, 1967: pl. VI, fig. b; Wood, 1968: 27 (descr.), fig. 50; Subrahmanyan, 1968: 12 (in key), 546 (descr., distrib., refs & syn., incl. *Ceratium declinatum angusticornum* Peters, 1932: 43, pl. 4, fig. 23; Nielsen, 1934: 22 (ecol., N.Z. occurrence, etc.), 35 (table 8); Graham & Bronikovsky, 1944: 32, figs 17A–C; Sournia, 1967: 440 (status); Steidinger & Williams, 1970: 45, fig. 18; Yamaji, 1971: 98, pl. 47, fig. 11; Tu & Chiang, 1972: 140, fig. 16; Sournia, 1973: 8; Hermosilla, 1973: 61 (in key), 66 (descr., etc., distrib.), pl. 34, figs 1–3; Taylor, 1974: 197 (Nielsen's N.Z. record listed); Travers & Travers, 1975: 265 (varieties); Taylor, 1976: 823 (discuss., refs), pl. 16, figs 163–164, 166–167; Muñoz & Avaria, 1980: 8 (in key), 27 (diag., syn.), pl. 4, fig. 4; Wongrat, 1982: 6, 39-40, 67, pl. IV, figs 4–5, map 8; Dowidar, 1983: 15, pl. VII, fig. 1; Balech, 1988: 142 (diag., taxon., distrib., ecol.), pl. 61, fig. 2.

Ceratium extensum (Gourret, 1883)

Gourret, 1883: 52, pl. IV, figs 56–56a (as *C. fusus* var. *extensum*); Lemmermann, 1899: 248; Cleve, 1901b: 215; Pavillard, 1905: 56; Paulsen, 1908: 74 (in key), 91 (descr.); Jörgensen, 1911: 24 (in key), 289 (descr., distrib., etc.), pl. III, figs 50a-b; Jörgensen, 1920: 435 (review of ecol., etc.), text-fig. 31; Lebour, 1925: 146 (descr.); text-fig. 46a; Peters, 1932: 36, fig. 11, pl. 2, figs 10d, 14f; Nielsen, 1934: 14, 35 (table 8), 49–50 (table 13), text-fig. 24, map 7 (var., etc.); Schiller, 1937: 380 (descr., etc.), text-fig. 419a (in subgenus *Amphiceratium*); Graham & Bronikovsky, 1944: 245 (ecol., etc.), figs 11BB–DD, chart 16, text-table 17, appendix-table 20; Kiselev, 1950: 257 (in key, subgenus *Amphiceratium*), 244–245 (descr., refs), fig. 412; Massuti & Margalef, 1950: 58, fig. 94; Wood, 1954: 269 (in key), 283 (descr., distrib.), text-fig. 203; Yamaji, 1959: fig. 7 (on p. 113); Cassie, 1961: 40, pl. XII, fig. 2; Wood, 1963b: 8 (refs); Mulford, 1963: 87; Hamlin, 1963: 497, fig. 9; Wood, 1964a: 39 (ecol.); Wood, 1964b: 551 (ecol.); López, 1966: 330 (in subgenus *Amphiceratium*), 421 (in key), text-figs 2(12), 12; Sournia, 1967: 412 (distrib., refs & syn.); Halim, 1967: 716 (ecol.); Wood, 1968: 28 (descr.), fig. 54; Subrahmanyan, 1968: 11 (in key), 324 (descr., distrib., refs & syn.), figs 56–57; Steidinger & Williams, 1970: 27 (in key), 45, fig. 19; Sournia 1973: 8; Taylor, 1974a: 197 (N.Z. records listed); Hassan & Saifullah, 1974: 82; Muñoz & Avaria, 1980: 6 (in key), 18–19 (diag., syn.), pl. 2, fig. 3; Dodge, 1982a: 224 (in key), 231, fig. 29A; Carbonell, 1982: 80 (refs etc.), pl. 1, fig. 5; Wongrat, 1982: 12, 33–34, 66, pl. II, fig. 7, map 6; Dowidar, 1983: 12, pl. II, fig. 5; Taylor, 1987c: 453; Balech, 1988: 133 (diag., distrib., ecol.), pl. 55, figs 1–2.

Ceratium falcatiforme Jörgensen, 1920

Jörgensen, 1920: 40–41, text-fig. 29; Nielsen, 1934: 14, 35 (table 8), text-fig. 23 (N.Z. occurrence); Schiller, 1937: 378 (descr., syn.), text-fig. 417b (in subgenus *Amphiceratium*, section Inflata); Massuti & Margalef, 1950: 58 (in subgenus *Amphiceratium*, section Fusiformia incl. Inflata, key), fig. 92; Wood, 1954: 269 (in key), 282, text-figs 201 a-b; Balech, 1962: 181–182, pl. XXV, fig. 387; Wood, 1964a: 39 (ecol.); Wood, 1964b: 551; López, 1966: 330 (in subgenus *Amphiceratium*), 421 (in key), text-figs 2(9), 9; Sournia. 1967: 414 (refs & syn.), text-fig. 39; Wood, 1968: 28 (descr.), fig. 55; Subrahmanyan, 1968: 11 (in key), 31 (descr., refs), text-fig. 54; Sournia, 1973: 8, 10 (*C. inflatum falcatiforme* of Peters, 1934: 36 listed); Taylor, 1974: 197 (N.Z. records listed, and comment (p. 199, note 18) that *C. falcatiforme*, *C. falcatum* and *C. longirostrum* may be clones of *C. inflatum* (refs given)); Taylor, 1976: 65, pl. 13, figs 138–139; Hernandez-Becerril, 1989: 33 (subgenus *Amphiceratium*).

Ceratium falcatum (Kofoid, 1907)

Kofoid, 1907: 172, pl. 2, fig. 14 (as *C. pennatum* f. *falcata*); Jörgensen, 1911: 27, tex-t-fig. 48b (as *C. p.* var. *falcatum*); Jörgensen, 1920: 39–40 (review of ecol., etc.), text-fig. 28; Nielsen, 1934: 14, 35 (table 8), text-fig. 22 (N.Z. occurrence); Schiller, 1937: 377 (descr.), text-fig. 417a (in subgenus *Amphiceratium*); Graham & Bronikovsky, 1944: 24 (ecol., etc.), figs 11 W–AA, chart 5, text-table 16, appendix-table 19; Massuti & Margalef, 1950: 58, fig. 91; Wood, 1954: 269 (in key), 281–282 (descr., distrib., syn.), text-fig. 200; Trégouboff & Rose, 195 : 115, pl. 25, fig. 12; Halim, 1963: 496, fig. 17; Wood, 1963b: 8 (refs); Wood, 1964a: 40 (ecol.); Wood, 1964b: 551; López, 1966: 330 (in subgenus *Amphiceratium*), 422 (in key), text-figs 2(14), 14; Sournia, 1967: 414 (distrib., refs & syn.), text-fig. 38; Wood, 1968: 29 (descr.), fig. 56; Subrahmanyan, 1968: 11 (in key), 301 (descr., distrib., refs & syn.), text-fig. 53; Steidinger & Williams, 1970: 27 (in key), 45; Taylor, 1974: 197 (N.Z. records listed and see "taxonomic comment 18", pl. 199); Taylor, 1978: 65–66 (taxon., refs), pl. 13, fig. 133; Wongrat, 1982: 4, 33, 66, pl. II, fig. 6, map 5; Balech, 1988: 133–134 (diag., taxon., distrib., ecol.), pl. 55, fig. 16.

Ceratium furca (Ehrenberg, 1833)

Ehrenberg, 1833: 270 (*Peridinium*); Ehrenberg, 1836: 537, 574, pl. II, fig. 2; Ehrenberg, 1838: 256, pl. 22, fig. 21; Claparède & Lachmann, 1859: 399, pl. 19, fig. 5 (*C. furca*), 400, pl. 19, fig. 8 (as *C. biceps*); Pouchet, 1884: 20, pls 18–19, fig. 2; Gourret, 1883: 48, pl. 1, fig. 14, pl. 4, fig. 60; Lemmermann, 1899: 315 (N.Z. record from French Pass), 325, 347; Pavillard, 1905: 55; (?)Karsten, 1905b: 148, pl. XXIII (IV), fig. 4a; Karsten, 1907: 415; Paulsen, 1908: 74 (in key), 90 (descr., refs), text-fig. 122; Jörgensen, 1911: 11 (in key), 17 (descr.), 30, 90, 98, 102, 103, 106, 108, pl. II, figs 23a-b (descr., incl. subspp. (pp. 17–18) *berghii* Lemmermann, 1900, *eugrammum* Ehrenberg, 1859, pl. II, figs 23–26; see also varieties and subspecies in index, p. 115); Jörgensen, 1920: 17–22 (review of ecol., forms, refs), text-figs 7–12; Lebour, 1925: 145 (descr., distrib.), pl. XXX, fig. 3; Böhm, 1931: 8–12 (var.), figs 4–8, table 1; Peters, 1932: 29, fig. 9, pl. 24, figs 11a, 14c, 15e, 17c; Nielsen, 1934: 9–10 (N.Z. occurrence, ecol., refs, etc.), 35 (table 8), 37 (table 9), text-figs 8–9, tables 2a-b; Schiller, 1937: 367–368 (descr., var.), text-figs 404–405 (in subgenus *Biceratium*, section Furciformia Jörgensen, 1911); Dakin & Colefax, 1940: 60, fig. 70a; Graham & Bronikovsky, 1944: 18–19 (ecol., etc.), fig. 7, chart 6, text-table 7, appendix-table 6; Crawford, 1949: 174 (Cook Strait); Kiselev, 1950: 236 (in key, subgenus *Biceratium*), 243 (descr.), fig. 415; Massuti & Margalef, 1950: 58 (in subgenus *Biceratium*, section Furciformia), fig. 84; Hayes & Austin, 1951: 530–541; Wood 1954: 269 (in key), 274 (descr., syn.); Hardy, 1956: pl. I, fig. 17 (coloured); Trégouboff & Rose, 1957: 114, pl. 25, fig. 5; Yamaji, 1959: fig. 1 on p. 91, fig. on p. 112, pl. 4 (coloured); Cassie, 1960a: 168; Cassie, 1960b: 328 (NZOI Stn C201, red-water bloom in Cook Strait); Cassie, 1961: 18, 47 (N.Z. localities); Fraser, 1962: frontispiece, fig. 40, pl. VII, fig. 18; Newell & Newell, 1963: 401, pl. XII, fig. 5; Cassie, 1963: 8 (table 2); Sweeney, 1963: 177–181; Mulford, 1963: 86; Halim, 1963: 496, fig. 2; Klement, 1963: 354 (features, dimensions, etc.); Wood, 1963b: 89 (refs); Wood, 1964a: 40 (ecol.); Wood, 1964b: 551 (ecol.); Balech & El-Sayed, 1965: 110; Cassie, 1966: 578 (Hauraki Gulf); López, 1966: 330 (in subgenus *Biceratium*), 355–362, 371–375, 417–419, 421 (in key), 424, text-fig. 2 (6–7), 6–7, 68–72, 79–82, 92–93, tables 8–10; Sournia, 1966: 464, table I (varieties and transitional stages); Sournia, 1967: 395–399 (var., refs & syn., etc.), text-fig 20; Hada, 1967: 20, fig. 31B; Halim, 1967: 716–718, pl. I, figs 7–8, pl. II, fig. 19, pl. III, fig. 32; Steidinger *et al.*, 1967: pl. V, fig. e; Wood, 1968: 29 (descr.), fig. 57; Subrahmanyan, 1968: 10 (in key), 20 (descr., distrib., refs & syn.), text-figs 21–29, pl. II, figs 7–12; Kayser, 1969: 21–44 *passim* (industrial wastes and population growth); Sournia, 1970: 678–696; Loeblich, 1970: 889 (review of cellular covering of this and other *Ceratium* species); Hada, 1970: 201; Steidinger & Williams, 1970: 28 (in key), 45, figs 20a-b; Lanigan, 1972: 169, fig. on p. 175 (Hauraki Gulf); Dodge, 1972: 292 (pusule morphol.); Sournia, 1973: 8, 9; Taylor, 1973: 491 (Hauraki Gulf ecol.); Hermosilla, 1973: 60 (in key), 634 (descr., etc., distrib.), pl. 33, figs 12, 78; Hassan & Saifullah, 1974: 82; Taylor, 1974: 197 (as var. *furca* "widely distributed. 33 records [in N.Z.]" and as var. *eugrammum* (Ehrenb.) J. Schiller as recorded by Wood (1954) — see "taxonomic comment 19" (p. 199) regarding recognition of this variety following Sournia (1966)); Drebes, 1974b: 145 (descr.), fig. 128b; Wall & Evitt, 1975: 17–19, text-fig. 2K–L; Taylor, 1976: 601 (taxonomic list, refs etc.), pl. 12, figs 107–109; Blasco, 1977: 255–263 (red tide); Dodge, 1977: 334; Taylor, 1978: 216 (var. *furca* at Goat Is Bay, Leigh); Taylor & Durbin, 1978: 221 (Whangateau records); Sournia *et al.*, 1979: 183–198; Burns & Mitchell, 1980: 150, figs 4–10 (SEM photographs of N.Z. material as *C. furca* var. *berghii* (Lemmermann); Muñoz & Avaria, 1980: 6 (in key), 12–13 (*berghii*), pl. 1, fig. 2, pl. 10, fig. 1, 6 (in key), 12 (*eugrammum*), pl. 1, fig. 1, pl. 13, fig. 2; Shim *et al.*, 1981: 73, pl. XIII, figs 41a-c; Dodge, 1982a: 225 (in key), 228 (descr., refs etc.), fig. 28C, pl. VIII, fig. e; Carbonell, 1982: 78 (refs); Andreis *et al.*, 1982: 226, figs 7–8 (thecal surface); Meeson & Sweeney, 1982:

241–245 (temperature adaptation etc.); Wongrat, 1982: 3, 26, 66, pl. I, figs 7–9, map 3; Dowidar, 1983: 9–10 (variability), pl. II, fig. 3; Chang, 1983b: 291, table 1 (West Coast productivity study); Han & Yoo, 1983b: 57 (refs & syn. etc.), pl. VII, figs 7–9; Gillbricht, 1983: 393–426 (figs as red-tide organism); Rodriguez *et al.*, 1986: 75 *et seq.* (primary production, environmental factors); MacKenzie & Gillespie, 1986: 377 (table 3: Tasman Bay); MacKenzie *et al.*, 1986: 402 (table 1: Kenepuru Sound); Fraga, 1987: 19; Prézelin, 1987: 180, 195, 199, 204, 207, 213, 214 (photosynthesis); Gaines & Elbrächter, 1987: 237, 259 (nutrition); Sweeney, 1987: 277 (bioluminescence); Levandowsky & Kaneta, 1987: 366, 383, 384 (behaviour); Taylor, 1987c: 408, 409, 417, 418, 427, 438, 446, 454, 455,461; Harding *et al.*, 1987 : 403 *et seq.* (photosynthesis); Balech, 1988: 131 (diag., taxon., distrib., ecol.); Subrahmanyan& Bhavanarayana, 1989: 251 (distrib. etc. rel. to pollution); Chang *et al.*, 1990: table 3 (at salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Ceratium fusus (Ehrenberg, 1833).

Ehrenberg, 1833: 271 (*Peridinium*); Ehrenberg, 1836: 504, 537, 574, pl. II, fig. 3; Ehrenberg, 1838: 256, pl. XXII, fig. 20; Claparède & Lachmann, 1859: 400, pl. XIX, fig. 7; Lemmermann, 1899: 315 (N.Z. record from French Pass), 325, 348; Pavillard, 1905: 556; Paulsen, 1908: 74 (in key), 901 (descr., refs), text-fig. 123; Jörgensen, 1911 : 5, 24 (in key), 29, 30, 103, 106, 108, pl. III, figs 51–53 (descr., etc., incl. varieties *concavum* Gourret, *extensum* Gourret, *geniculatum* Lemmermann, etc.); Jörgensen, 1920: 413 (ecol., etc.), text-fig. 30; Lebour, 1925: 146–148 (descr., distrib., refs), pl. XXXI, fig. 1; Martin, 1929: 30, pl. VI, fig. 7; Böhm, 1931: 14–15 (var.), figs 10c-f; Peters, 1932: 37, fig. 12, pls 3-4, figs 14a, 15f, 17e; Nielsen, 1934: 14–15, 35 (table 8), 37 (table 9), 489, table 12 (var.), text-figs 25–26, map 8 (N.Z. occurrence, etc.); Lebour *in* Russell & Yonge, 1936: pl. 40, fig. 1 (coloured); Schiller, 1937: 378–379 (descr., varieties, refs & syn.) text-figs 418a-b (in subgenus *Amphiceratium*); Dakin & Colefax, 1940: 60, fig. 70b; Graham & Bronikovsky, 1944: 25 (ecol., etc.), figs 11EE, 13A–D, chart 17, text-table 19, appendix-table 21; Crawford, 1949: 174 (Cook Strait); Kiselev, 1950: 237 (in key, subgenus *Amphiceratium*), 245 (descr.), fig. 419a; Massuti & Margalef, 1950: 58 (in subgenus *Amphiceratium*, section Fusiformia (inc. Inflata), key), fig. 95; Rytter & Nordli, 1951: 3–25; Wood 1954: 269 (in key), 282 (descr., distrib., syn.), text-fig. 202 (and var. *seta* Ehrenberg from N.Z., p. 283); Hardy, 1956: 47, fig. 15a; Trégouboff & Rose, 1957: 115, pl. 25, figs 13A–D; Yamaji, 1959: fig. on p. 20, fig. 5 on p. 113; Cassie, 1960a : 169 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities); Fraser, 1962: frontisp., fig. 41; Newell & Newell, 1963: 40, pl. XII, fig. 1; Cassie, 1963: 8; Mulford, 1963: 85 (ecol.); Halim, 1963: 497; Wood, 1963b: 9 (refs); Downie & Sarjeant, 1964: 1–180, graphs 1–3; Wood, 1964a: 40 (ecol.); Wood, 1964b: 551 (ecol.); Davis, 1965a: 1–3; Cassie, 1966: 574, 575, 578, 579, 581–583, text-figs 2–5 (seasonal occurrence in Hauraki Gulf); López, 1966: 330 (in subgenus *Amphiceratium*), 421 (in key, text-figs (11), 11; Sournia, 1966: 464 (varieties and transitional stages), table I; Sournia, 1967: 408–411 (status, varieties, distrib., refs & syn.), text-fig. 32; Hada, 1967: 20, fig. 31A; Halim, 1967: 718 (ecol.), pl. III, fig. 33; Wood, 1968: 29 (descr.), fig. 58; Toriumi, 1968: 1–6; Subrahmanyan, 1968: 11 (in key), 312 (descr., distrib., refs & syn.), text-fig. 55, pl. I, figs 3–6; Hada, 1970: 20; El-Sayed, 1970: 194–210; Steidinger & Williams, 1970: 27 (in key), 45, figs 21a-b; Lanigan, 1972: 170, fig. on p. 175; Taylor, 1973: 491 (Hauraki Gulf ecol.); Sournia, 1973: 9; Hassan & Saifullah, 1974: 82; Sarjeant, 1974: 29, fig. 2b; Taylor, 1974: 197 (listed as var. *fusus*: "widely distributed. 33 records [in N.Z.]" and as var. *seta* based on Wood's (1954) record — see also "taxonomic comment 20" (p. 199)); Drebes, 1974b: 145 (descr.), fig. 128a; Travers & Travers, 1975: 265; Taylor, 1976: 66 (features, refs), pl. 13, figs 129–130, 136–137; Dodge, 1977: 355; Taylor, 1978: 216 (var. *fusus* at Goat Is Bay, Leigh); Taylor & Durbin, 1978: 221 (Whangateau Harbour records); Staker & Bruno, 1980: 167–172 *passim* (diurnal migration); Muñoz & Avaria, 1980: 6 (in key), 17–18 (diag., syn.), pl. 2, fig. 1, pl. 14, fig. 2; Shim *et al.*, 1981: 73–74, pl. XIII, figs 39a-c; Dodge, 1982a: 225 (in key), 231 (descr., refs, etc.), fig. 29C; Carbonell, 1982: 79 (refs); Wongrat, 1982: 5, 34–35, 66, pl. II, fig. 8, map 3; Chang, 1983b: 291, table 1 (West Coast productivity study); Dowidar, 1983: 11–12 (forms discussed), pl. I, fig. 8; Han & Yoo, 1983: 57 (refs & syn. etc.), pl. VIII, fig. 1; Okamoto & Takahashi, 1984: 14 *et seq.* (limiting factors/distrib.); Rivkin & Voytek, 1985: 199–205 (cell division); MacKenzie & Gillespie, 1986: 377 (table 3 : Tasman Bay); Taylor, 1987a 6 , 10; Taylor, 1987c: 34, 41, 79; Prézelin, 1987: 195 (photosynthesis); Gaines & Elbrächter, 1987: 259; Sweeney, 1987: 270 (bioluminescence); Levandowsky & Kaneta, 1987: 393 (behaviour); Taylor, 1987c: 408, 409, 438, 440, 443, 445, 446, 454, 455, 459, 461, 466, 472; Balech, 1988: 132–133 (diag., taxon., distrib., ecol.), pl. 54, figs 5, 6 & 8; Subrahmanyan & Bhavanarayana, 1989: 251 (distrib., etc., rel. to pollution).

Ceratium gibberum Gourret, 1883

Gourret, 1883: 36, pl. II, fig. 35a; Karsten, 1905b:

141, pl. XX, fig. 1; Paulsen, 1908: 73 (in key), 75 (descr., refs), text-fig. 98; Jörgensen, 1911: 30 (in key), 49–50 (descr., distrib., refs & syn.), 94, 97, pl. V, fig. 106; Jörgensen, 1920: 70 (review of ecol., forms, etc.); Lebour, 1925: 152–153, figs 49a-c; Peters, 1932: 44, fig. 18, pl. 3, fig. 13c; Nielsen, 1934: 22, 35 (table 8), text-fig. 48, map 5 (N.Z. occurrence, syn., etc.); Schiller, 1937: 398–399, text-figs 436-437 (in subgenus *Euceratium*, section Tripos); Graham & Bronikovsky, 1944: 33 (ecol., etc.), figs 17D–G, chart 29, text-table 31, appendix-table 34; Kiselev, 1950: 237 (in key, subgenus *Euceratium*) 250 (descr.), fig. 437; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Tripos, key) fig. 105; Wood, 1954: 270 (in key), 290 (descr., syn.), text-figs 214a-b; Mulford, 1964: 88; Halim, 1963: 498, fig. 14; Wood, 1963b: 10 (refs); Wood, 1964a: 40 (ecol.); Wood, 1964b: 552 (ecol.); Klement, 1964: 356 (features, dimensions, etc.), pl. 2, fig. 7; López, 1966: 330 (in subgenus *Euceratium*), 422 (in key), text-figs 2(23), 23; Sournia, 1966: 464, table I (varieties and transitional stages); Sournia, 1967: 446–449 (status, variability, refs & syn., etc.); Halim, 1967: 719 (ecol.), pl. II, fig. 20, pl. IV, fig. 46; Wood, 1968: 30 (descr.), fig. 61; Subrahmanyan, 1968: 11 (in key), 468 (descr., distrib., refs & syn.), 51, 61, text-figs 76–78; El-Sayed, 1970: 194–210; Ricard, 1974: 132 (SEM morphol.), pl. 4, figs 34-37 (var. *dispar* Pouchet); Travers & Travers, 1975: 265 (varieties etc.); Taylor, 1976: 84 (identif., var., refs), pl. 19, fig. 187; Muñoz & Avaria, 1980: 7 (in key), 24-5, pl. 5, fig. 5; Dodge, 1982a: 227 (in key), 235, fig. 30F; Carbonell, 1982: 87, pl. I, figs 1a-b; Wongrat, 1982: 7, 40-41, 67, pl. IV, figs 6–7, map 9; Balech, 1988: 145–146 (diag., taxon., distrib., ecol.), pl. 63, figs 3-4.

Ceratium gravidum Gourrett, 1883

Gourret, 1883 : 58, pl. I, fig. 15; Jörgensen, 1911 : 10 (descr., refs & syn.), pl. I, fig. 8 (in subgenus *Poroceratium*); Jörgensen, 1920: 811 (review of ecol., etc., refs), fig. 4; Peters, 1932: 28, fig. 6, pl. 2, fig. 12g; Nielsen, 1934: 8, 35 (table 8, text-figs 3–4, map 1 (N.Z. occurrence); Schiller, 1937: 357 (descr., varieties, refs & syn.), text-fig. 389 (in subgenus *Archaeceratium* Jörgensen, 1920, section Poroceratium Vanhoffen, 1896); Graham & Bronikovsky, 1944: 15–16 (ecol., etc.), figs 34, chart 3, text-table 4, appendix-table 3; Kiselev, 1950: 236 (in key, subgenus *Poroceratium*), 238 (descr.), figs 396a-b; Massuti & Margalef, 1950: 58 (in subgenus *Archiceratium*, sect. Poroceratium, key), fig. 79; Wood 1954: 272, fig. 186; Silva, 1955: 49, pl. 7, fig. 1; Trégouboff & Rose, 1957: 114, pl. 25, fig. 2; Yamaji, 1959: fig. on p. 23; Halim, 1960: pl. 4, fig. 21; Newell & Newell, 1963: 40, pl. XI, fig. 3; Wood, 1963: 10 (refs); Wood 1964a: 41 (ecol.); Wood, 1964b: 552 (ecol.); Sournia, 1967: 388, 390 (distrib., syn.), pl. I, fig. 3; Halim, 1967: 719 (ecol.), pl. I, figs 9–10; Wood, 1968: 31 (descr.) fig. 62; Subrahmanyan, 1968: 10 (in key), 14–16 (descr., distrib., refs), text-figs 10–11; Reinecke, 1971: 88–90 (descr., refs & syn.), figs 1E–F, 3A–B; Yamaji, 1971: 91, pl. 44, fig. 5; Tu & Chiang, 1972: 141, fig. 21; Kuzmina, 1972: 212, figs 11a-b; Taylor, 1974: 167, 168 (ecol.), fig. 4f; Taylor, 1974: 197 (N.Z. records listed); Ricard, 1974: 132 (SEM morphol.), pl. 4, figs 30–33; Taylor, 1976: 578 (discuss., refs, in subgenus *Archaeoceratium* Jörgensen), pl. 11, figs 99, 100, 101a-b; Muñoz & Avaria, 1980: 5 (in key), 10–11 (diag., syn.), pl. 6, fig. 1, pl. 12, fig. 1; Dodge, 1982a: 227 (in key, descr. etc.), fig. 28B; Dowidar, 1983: 89, pl. II, fig. 1; Taylor, 1987b: 32; Taylor, 1987d: 453; Hernandez-Becerril, 1988: 517–533, figs.

Ceratium hexacanthum Gourret, 1883

Gourret, 1883: 36, pl. III, figs 49-49A; Cleve, 1903: 342 (as *C. reticulatum* (Pouchet)); Karsten, 1905b: 148; Paulsen, 1908: 82, fig. 110 (as *C. reticulatum*); Jörgensen, 1911: 86-87 (descr., etc., refs & syn., as *C. reticulatum* (Pouchet, 1883), not of Imhof, 1883, incl. *C. hexacanthum* Gourret), pl. X, figs 182–183; Jörgensen, 1920: 101–104 (review of ecol., etc.), text-fig. 94; Lebour, 1925: 157–158, fig. 51 (as *C. reticulatum*); Böhm, 1931: 42; Peters, 1932 : 54, fig. 27, pl. 2, figs 10a, 11b; Nielsen, 1934: 29, text-fig. 73, map 5 (incl. *C. reticulatum* (Pouchet) of Jörgensen, 1911); Schiller, 1937: 421 (descr., forms, refs & syn.) (in subgenus *Euceratium*, section Macroceros), text-figs 462a-c; Graham & Bronikovsky, 1944: 44-45, figs 27F–G, chart 28, text-table 50, appendix-table 53; Kiselev, 1950: 238 (in key, subgenus *Euceratium*), 254, (descr.), fig. 438; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Macroceras, key, fig. 115; Trégouboff & Rose, 1957: 116, pl. 26, figs 13–14; Halim, 1963: 499, fig. 35; Wood, 1963b: 10 (refs); Wood, 1964a: 41 (ecol.); Wood, 1964b: 552 (ecol.); Davis, 1965b: 13 (features, etc.); López, 1966: 333 (in subgenus *Euceratium*), 423 (in key), text-figs 2(38), 38; Sournia, 1967: 484-485 (distrib., varieties, refs & syn., etc.), text-fig. 98; Halim, 1967: 719 (ecol.), pl. III, figs 34–35; Wood, 1968: 31 (descr.), fig. 63; Subrahmanyan, 1968: 12 (in key), 72–74 (descr., distrib., refs & syn.), text-figs 140–141; Steidinger & Williams, 1970: 45, figs 23a-c; Kuzmina, 1972: 212, fig. 19; F.J.R. Taylor, 1976: 701 (identif., var., refs), pl. 22, figs 214–215, 219; Muñoz & Avaria, 1980: 6 (in key), 35–36 (diag., syn.), pl. 6, fig. 3, pl. 12, fig. 2; Dodge, 1982a: :225 (in key), 236–238 (descr., distrib. etc.), figs 30H–I, pl. VII, fig. e; Carbonell, 1982: 82 (refs); Wongrat, 1982: 11, 55–56, pl. IX, figs 3-4, map 12;

Dowidar, 1983: 20, pl. V, fig. 6; Taylor, 1987c: 79; Balech, 1988: 152–153 (diag., taxon., distrib., ecol.), pl. 69, figs 1–2.

Ceratium horridum Gran, 1902

Gran, 1902: 53, figs 193–194; Ostenfeld, 1903: 584, figs 136–139; Karsten, 1907: 412, 413 (in subsection Tergestina of *C. tripos*); Paulsen, 1908: 83, figs 111–112 (as *C. intermedium*); Jörgensen, 1911: 83–84 (descr., etc. (in syn. of *C. intermedium* (Jörgensen, 1899)), pl. X, figs 174–176; Jörgensen, 1920: 96–100 (in part, review of ecol.), figs 86–92; Lebour, 1925: 155–156 (descr., etc.), pl. XXXIV, fig. 2; Peters, 1930: 80, fig. 45E; Böhm, 1931: 41, fig. 36 (var.); Peters, 1930: 80, fig. 45E; Böhm, 1931: 41, fig. 36 (var.); Peters, 1932: 51, 54, fig. 26; Schiller, 1937: 413–414, figs 455a-c (in subgenus *Euceratium*, section Macroceros); Graham & Bronikovsky, 1944: 423, figs 23 I–L, 24C–I, 25A–G, chart 44, text-table 46, appendix-table 49; Kiselev, 1950: 238 (in key, subgenus *Euceratium*), 253–254 (descr., etc.), fig. 430; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Macroceros, key), fig. 120; Wood, 1954: 271 (in key), 300–301 (descr., distrib., syn.), text-figs 230a-b; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities); Halim, 1963: 499, fig. 32; Wood, 1964a: 41 (ecol.); Wood, 1964b: 552 (ecol.); Stosch, 1964: 140 *et seq.* (sexual reprod.), text-figs 6–7; López, 1966: 333 (in subgenus *Euceratium*), 423 (in key), text-figs 2(42–43), 42–43; Sournia, 1966: 465, table I (varieties and transitional stages); Sournia, 1967: 474–480 (status, var., distrib., refs & syn., etc.), text-figs 91–95, pl. III, fig. 12, table III; Halim, 1967: 720–721 (ecol., status of forms, etc.), pl. I, fig. 11, pl. III, fig. 36, pl. X, fig. 153; Wood, 1968: 32 (descr.), fig. 65; Subrahmanyan, 1968: 6, 7, 12 (in key), 63–67 (descr., distrib., detailed refs & syn.), text-figs 5–6, 113–128; Steidinger & Williams, 1970: 46; Reinecke, 1971: figs 1 K–L; Sournia. 1973: 10; Sarjeant, 1974: 40, fig. 1K; Taylor, 1974: 197 (N.Z. records of *C. buceros f. claviger*, *C. buceros, f. molle*, *C. claviger*, *C. molle*, etc., included with *C. horridum* var. *horridum* and records of *C. buceros f. tenue*, *C. tenue*, *C. buceros*, etc., included with *C. horridum* var. *buceros* — see also "taxonomic comment 21" (p. 199) "... it seems of value to distinguish the extremes as *C. horridum* var. *horridum* and *C. horridum* var. *buceros*. I have placed *C. claviger* and *C. molle* in the type rather than treating them as varieties of *C. buceros* and putting them into *C. horridum* var. *buceros*. The permutations between the epithets of these species and varieties are considerable. It is possible that *C. horridum* is also conspecific with *C. intermedium* (Jörg.) Jörg."); Drebes, 1974b: 145 (descr.), fig. 129a; Travers & Travers, 1975: 265, systematic problems); Taylor, 1976: 712 (var., refs, etc.), pl. 20, fig. 202, pl. 21, figs 203–208, 211–212; Elbrachter, 1977: 192–200; Dodge, 1977: 334; Taylor, 1978: 217 (var. *buceros* at Goat Is Bay, Leigh, June 1969); Taylor & Durbin, 1978: 221 (Whangateau Harbour, Leigh area: var. *horridum*, Dec. 1968 and var. *buceros*, Sept, Oct. 1967); Burns & Mitchell, 1982a: 60, fig. 10 (N.Z. specimens, comments on specific recognition etc.); Dodge, 1982a: 226 (in key), 240 (figs 31 B & H), (descr., syn. etc. incl. *C. buceros* Zacharias emend. Böhm *in* Schiller, 1937: 415, *C. batavum* Paulsen, 1908: 84, fig. 114 and *C. tenue* (Ostenfeld & Schmidt) — see also the following: *Ceratium tenue* Ostenfeld & Schmidt, 1902: 166, fig. 18; Jörgensen, 1911: 62 (in key), 778, 103 (descr., incl. forma *inclinatum* Kofoid, 1907), 789, 103 (var. *buceros* Zacharias, 1906), pl. IX, figs 163 (*C. tenue*), 164–166 (var. *buceros*); Jörgensen, 1920: 100 (as *C. horridum buceros* var. *tenue*); Nielsen, 1934: 28 (ecol., syn., etc.), 35 (table 8), (N.Z. occurrence as *C. tenue*), text-fig. 69; Schiller, 1937: 415, text-figs 456a-b; Graham & Bronikovsky, 1944: 43 (ecol., etc.), figs 26C–D, chart 45, text-table 47, appendix-table 50; Trégouboff & Rose, 1957: 116, pl. 26, fig. 19 (as *C. buceros* forma *tenue*); Yamaji, 1959: fig. on p. 114 (and var. *buceros*); Cassie 1960a: 168 (E. of N.Z., as *C. buceros* forma *tenue*); Cassie 1960a: 18, 47 (N.Z. localities); Halim, 1963: 499, fig. 33 (*C. buceros* f. *tenue*); López 1966: 333 (in subgenus *Euceratium*), text-fig. 2(41), 41; Sournia, 1967: 477 (syn. etc., as *C. horridum* (Cleve) var. (Zacharias), in part); Subrahmanyan, 1968: 65 (incl. in syn. of *C. horridum* Gran, 1902, *q.v.*); Sournia, 1973: 10; Taylor, 1974: 197 (N.Z. records included within *C. horridum* var. *buceros q.v.*); Carbonell, 1982: 82–83 (discuss., refs & syn. as *C. tenue* incl. *C. buceros* Zacharias, *C. buceros* forma *tenue*, *C. horridum* in part), pl. II, fig. 20; Wongrat 1982: 11, 54–55, pl. VIII, fig. 5, pl. IX, fig. 12, map 12; Chang, 1983b: table 1 (N.Z., West Coast productivity study); Dowidar, 1983: 19–20 (forms and var. discussed incl. *C. tenue*), pl. IV, figs 34, pl. VI, fig. 6, pl. VII, fig. 2; Okamoto & Takahashi, 1984: 14 *et seq.*; Balech, 1988: 148–149 (diag., taxon., distrib., ecol.), pl. 65, figs 3–7.

Ceratium inflatum (Kofoid, 1907)

Kofoid, 1907: 172, pl. 2, fig. 13 (*C. pennatum* sp. nov., forma *inflata*, forma nov.); Jörgensen, 1911: 24 (in key), 256 (descr., distrib., refs & syn.) (in subgenus *Amphiceratium* Vanhöffen, 1896), pl. III, figs 45-46; Jörgensen, 1920: 35–37, text-fig. 25 (review of ecol., etc.); Böhm, 1931: 14, figs 10a-b; Peters, 1932: 33, 36; Nielsen, 1934: 13, 35 (table 8), text-fig. 20 (N.Z. occurrence); Schiller, 1937: 376 (descr., refs & syn.) (in subgenus *Amphiceratium*, section Inflata Jörgensen,

1911), text-figs 41-45a-b; Graham & Bronikovsky, 1944: 23 (ecol., etc.), fig. 110S, chart 14, text-table 14, appendix-table 17; Kiselev, 1950: 237 (in key), 245 (descr.), fig. 462 (in subgenus *Amphiceratium*, section Fusiformia Jörgensen); Massuti & Margalef, 1950: 58 (in subgenus *Amphiceratium*, section Fusiformia (incl. Inflata), key), fig. 89; Wood, 1954: 269 (in key), 281 (descr., distrib., syn.), text-fig. 198; Trégouboff & Rose, 1957: 115, pl. 25, fig. 10; López, 1966: 330 (in subgenus *Amphiceratium*), 421 (in key), text-figs 2(10), 10; Sournia, 1967: 412-413 (distrib., refs & syn.), text-fig. 36; Halim, 1967: 721 (ecol.), pl. III, fig. 38; Subrahmanyan, 1968: 11 (in key), 29 (descr., distrib., refs & syn.), 30, text-figs 48-49; Steidinger & Williams, 1970: 27 (in key), 46, fig. 25; Taylor, 1974: 197 (N.Z. records listed); Taylor, 1976: 67 (forms, features, refs), pl. 13, fig. 132; Muñoz & Avaria, 1980: 6 (in key), 19 (diag., syn.), pl. 2, fig. 2, pl. 11, fig. 12; Carbonell, 1982: 80, pl. I, fig. 8; Dowidar, 1983 : 12, pl. II, fig. 7; Balech, 1988: 135 (diag., taxon., distrib., ecol.), pl. 55, figs 5–9.

Ceratium karsteni Pavillard, 1907

Pavillard, 1907: 152; Jörgensen, 1911: 6, 32 (in key), 534 (descr., distrib., refs & syn.), 98, 101, pl. V, fig. 116, pl. VI, figs 117–118; Jörgensen, 1920: 75, fig. 71 (as *C. arcuatum* Cleve, 1900: 17, pl. VII, fig. 11); Nielsen, 1934: 23 (N.Z. occurrence), 35 (table 8), text-fig. 51, map 7; Schiller, 1937: 393–395 (descr., refs & syn.), text-figs 431a-b (in subgenus *Euceratium*, section Tripos); Kiselev, 1950 : 238 (in key), 249, fig. 512 (descr.); Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Tripos, key), fig. 98; Wood, 1954: 270 (in key), 289 (descr., distrib., syn.), text-figs 211a-b; Trégouboff & Rose, 1957: 116, pl. 25, fig. 16; Balech, 1962: 185; Halim, 1963: 498, fig. 19; Wood, 1963b: 11 (refs); Wood, 1964a: 47 (ecol.); Wood, 1964b: 553 (ecol.); Klement, 1964: 355–356 (dimensions, etc.), pl. 2, fig. 8; López, 1966: 330 (in subgenus *Euceratium*), 423 (in key), text-figs 2(37), 37; Sournia, 1967: 441-444 (status, refs & syn., etc.), text-fig. 71, pl. III, fig. 10; Halim, 1967: 722 (ecol.), pl. III, fig. 39, pl. X, fig. 151; Wood, 1968: 33 (descr.), fig. 68; Subrahmanyan, 1968: 11 (in key), 40, 42-44 (descr., distrib., refs & syn.), 45, 48, text-figs 67–68; Yamaji, 1971: 96, pl. 46, fig. 13; Tu & Chiang, 1972: 140, fig. 14; Sournia, 1973: 11; Taylor 1974: 197 (N.Z. records listed); Wongrat, 1982: 8, 44-45, pl. V, fig. 2, map 10; Dowidar, 1983: 16, pl. IV, fig. 6; Balech, 1988: 144–145 (diag., taxon., distrib., ecol.), pl. 62, fig. 3, pl. 63, figs 1 & 6.

Ceratium limulus Gourret, 1883

Gourret, 1883: 33, pl. I, fig. 7; Pouchet, 1883: 424, text-fig. 4, pls 18–19 (as *C. tripos* var. *limulus*); Schütt, 1895: pl. IV, fig. 39; Pavillard, 1905: 53; Karsten, 1905a: 133, pl. XIX, figs 11, 12a; Karsten, 1905b: 140–141 (status, as *C. tripos limulus*); Karsten, 1907: 405; Jörgensen, 1911: 57, pl. VI, fig. 122 (descr., distrib., etc.); Jörgensen, 1920: 77–79 (review of ecol., etc.), text-fig. 72; Böhm, 1931: 31, fig. 27b; Peters, 1932: 46, fig. 5, pl. I, fig. 6; Nielsen, 1934: 24 (N.Z. occurrence, ecol., etc.), 35 (table 8) text-fig. 54; Schiller, 1937: 407 (descr., refs), text-figs 448a-c (in subgenus *Euceratium*, section Tripos); Graham & Bronikovsky, 1944: 35–36 (ecol., etc.), fig. 19A, chart 33, text-table 35, appendix-table 38; Kiselev, 1950: 255; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Limulus, key), fig. 109; Wood, 1954: 270 (in key), 296 (descr., distrib.), text-figs 223a-b; Trégouboff & Rose, 1957: 115, pl. 26, fig. 7; Wood, 1963: 11 (refs); López, 1966: 330 (in subgenus *Euceratium*), 422 (in key), text-figs 2(21), 21; Sournia, 1967: 458 (distrib., refs & syn.), pl. I, fig. 5; Wood, 1968: 34 (descr.), fig. 71; Subrahmanyan, 1968: 12 (in key), 56–57 (descr., distrib., refs & syn.), 58, text-figs 103–105; Yamji, 1971: 39, pl. 46, fig. 13; Tu & Chiang, 1972: 140, fig. 15; Taylor, 1976: 85 (refs), pl. 18, fig. 182; Muñoz & Avaria, 1980: 7 (in key), 28–29 (diag., syn.), pl. 3, fig. 3; Carbonell, 1982: 87, pl. II, fig. 16; Dowidar, 1983: 17, pl. IV, fig. 8; Balech, 1988: 137 (diag., nomencl., distrib., ecol.), pl. 57, fig. 10; Hernandez-Becerril, 1989: 33 (in subgenus *Orthoceratium*).

Ceratium lineatum (Ehrenberg, 1853)

Ehrenberg, 1853: 528 (*Peridinium*); Ehrenberg, 1854a: 239–240, pl. XXXV, fig. [24c]B; Cleve, 1899: 36; Pavillard, 1905: 55; Paulsen, 1908: 74 (in key), 88–89 (descr., distrib., refs), (as *C. tripos* forma *lineata*), text-fig. 121; Lohmann, 1908: 88–89, fig. 121 (as *C. tripos* var. *subsala* f. *lineata*); Jörgensen, 1911: 12 (in key), 22, 30, 38, 103, 105, 106, 108, 109, pl. II, figs 36–37; Lebour, 1917: 187, text-fig. 1; Jörgensen, 1920: 34; Lebour, 1925: 145 (descr., distrib., refs), text-figs 45d-e; Schiller, 1937: 372–373 (descr., refs & syn.); Graham & Bronikovsky, 1944: 22 (ecol., etc.), figs 11E-G, chart 12, appendix-table 14; Kiselev, 1950: 237 (in key), 244 (descr.), figs 410a-b; Wood, 1954: 269 (in key), 277 (descr., distrib., syn.), text-figs 192a-b; Cassie 1960: 169 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities); Cassie, 1963: 4, 8 (table 2), text-fig. 2 (latitudinal distrib. S. of N.Z.), pl. I, fig. 3; Newell & Newell, 1963 : 40, pl. XII, fig. 8; Mulford, 1963: 86–87; Wood, 1964a: 42 (ecol.); Sournia, 1967: 404-405 (refs & syn., etc.), text-figs 25–26; Halim, 1967: 722 (ecol.), pl. III, fig. 37; Wood, 1968: 34 (descr.), fig. 72; Subrahmanyan, 1968: 11 (in key), 24–26 (descr., distrib., refs & syn.), text-fig. 36; Balech, 1970: 143 (Ant-

arctic); Steidinger & Williams, 1970: 28 (in key), 46; Hermosilla, 1973: 60 (in key), 61-62 (descr., obs., distrib.), pl. 32, figs 1–3, 7, 9; Hassan & Saifullah, 1974: 82; Taylor, 1974: 197 (N.Z. records listed), 200 (note 22) ("Sometimes regarded as a neritic coldwater form of *C. pentagonum*)"; Drebes, 1974b: 145 (descr.), fig. 128c; Wall & Evitt, 1975: 19; Balech, 1976: 90, 92, fig. 67; Taylor, 1976: 61–62 (identif., refs), pl. 12, fig. 121; Dodge, 1977: 333–334; Sournia *et al.*, 1979: 193 (refs), figs 36-37; Burns & Mitchell, 1980: 150 (identif. features of N.Z. material), fig. 11 (SEM); Muñoz & Avaria, 1980: 6 (in key), 16 (diag., syn.), pl. 1, fig. 16; Shim *et al.*, 1981: 74, pl. XIII, fig. 43; Dodge, 1982a: 225 (in key), 228–230 (descr. etc. "This species probably merges into *C. minutum* which often cannot clearly be distinguished from it."), fig. 28D, pl. VIII, fig. f; Dowidar, 1983: 11, pl. I, fig. 6; Han & Yoo, 1983b: 58 (refs, dimensions etc.), pl. VIII, figs 4–5; Okamoto & Takahashi, 1984: 14 *et seq.;* Prézelin, 1987: 191 (photosynthesis); Taylor, 1987d: 440, 445, 446, 449, 450; Balech, 1988: 130–131 (diag., taxon., distrib., ecol.), pl. 56, figs 10–13.

Ceratium longirostrum Gourret, 1883

Gourret, 1883: 55, pl. 4, fig. 65; Jörgensen, 1911: 27, figs 47a-d (as *C. pennatum* var. *scapiforme*); Jörgensen, 1920: 37–39 (review of ecol., etc., refs), text-figs 26–27, 39 (as *C. falcatum* (Kofoid), text-fig. 28; Nielsen, 1934: 13 (ecol., refs), 35 (table 8) (N.Z. occurrence), text-fig. 21; Schiller, 1937: 376–377 (descr., refs & syn.), text-figs 416a-b (in subgenus *Amphiceratium*, section Inflata); Graham & Bronikovsky, 1944: 24, figs 11T-V, chart 14, text-table 15, appendix-table 18; Wood, 1954: 269 (in key), 281 (descr., distrib., syn.), text-fig. 199; Trégouboff & Rose, 1957: 115, pl. 25, fig. 11; Halim, 1963: 496, fig. 6; López, 1966: 330 (in subgenus *Amphiceratium*), 422 (in key), text-figs 2(15), 15; Massuti & Margalef, 1950: 58 (in subgenus *Amphiceratium*, section Fusiformia, key), fig. 90; Sournia, 1967: 413 (distrib., refs & syn.), text-fig. 37; Halim, 1967: 722 (ecol.), pl. III, fig. 40; Wood, 1968: 35 (descr.), fig. 75 (incl. *C. falcatum* Kofoid of Jörgensen, 1920); Subrahmanyan, 1968: 11 (in key), 30 (descr., distrib., refs & syn), text-figs 50–52; Steidinger & Williams, 1970 : 27 (in key), 46, fig. 27; Sournia, 1973: 11; Hasson & Saifullah, 1974: 82; Sargeant, 1974: fig. 1j; Taylor, 1974: 197 (N.Z. records listed), 199 (may be clone of *C. inflatum* — see "taxonomic comment 18"); Taylor, 1976: 67–68 (features, refs), pl. 13, figs 131a-b; Dodge, 1982a: 225 (in key), 231, fig. 29D; Carbonell, 1982: 8 0 (discuss., syn. etc.), pl. I, fig. 6; Wongrat, 1982: 4, 32, 66, pl. II, figs 4–5, map 4; Dowidar, 1983: 12, pl. II, fig. 8; Taylor, 1987d: 454; Balech, 1988: 134–135 (diag., taxon., distrib., ecol.), pl. 55, figs 10–11.

Ceratium macroceros (Ehrenberg, 1840)

Ehrenberg, 1840b: 201 (*Peridinium*); Cleve, 1901: 227; Pavillard, 1905: 53; Karsten, 1907: 411 (status, etc., as subsection of *tripos*, refs etc.); Paulsen, 1908: 73 (in key), 81–82 (descr., refs), text-fig. 109; Jörgensen, 1911: 30 (in key), 62 (in key), 63 (descr., distrib., refs & syn.), 97, 104, 106, 109, pl. VII, figs 132–133; Jörgensen, 1920: 83–85 (review of ecol., etc.), text-fig. 77; Peters, 1930: 80, fig. 45D; Böhm, 1931: 38, fig. 35a; Peters, 1932: 47, fig. 21, pl. 4, fig. 17b; Nielsen, 1934: 25, 35 (table 8), 54 (table 22), text-fig. 59, map 7 (N.Z. occurrence, variation, etc.); Schiller, 1937: 428–430 (descr., refs & syn.), text-fig. 468 (in subgenus *Euceratium*, section Macroceros Pavillard, 1907); Graham & Bronikovsky, 1944: 37–38 (ecol., etc.), figs 21B–F, chart 37, text-table 39, appendix-table 42; Kiselev, 1950: 58 (key to sect. Macroceros of subgenus *Euceratium*); Wood, 1954: 271 (in key), 310–311 (descr., distrib., syn.), text-fig. 238a; Hardy, 1956: fig. 15b; Trégouboff & Rose, 1957: 116, pl. 26, fig. 17; Yamaji, 1959: fig. on p. 114; Fraser, 1962: frontispiece, fig. 42, pl. VII, fig. 17; Newell & Newell, 1963: 40, pl. XII, fig. 4; Mulford 1963: 86; Halim, 1963: 498; Wood, 1963b: 12 (refs); Klement, 1964: 357–358, pl. 3, fig. 1; Wood, 1964a: 42–43 (ecol.); Wood, 1964b: 553 (ecol.); López, 1966: 330 (in subgenus *Euceratium*), 422 (in key), text-figs 2 (16), 16; Sournia, 1966: 465, table I (varieties and transitional stages); Sournia, 1967: 460–464 (status, var., refs & syn., etc.), text-fig. 83; Wood, 1968: 36 (descr.), fig. 77; Subrahmanyan, 1968: 8, 12 (in key), 74, 79–81 (descr., distrib., refs & syn.), text-figs 149–150, pl. IV, fig. 24, pl. V, figs 25–26, pl. VI, figs 29–30; Taylor, 1974: 197 (N.Z. records listed); Drebes, 1974: 149 (descr.), fig. 132; Taylor, 1976: 72–73 (var., refs), pl. 20, figs 198–199, pl. 22, fig. 218; Muñoz & Avaria, 1980: 8 (in key), 29–30 (diag.), pl. 8, fig. 2, pl. 12, fig. 4; Shim *et al.*, 1981: 75, pl. XIV, figs 45a-b; Dodge, 1982a: 226 (in key), 235–236 (descr. etc.), fig. 31A; Wongrat, 1982: 9, 47–48, 67, pl. VI, figs 2–3, map 11; Dowidar, 1983: 17–18, pl. VII, fig. 5; Fornshell *et al.*, 1984: 15–27 *passim* (distrib., patterns/water temperature); Taylor, 1987a: 5; Taylor, 1987b: 79; Levandowsky & Kaneta, 1987: 383 (behaviour); Taylor, 1987d: 445; Balech, 1988: 146 (diag., distrib., ecol.), pl. 64, fig. 4.

Ceratium massiliense Gourret, 1883

Gourret, 1883: 27, pl. 1, figs 2–2a (as *C. tripos* var. *massiliense*); Jörgensen, 1911: 62 (in key), 66-67 (descr., distrib., refs & syn.), 97, 98, 109; Jörgensen, 1920: 85–89 (review of ecol., varieties, etc.), text-figs 78–80; Böhm, 1931: 35–36, fig. 32 (forms); Peters,

1932: 50–51, fig. 24, pl. 1, figs 2a-b, pl. 2, fig. 10f, pl. 3, fig. 16a; Nielsen, 1934: 25, 35 (table 8), 37 (table 9), text-figs 60–62, map 8 (N.Z. occurrence, etc.); Schiller, 1937: 422–424 (descr., refs & syn.), text-fig. 463 (in subgenus *Euceratium*, section Macroceras); Graham & Bronikovsky, 1944: 38–39, figs 22E–L, chart 38, text-table 40, appendix-table 43; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Macroceros, key), fig. 112; Wood, 1954 : 271 (in key), 306–307 (descr., distrib., syn., incl. *C. m.* forma *protuberans* (Karsten, 1906), off N.Z., after Nielsen); Trégouboff & Rose, 1957: 116, pl. 26, fig. 15; Yamaji, 1959: fig. on p. 115; Curl, 1959: 306, fig. 119; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. occurrence); Riedl, 1963: 33, pl. 5; Mulford, 1963: 87; Halim, 1963: 498–499; Wood, 1963b: 13 (refs); Klement, 1964 : 357, pl. 3, fig. 2; Wood, 1964a: 43 (ecol.), fig. 1; Wood, 1964b: 552 (ecol.); Cassie, 1966: 583 (Hauraki Gulf occurrence as forma *protuberans* Karsten); López, 1966: 333 (in subgenus *Euceratium*), 433 (in key), text-figs 2(50-51) 50-51; Sournia, 1966: 465, table I (varieties and transitional stages); Sournia, 1967: 465–469 (status, varieties, distrib., refs & syn., etc.); Halim, 1967: 723 (ecol.), pl. II, figs 22–23, pl. III, fig. 41; Wood, 1968: 36 (descr.), fig. 78; Subrahmanyan, 1968: 12 (in key), 74–77 (descr., distrib., refs & syn.), 78, pl. IV, fig. 23, pl. VII, figs 34–35; Steidinger & Williams, 1970: 46, figs 30a-c; Yamaji, 1971: 104, pl. 50, fig. 11; Tu & Chiang, 1972: 141, fig. 19; Sournia 1973: 12; Hermosilla, 1973: 60 (in key), 64–65 (descr., etc., distrib.), pl. 33, figs 3-4; Taylor, 1973: 163, fig. 4b (ecol.); Taylor, 1974: 197 (N.Z. records listed as *C. massiliense* (Gourr.) Jörg. var. *massiliense* and as var. *protuberans* (Karsten) Jörg.); Taylor, 1976: 73–74 (var., refs), pl. 20, figs 193–196; Muñoz & Avaria, 1980: 9 (in key), 31–32 (diag. syn.), pl. 7, fig. 2, pl. 14, fig. 1; Burns & Mitchell, 1982a: 62, figs 11–13 (N.Z. specimens); Carbonell, 1982: 84 (refs); Dodge, 1982a: 226 (in key), 236, fig. 31E; Wongrat, 1982: 9–10, 51, 68, pl. VII, figs 3–5, map 11; Dowidar, 1983: 18, pl. II, fig. II, pl. VIII, fig. 1; Fornshell *et al.* 1984: 15–27 *passim* (distrib. pattern/satellite temperature-imagery); Gaines & Elbrächter, 1987: 237 (nutrition); Taylor, 1987d: 436; Balech, 1988: 147 (diag., distrib., ecol.), pl. 64, figs 2, 3 & 5; Huisman, 1989: 441 (priority of *C. carriense* Gourret, 1883 over *C. massiliense* Karsten, 1906), invalid name).

Ceratium minutum Jörgensen, 1920

Jörgensen, 1920: 34, text-figs 21–23 (new name for *C. eugrammum* Kofoid, 1907: 26, fig. 3, not *Peridinium eugrammum* Ehrenberg); Lebour, 1925: 145–146 (descr., distrib., refs), pl. XXX, fig. 4; Martin, 1929: 30 (descr.), pl. II, figs 17–19, pl. V, figs 13–14; Schiller, 1937: 374, text-figs 413a-c (in subgenus *Biceratium*, section Pentagona); Kiselev, 1950: 237 (in key), 244 (descr.), figs 411a-b; Wood, 1954: 269 (in key), 279 (descr., distrib.), text-fig. 196; Cassie, 1963: 8 (table 2) (S. of N.Z.); Sournia, 1967: 406–407 (descr., distrib., refs & syn.), text-fig. 27; Wood, 1968: 36 (descr.), fig. 79; Steidinger & Williams, 1970: 28 (in key); Hassan & Saifullah, 1974: 82 (key); Sarjeant, 1974: fig. 1g; Taylor, 1976: 62 (discuss.), pl. 12, fig. 120; Muñoz & Avaria, 1980: 6 (in key), 16–17 (diag., syn.), pl. 1, fig. 3, pl. 11, fig. 5; Dodge, 1982a: 225 (in key), 230 (descr. etc.), fig. 28E, pl. VII, fig. C; Dowidar, 1983: 11, pl. I, fig. 7; Okamoto & Takahashi, 1984: 14 *et seq.*

Ceratium pentagonum Gourret, 1883

Gourret, 1883: 45, pl. 4, fig. 48 (*C. pentagonum*), 59 (as var. *rectum*); Lemmerman, 1900: 365 (as *C. furca* var. *pentagonum*); Jörgensen, 1911: 12 (in key), 20–21 (descr., distrib., refs & syn.), 97, 100, 106, 108, pl. II, figs 21–23; Jörgensen, 1920: 24–28 (review of ecol., forms, refs), text-figs 15–17; Peters, 1932: 29, fig. 10, pls 1, 3–4, figs 1a-c, 15a, 18; Nielsen, 1934: 11 (ecol., var., N.Z. occurrence, refs); Schiller, 1937: 370-371 (descr., var., refs & syn.), text-fig. 408 (in subgenus *Biceratium*, section Pentagona Jörgensen, 1911); Kiselev, 1937: 234, fig. 5; Graham & Bronikovsky, 1944: 20 (ecol., etc.), figs 10C–D, H–N, chart 9, text-table 10, appendix-table 10; Kiselev, 1950: 237 (in key), 243 (descr.), fig. 417; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Pentagona), fig. 85; Wood, 1954: 269 (in key), 276–277 (descr., distrib., forms, syn.); Trégouboff & Rose, 1957: 114, pl. 25, fig. 7; Cassie & Cassie, 1960: 182 (table 1) (misspelt as *pentagorum*); Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities) (misspelt as *pentagorum*); Balech, 1962: 176–179; Halim, 1963: 496; Wood, 1963: 13 (refs); Klement, 1964: 354 (dimensions, etc.), pl. 2, fig. 6; Wood, 1964a: 43-44 (ecol.); Wood, 1964b: 554 (ecol.); Sournia, 1966: 464, table I (varieties and transistional stages); López, 1966: 330 (in subgenus *Biceratium*), 344–352, 367–370, 413-415, 421 (in key), 424, text-figs 2(5), 5, 59, 63, 76–68, 90, tables 5-6; Sournia, 1967: 400–404 (varieties, refs & syn., etc.), text-fig. 23; Halim, 1967: 724 (ecol.), pl. II, fig. 24, pl. V, fig. 60; Wood, 1968: 37 (descr.), fig. 82; Subrahmanyan, 1968: 11 (in key), 23–24 (descr., distrib., refs & syn.), text-figs 32–33 (incl. *Ceratium pentagonum* Gourret, 1883, forma *robustum* Cleve [1900] 1901a: 925, fig. 16 (as *C. lineatum* var. *robusta*); Jörgensen, 1911: 20–21, pl. II, figs 21–23 (in syn. of *C. pentagonum* Gourret); Jörgensen, 1920: 26, text-figs 17a-b; Nielsen, 1934: 35; Schiller, 1937: 371, fig. 408a; Kiselev, 1950: 244, fig. 418; Wood, 1954:

276, text-figs 191a-b; Cassie, 1961: 18, 47 (N.Z. occurrences); Halim, 1963: 496, fig. 3; Sournia, 1967: 401–402 (distrib., refs & syn.)); Steidinger & Williams, 1970: 27 (in key), 47, fig. 31; Yamaji, 1971: 92, pl. 44, fig. 14; Tu & Chiang, 1972: 138–139, fig. 13; Sournia, 1973: 11; Hermosilla, 1973: 60 (in key), 62–63 (descr., var., etc.), pl. 32, figs 4–6, 8; Taylor, 1974: 197 (N.Z. occurrence listed, incl. *C. pentagonum* Gourret f. *robustum* (Cleve) (Jörg.) — "Widely distributed 18 records"); Hassan & Saifullah, 1974: 82 (key); Ricard, 1974: 134 (SEM morphol.), pl. 5, figs 44–47 (var. *robustum*); Travers & Travers, 1975: 266 (var.); Taylor, 1976: 62–63 (discuss., var., refs), pl. 12, figs 111–113; Taylor, 1978: 217 (Leigh record, June 1969); Sournia *et al.*, 1979: 193, 195, figs 35, 38, 49; Muñoz & Avaria, 1980: 15 (diag., syn. as *C. pentagonum* var. *robustum*), pl. 1, fig. 4, pl. 10, fig. 3, pl. 13, fig. 3; Shim *et al.*, 1981: 75, pl. XIV, fig. 46; Dodge, 1982a: 225 (in key), 230, fig. 28F, pl. VIII, fig. d; Carbonell, 1982: 79 (refs etc.); Wongrat, 1982: 3, 28, G6, pl. I, figs 11–12, map 2; Dowidar, 1983: 10, pl. III, fig. 1; Chang, 1983b: table 1 (West Coast productivity study); Okamoto & Takahashi, 1984: 14 *et seq.*; MacKenzie & Gillespie, 1986: 377 (table 3 : Tasman Bay); Taylor, 1987d: 433, 444, 449, 450; Balech, 1988: 129 (diag., distrib., ecol., pl. 56, figs 15–16.

Ceratium petersii Nielsen, 1934

Nielsen, 1934: 20–21, 35 (N.Z. occurrence), text-fig. 44; Peters, 1932: 39, pl. 3, fig. 16c (as *C. bucephalum*); Schiller, 1937: 406, text-fig. 446 (in subgenus *Euceratium*, section Tripos); Graham & Bronikovsky, 1944: 31 (ecol., etc.), fig. 16L, chart 26, appendix-table 31; Wood, 1954: 270 (in key), 296–297 (descr., distrib.), text-figs 224a-b; Balech, 1962: 183–184, pl. XXVI, figs 395–397; López, 1966: 330 (in subgenus *Euceratium*), 419, 422 (in key), 425, text-fig 2(25), 25; Taylor, 1978: 86–87, pl. 15, fig. 61 (possible var. of *C. azoricum*); Muñoz & Avaria, 1980: 8 (in key), 26 (diag., syn.), pl. 3, fig. 1, pl. 9, fig. 4; Sournia, 1967: 436 (refs & syn.), text-figs 59–63; Subrahmanyan, 1968: 12 (in key), 91–93 (descr., refs), text-fig. 165; Sournia, 1973: 12 (listed); Dodge, 1982: 226 (in key), 232, fig. 29E; Okamoto & Takahashi, 1984: 14 *et seq.*; Taylor, 1987d: 437; Balech, 1988: 137–138 (diag., taxon., distrib., ecol.), pl. 57, figs 8–9.

Ceratium platycorne von Daday, 1888

von Daday, 1888: 101, pl. 3, figs 1–2; Lemmermann, 1899: 346; Paulsen, 1908: 73 (in key), 74–75 (refs), text-fig. 97; Kofoid, 1908: 185, fig. 28 (as *C. lamellicorne*); Jörgensen, 1911: 58–59 (descr., refs), pl. VI, figs 124–125; Jörgensen, 1920: 79–82 (review of ecol., etc.), text-figs 74–75; Lebour, 1925: 153–154, figs 50a-b; Böhm, 1931:31, fig. 27a; Peters, 1932: 47, fig. 6, pl. 2, fig. 12b; Nielsen, 1934: 24 (ecol., etc.), 35 (table 8) (N.Z. occurrence), text-figs 56–57; Schiller, 1937: 408–409 (descr., syn.), figs 450a-b (in subgenus *Euceratium*, section Platycornia Jörgensen, 1911); Dakin & Colefax, 1940: 60, fig. 71; Graham & Bronikovsky, 1944: 36–37 (ecol., etc.), figs 19C-H, chart 35, text-table 37, appendix-table 40; Kiselev, 1950: 238 (in key), 252, fig. 426 (descr., refs); Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Platycornia), fig. 110; Gaarder, 1954b: 15; Wood, 1954: 270 (in key), 297–298 (descr., distrib., syn.), text-fig. 226; Trégouboff & Rose, 1957: 115, pl. 26, figs 8–9; López, 1966 : 330 (in subgenus *Euceratium*), 422 (in key), text-figs 2 (17–18), 17–18; Sournia, 1966: 465, table I (varieties and transitional stages); Sournia, 1967: 453–456 (status, var., distrib., refs & syn., etc.), text-fig. 78; Halim, 1967: 724 (ecol.), pl. III, fig. 42; Subrahmanyan, 1968: 12 (in key), 58–60 (descr., distrib., refs & syn.), 89, text-figs 108–109; Taylor 1974: 198 (N.Z. records listed and noted (p. 200) that "Ostenfeld (1931) considered this to be a tropical form which becomes *C. compressum* Gran in cool water"); Travers & Travers, 1975: 266; Dodge, 1982a: 224 (in key), 234 (descr., etc., cf. with *C. compressum*), figs 29H–J; Dowidar, 1983: 17, pl. VII, fig. 6; Taylor, 1987d: 453.

Ceratium porrectum Karsten, 1907

Karsten, 1907: 51, figs 6a-b; Jörgensen, 1911: 32 (in key), 34–35 (descr., distrib., etc., refs & syn.), 106, pl. III, figs 63–64; Schiller, 1937: 389–390 (descr., etc.), fig. 427a (in subgenus *Euceratium*, section Tripos); Wood, 1954 : 270 (in key), 287 (descr., distrib.), text-fig. 207; Cassie, 1961: 18 (N.Z. record from off New Plymouth); Sournia, 1967: 427 (distrib., refs & syn.), text-fig. 46; Subrahmanyan, 1968: 11 (in key) 37, 38 (descr., refs & syn.), text-fig. 61; Taylor, 1974: 198 (record of Cassie (1961) listed); Taylor, 1976: 77–78 (var., refs), pl. 19, figs 185, 188; Wongrat, 198 : 6, 38–39, 67, pl. IV, figs 1–2, map 8.

Ceratium pulchellum Schröder, 1906

Schröder, 1906b: 358, fig. 27; Jörgensen, 1911: 8, 32 (in key), 33–34 (descr., distrib., refs & syn.), 45, 106, 108, pl. III, figs 59–62; Jörgensen, 1920: 50–56 (review of ecol., forms, etc.), text-figs 40–53; Böhm, 1931: 15, 17 (forms and var.), figs 13–15; Nielsen, 1934: 16–17 (ecol., syn.), 35 (table 8) (N.Z. occurrence), 52 (table 16) (var.), text-fig 31, map 6; Schiller, 1937: 386–389 (descr., varieties, refs & syn.), text-figs 422a-b (in subgenus *Euceratium* Gran, section Tripos Ostenfeld); Graham & Bronikovsky, 1944: 27 (ecol., etc.), figs 14B–F, chart 20, text-table 22, appendix-table 24; Massuti &Margalef, 1950: 58 (in subgenus

Euceratium section Tripos), fig. 97; Wood, 1954: 269 (in key) 286 (descr., distrib., syn.), text-figs 206a; Trégouboff & Rose, 1957: 116, pl. 25, fig. 15; Curl, 1959: 306, fig. 121; Cassie, 1961: 18, 47 (N.Z. record from off New Plymouth); Halim, 1963: 498, fig. 22; Wood, 1963b: 14 (refs); Wood, 1964a: 44 (ecol.); Wood, 1964b: 554 (ecol.); Klement, 1964: 355, pl. 2, fig. 3 (dimensions etc.); Cassie, 1966: 577, 584 (Hauraki Gulf); Sournia, 1967 : 420-421 (status, refs & syn., etc.), text-fig. 40; Subrahmanyan, 1968: 11 (in key), 36–37 (descr., distrib., refs & syn.), 38, text-fig. 60; Steidinger & Williams 1970: 47, fig. 32; Yamaji, 1971: 99, pl. 48, fig. 2; Tu & Chiang, 1972: 140, fig. 17; Taylor, 1974: 196 (N.Z. records listed as *C. tripos* (O.F. Müll.) Nitzsch var. *pulchellum* (Schröder)); Muñoz & Avaria 1980: 8 (in key), 23–24 (diag., syn.), pl. 5, fig. 1, pl. 10, fig. 5; Dowidar, 1983: 13, pl. I, fig. 10; Balech, 1988: 140–141 (diag., taxon., distrib., ecol.), pl. 60, fig. 4.

Ceratium ranipes Cleve, 1900

Cleve, 1900: 15, pl. VII, fig. 1; Karsten, 1905b: 148, figs 3b, 3d; Jörgensen, 1911: 61, pl. VI, fig. 130 (as *C. palmatum* (Schröder, 1900) var. *ranipes* (Cleve); Jörgensen, 1920: 82-83, text-fig. 76 (ecol., etc.); Böhm, 1931: 31–35, figs 28–31 (transitional forms); Peters, 1932 : 47, fig. 6, pl. 2, figs 12d-e; Nielsen, 1934: 24, 35 (table 8) (N.Z. occurrence), text-fig. 58; Nie, 1936: 61, fig. 27 (as *C. palmatum* var. *ramipes*) [sic]; Schiller, 1937: 409– 410 (descr., refs & syn.), text-fig. 451a (in subgenus *Euceratium*, section Palmata Pavillard); Dakin & Colefax, 1940: 60, fig. 72; Graham & Bronikovsky, 1944: 37 (ecol., etc.), figs 19I–K, 20, 21A, chart 36, text-table 38, appendix-table 41; Kiselev, 1950: 255, fig. 470; Mas-suti & Margalef, 1950: 58 (in subgenus *Euceratium* section Palmata), fig. 111; Wood, 1954: 270 (in key), 299 (descr., distrib., syn.), text-fig. 227; Trégouboff & Rose, 1957: 115, pl. 26, fig. 10; Yamaji, 1959: fig. on p. 19 (as *C. palmata* var. *ranipes*); Balech, 1962: 186; Halim, 1963: 498, fig. 26; Wood, 1964b: 554 (ecol.); López, 1966: 330 (in subgenus *Euceratium*) 422 (in key), text-figs 2(19–20), 1–20; Sournia, 1967: 459-460 (distrib., varieties, refs & syn.), text-figs 81-81; Halim, 1967: 724 (ecol.), pl. III, fig. 44; Wood, 1968: 38 (descr.), fig. 84; Subrahmanyan, 1968: 12 (in key), 60-61 (descr., distrib., refs & syn.), text-fig. 110; Stei-dinger & Williams, 1970: 47, fig. 33; Sarjeant, 1974: 29, fig. 1h; Taylor 1974: 196 (N.Z. records listed, incl. *C. palmatum* (Schröder); Carbonell, 1982: 85, pl. II, fig. 18; Wongrat, 1982: 8, 46–47, 67, pl. VI, fig. 1, map 11; Dowidar, 1983: 17, pl. V, fig. 5; Taylor, 1987c: 79; Taylor, 1987d: 453, 454; Balech, 1988: 142 (diag., taxon., distrib., ecol.), pl. 60, figs 8–9, pl. 61, fig. 1.

Ceratium semipulchellum (Jörgensen, 1920)

Jörgensen, 1920: 50, figs 43–44 (as *C. pulchellum* forma *semipulchellum*); Peters, 1932: 39, pl. 4, fig. 20 (as subspecies of *C. tripos*); Nielsen, 1934: 16, figs 29–30 (as separate species *C. semipulchellum*); Schiller, 1937: 387, figs 423a-b (syn. etc. as form of *C. pulchellum* Schröder, 1906); Graham & Broniskovsky, 1944 : 27 (as subspecies of *C. tripos*); Wood, 1954: 286 (as form of *C. pulchellum*); Subrahmanyan, 1968: 36 (as variant of *C. pulchellum*); Taylor, 1976: 89, pl. 14, fig. 150 (as *C. pulchellum* as a variety of *C. tripos* and *C. semipulchellum* as a form of this variety); Burns & Mitchell, 1982: 62, fig. 14 (N.Z. specimens, det. following Nielsen); Wongrat, 1982: 5, 36–37, 67, pl. III, figs 6–7, map 7 (*C. tripos* var. *pulchellum* f. *semipulchellum*).

Ceratium setaceum Jörgensen, 1911

Jörgensen, 1911: 12 (in key), 23, pl. II, figs 40–41; Jörgensen, 1920: 31–33 (review of ecol., etc., refs), text-fig. 19; Nielsen, 1934: 12, 35 (table 8), text-fig. 16 ("Dana" Stn 3650, W. of N.Z.); Schiller, 1937: 373 (descr., refs), text-fig. 411; Graham & Bronikovsky, 1944: 22 (ecol., etc.), fig. 11A, appendix-table 15; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Pentagona), fig. 87; Wood, 1954: 269 (in key), 278 (descr., distrib., syn.), text-figs 194a-b; Trégouboff & Rose, 1957: 115, pl. 25, fig. 9; Newell & Newell, 1963: 40, pl. XI, fig. 14; Wood, 1964b: 554; Sournia, 1967: 407 (refs & syn.); Wood, 1968: 38 (descr.), fig. 88; Subrahmanyan, 1968: 11 (in key), 26 (descr., distrib., refs), text-figs 37–38; Tu & Chiang, 1972: 138, fig. 12; Taylor, 1974: 198 (Nielsen's N.Z. record listed); Taylor, 1976: 63 (refs etc.), pl. 12, figs 114–115; Burns & Mitchell, 1980: 150 (identification features of N.Z. material), figs 12–13 (SEM); Dodge, 1982a: 225 (in key), 231, fig. 28G.

Ceratium symmetricum Pavillard, 1905

Pavillard, 1905: 52, pl. 1, fig. 4 (*C. symmetricum*) 52, pl. 1, fig. 6 (as *C. coarctatum*); Jörgensen, 1911: 44, pl. V, fig. 94 (as *C. gracile* Gourret, 1884 var. *symmetricum*); Nielsen, 1934: 19 (ecol., syn.), 36 (table 8) (N.Z. occurrence), 54 (table 20) (var.), text-figs 40-41, map 7; Schiller, 1937: 401-402 (descr., refs & syn.), text-figs 441a-d (in subgenus *Euceratium*, section Tripos); Graham & Bronikovsky, 1944: 29–30 (ecol., etc.), figs 15H–L, chart 24, text-table 26, appendix-table 28; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Tripos), fig. 103; Wood, 1954: 270 (in key), 292–293 (descr., distrib., syn.), text-figs 217 a-c; Trégouboff & Rose, 1957: 115, pl. 26, fig. 3; Cassie, 1961: 18, 47 (N.Z. record from off New Plymouth); Halim, 1963: 498, fig. 25; Wood, 1964a: 44

(ecol.); Wood, 1964b: 554; López, 1966: 330 (in subgenus *Euceratium*), 422 (in key), text-figs 2 (29–30) 29–30; Sournia, 1967: 432–434 (status, varieties, refs & syn. etc.), text-fig. 56; Halim, 1967: 725, pl. I, fig. 13; Wood, 1968: 40 (descr.), fig. 89; Subrahmanyan, 1968: 12 (in key), 51–52 (descr., distrib., refs & syn), text-figs 89–92; Steidinger & Williams, 1970: 47, fig. 34; Sournia, 1973: 13; Taylor, 1974: 198 (N.Z. records listed), 200 (notes that Nielsen (1934) and Schiller (1937) considered this to include *C. gracile* (Gourr.)); Taylor, 1976: 87–88 (var., refs), pl. 15, figs 152–154, 156; Dodge, 1982a: 227 (in key), 235, fig. 30G; Andreis *et al.*, 1982: 227, fig. 13 (thecal surface); Dowidar, 1983: 14 (varieties discuss.), pl. IV, fig. 5, pl. VI, fig. 1; Balech, 1988: 143 (diag. etc.).

Ceratium teres Kofoid, 1907

Kofoid, 1907: 308, pl. 29, figs 34–36; Jörgensen, 1911: 12 (in key), 21–22 (descr., distrib.), 106, pl. II, figs 34–35; Jörgensen, 1920: 28–31 (review of ecol., etc., refs), text-fig. 18; Böhm, 1931: 12, fig. 9d; Nielsen, 1934 : 11, 35 (table 8) (N.Z. occurrence), text-fig. 14; Schiller, 1937: 372, text-figs 409a-b (in subgenus *Biceratium*, section Pentagona); Graham & Bronikovsky, 1944: 21 (ecol., etc.), figs 11B–D, chart 11, text-table 23, appendix-table 11; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Pentagona), fig. 86; Wood, 1954: 269 (in key), 277–278 (descr., distrib., syn.), text-fig. 193; Trégouboff & Rose, 1957: 115, pl. 25, fig. 8; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities); Halim, 1963: 496, fig. 5; Wood, 1964a: 44–45 (ecol.); Wood, 1964b: 555 (ecol.); López, 1966: 330 (in subgenus *Biceratium*), 352–355, 371, 415–416, 421 (in key), 424, text-figs 2(8), 8, 64–67, 91, table 7; Sournia, 1967: 405–406 (distrib., refs & syn.), text-fig. 28; Wood, 1968: 40, (descr.), fig. 90; Subrahmanyan, 1968: 11 (in key), 24 (descr., distrib., refs), text-figs 34–35; Steidinger & Williams, 1970: 28 (in key), 47, figs 35a-b; Taylor, 1974: 198 (N.Z. records listed); Taylor, 1976: 63–54 (identif., refs, etc.), pl. 12, fig. 110, pl. 40, fig. 484; Taylor, 1978: 217 (Leigh records); Burns & Mitchell, 1980: 150, 153 (identif. features of N.Z. material), fig. 15 (SEM); Dodge, 1982a: 225 (in key), 230, fig. 28J; Carbonell, 1982: 79 (refs etc.); Wongrat, 1982: 3, 28–29, 66, pl. I, fig. 10; Dowidar, 1983: 11, pl. I, fig. 3; Gaines & Elbrächter, 1987: 259; Balech, 1988: 131 (diag., distrib., ecol.), pl. 56, fig. 7.

Ceratium trichoceros (Ehrenberg, 1859) var. **contrarium** (Gourret, 1883)

Gourret, 1883: 31–32, pl. 3, fig. 51 (as *C. tripos* var. *contrarium*); Pavillard, 1905: 53, pl. 2, fig. 1; Jörgensen, 1911: 76 (descr., etc., as *C. tripos* var. *contrarium*, in syn. of *C. inflexum* (Gourret, 1883), pl. IX, figs 160–161; Jörgensen, 1920: 93–95 (review of ecol., etc., as *C. contrarium*), text-fig. 84; Böhm, 1931: 40, table 4; Peters, 1932: 50, fig. 23, pl. 2, fig. 10c (*C. contrarium*), 51, fig. 25, pls 1, 4, figs 3a-c, 17a (*C. trichoceros*); Nielsen, 1934: 27, 35 (table 8), 53 (table 24) (var.), 55–57 (table 23) (var.), text-fig. 67, map 6 (N.Z. occurrence as *C. contrarium*); cf. Dakin & Colefax, 1940: 60, fig. 73 (*C. trichoceros*); Graham & Bronikovsky, 1944: 40 (ecol., etc.), figs 22E, 24A–B, chart 41, text-table 43, appendix-table 46 (cf. also *C. trichoceros*, pp. 40-41, fig. 22B); Crawford, 1949: 174 (Cook Strait record as *C. trichoceros*); Wood, 1954: 271 (in key), 311 (syn., etc.), text-fig. 239b; Trégouboff & Rose, 1957: 116, pl. 26, fig. 18 (as *C. contrarium*); cf. Yamaji, 1959: fig. on p. 114 (*C. trichoceros*); Cassie, 1961: 18, 47 (N.Z. record from Foveaux Strait as *C. trichoceros* var. *contrarium*); Mulford, 1963: 87; Halim, 1963: 499, fig. 30; Wood, 1963b: 15 (refs); Wood, 1964a: 38 (ecol., *C. contrarium*), 555 (ecol., *C. trichoceros*); Klement, 1964: 358, pl. 3, fig. 5 (features, dimensions, etc.); Cassie, 1966: 577, 583 (Hauraki Gulf); López, 1966: 333 (in subgenus *Euceratium*), 423 (in key), text-fig. 2(46), 46; Davis & Steidinger, 1966: 1–3 (identif.); Sournia, 1967: 472–473 (distrib., refs & syn.), text-fig. 89; Halim, 1967: 716 (ecol. as *C. contrarium* (Gourret); Steidinger *et al.*, 1967: pl. VI, fig. 5; Balech, 1968: pl. 11, map 5 (N.Z. records, as *C. contrarium*); Wood 1968: 26 (descr.) fig. 49; Subrahmanyan, 1968: 12 (in key), 82–83 (descr., distrib., detailed syn.), text-fig. 148; Dragovich, 1969: fig. 4a (as *C. contrarium* (Gourret)); Steidinger & Williams, 1970: 47; Yamaji, 1971: 103, pl. 50, fig. 2; Tu & Chiang, 1972: 141, fig. 20; Taylor, 1973: 163, fig. 4a (ecol.); Taylor, 1974: 197 (Nielsen's N.Z. records listed under full species, *C. contrarium*); Taylor 1976: 75–76 (var., refs), pl. 12, fig. 117, pl. 21, fig. 210; cf. Muñoz & Avaria, 1980: 8, 33–34 (diag., syn.), pl. 8, fig. 1; cf. Shim *et al.*, 1981: 75, pl. XIV, figs 48a-b; Burns & Mitchell, 1982a: 62, 64, fig. 15 (N.Z. specimen, taxon. comments); cf. Dodge, 1982a: 226 (in key, *C. trichoceros*), 236, fig. 31F; Carbonell, 1982: 82, pl. I, fig. 9 (as *C. contrarium* Gourret, incl. *C. inflexum* Gourret, discuss. etc.), 84 (*C. trichoceros* incl. forma *crypticum* cf. Taylor, 1976: 75 etc.); Dowidar, 1983: 18–19, pl. III, fig. 7, pl. V, fig. 1; cf. Fornshell *et al.*, 1984: 15–27 *passim* (distrib. pattern/ satellite temperature-imagery); Balech, 1988: 151 (diag., taxon., distrib., ecol., as *C. contrarium*), pl. 66, fig. 5.

Ceratium tripos tripos (O.F. Müller, 1776)

Müller, 1776 [1781]: 206 (*Cercaria*); Müller, 1786: 136, pl. XIX, fig. 22; Nitzch, 1817: 4; Ehrenberg, 1833: 272; Ehrenberg, 1834: 165, pl. 2, figs 1a-e, g-h

(not f); Schütt, 1896: 20–21 (descr.), text-figs 13, 18 A–C, 28A–D; Lemmermann, 1899: 315 (N.Z. record from French Pass), 325, 326, 345; Pavillard, 1905: 50, pl. I, figs 5, 7; Karsten, 1905b: 140 *et seq.* (review of forms, incl., p. 140, *C. tripos limulus* (Gourret), *q.v.*, *gracile* (Gourret), *balticum* Schütt, *sinistra* Gourret; p. 141, pl. XX [1], figs3–4, *azoricum* Cleve, *q.v.*; p. 142, *brevis* Ostenfeld, *arietinum*, pl. XX [1], figs 6a-d *q.v.*; *symmetricum* Pavillard, *q.v.*, *lunula* Schimper, *arcuatum* Gourret, *atlantica* Gourret, pl. XX [1], *q.v.*, etc.); Karsten, 1907: 404–414 (review, status of forms, etc.), pls XLVIII–XLIX [XIV–XV]; Paulsen, 1908: 73 (in key), 77–80 (descr., varieties, refs), text-figs 102–107; Jörgensen, 1911: 1–5, 30, 32, 35, 90, 98, 103, 106, 108, pl. I, figs 1–2, pl. IV, figs 65–79 (and see index p. 117 for varieties and forms); Jörgensen, 1920: 47–50, text-figs 33–39 (review of ecol., forms, etc.); Lebour, 1925: 148–150 (descr., varieties, distrib., etc., refs), text-figs 46b-d, pls XXXIIa-c, XXXIII; Martin, 1929: 30, pl. VII, fig. 7; Böhm, 1931: 15, fig. 12; Peters, 1932: 37, 39, figs 5, 7, 13, pls 1, 3, figs 5a-b, 15d, 16b; Nielsen, 1934: 17, 35 (table 8) (N.Z. occurrence), text-figs 32–33, map 9; Lebour *in* Russell & Yonge, 1936 : pl. 40, fig. 2 (coloured); Schiller, 1937: 382 (descr., varieties, refs & syn.), text-figs 384–385, 421a-e (in subgenus *Euceratium* Gran); Dakin & Colefax, 1940: 60, text-fig. 74; Graham & Bronikovsky, 1944: 25–26 (forms, ecol., etc.); Kiselev, 1950: 238 (in key), 246 (descr., forms, refs), fig. 428; Massuti & Margalef, 1950: 58 (in subgenus *Euceratium*, section Tripos subspecies *genuinum* Pavillard, incl. var. *atlanticum* Ostenf.), fig. 99; Wood, 1954: 270 (in key), 284–285 (descr., distrib., syn., etc.); Davis, 1955: fig. 195; Hardy, 1956: pl. I, fig. 16 (coloured), pl. II; Trégouboff & Rose, 1957: 116, pl. 25, fig. 14; Yamaji, 1959: fig. on p. 26, fig. on p. 116; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18, 47 (N.Z. localities); Fraser, 1962: frontisp., fig. 43, pl. VII, fig. 15, pl. IX; Newell & Newell, 1963: 40, pl. XII, fig. 3; Cassie, 1963: 8 (table 2) (S. of N.Z.); Mulford, 1963: 85–86 (ecol.); Wood, 1963b: 16 (refs); Wood, 1964a: 45 (ecol.); Wood, 1964b: 555 (ecol.); Klement, 1964: 355 (dimensions, etc.); Stosch, 1964: 144 *et. seq.*, text-figs 3–5 (sexual reprod.); Barth *et al.*, 1965: 1–12 (biogeography), figs; Cassie, 1966: 583 (Hauraki Gulf); Sournia, 1966: 464, table I (varieties and transitional stages); Sournia, 1967: 416–424 (review of status, varieties, distrib., refs & syn., etc.), table 2; Halim, 1967: 725–726 (ecol.); Wood, 1968: 41 (descr.), fig. 92; Toriumi, 1968: 1–6; Subrahmanyan, 1968: 11 (in key), 35–36 (descr., distrib., refs & detailed syn.), 37, 37, 40, text-fig. 59, pl. III, figs 17–18 (includes in syn. the following form: *Ceratium tripos atlanticum* Ostenfeld, 1903: 583–584, figs 132–133; Karsten, 1905b: 143 (status, etc.), pl. XX [17], fig. 16; Paulsen, 1908: 78, text-fig. 102; Jörgensen, 1911: 36–37, pl. IV, figs 69–73 (descr.); Jörgensen, 1920: 46, 47, 38, figs 33–36 (ecol., etc.); Nielsen, 1934: 17 (ecol., var., etc.), 37 (table 9) (N.Z. occurrence), 52 (table 17), text-figs 32–33, map 7; Schiller, 1937: 384, fig. 421a (descr.); Graham & Bronikovsky, 1944: 26 (ecol., etc.), figs 13E–K, chart 18, text-table 20, appendix-table 22; Kiselev, 1950: 246, fig. 440; Gaarder, 1954: 16; Wood, 1954: 285, text-fig. 205a; López, 1955: 131–159 (allometric var.); López, 1966: 330 (in subgenus *Euceratium*), text-fig. 2(33), 33, pl. 2, fig. 3; Sournia, 1967: 418–420 (status, distrib., refs & syn.), text-fig. 43; Halim, 1967: 725, pl. II, fig. 26); Steidinger & Williams, 1970: 47, fig. 37a-b; Wall & Evitt, 1975: 14–44 *passim*, text-fig. 2.4, pl. 2, figs 10–44 (comparison of morphology and phylogeny with Cretaceous fossils); McGowan, 1971: fig. 1.9 (distrib. in Pacific, after Graham & Bronikovsky, 1944); Reinecke, 1971: figs 1C–D, G–H (heteromorphic chain); Lanigan, 1972: 170, fig. on p. 175 (Hauraki Gulf); Sournia, 1973: 14–15; Hermosilla, 1973: 61 (in key), 65 (descr., etc.), pl. 33, fig. 5; Taylor, 1973: 491 (Hauraki Gulf ecol.); Sarjeant, 1973: 4, figs 1c-d; Taylor, 1974: 198 (N.Z. records listed as *C. tripos* var. *tripos* (incl. var. *atlanticum* Ostenf.) "Widely distributed 27 records" and as *C. tripos* var. *pulchellum*, and see "taxonomic comment 27" (p. 200) — "This is highly variable and Wood (1954) has found intergrades with *C. pulchellum*. Subrahmanyan (1968), however, says that the two species are distinct".); Drebes, 1974b: 148 (descr.), fig. 130; Travers & Travers, 1975: 266; Wetherbee, 1975: 58–88, 3 text-figs, 13 pls; Taylor, 1976: 88–89 (taxon., var., refs), pl. 14, figs 147, 149–151, pl. 16, figs 168–170; Milstein *et al.*, 1977: 1 *et seq.* (blooms/lethal effects); Dodge, 1977: 334; Malone, 1978: 1–14 (bloom, causes and consequences), figs 1–17; Taylor, 1978: 217 (Goat Is Bay, Leigh, records); Taylor & Durbin, 1978: 221 (Whangateau Harbour, Sept. 1968); Mahoney & Steimle, 1979: 225–230 (mass mortality effects); Muñoz & Avaria, 1980: 7 (in key), 20-21, pl. 4, fig. 2, pl. 9, fig. 2, pl. 13, fig. 4; Staker & Bruno, 1980: 167–172 *passim* (diurnal migration); Maruyama, 1981: 328–336, 32 figs (flagellar motion); Shim *et al.*, 1981: 75–76, pl. XIV, figs 47a-b; Andreis *et al.*, 1982: 226, figs 9–10 (thecal surface); Burns & Mitchell, 1982a: 64, figs 16–21 (N.Z. samples, 3 different morphological forms of *C. tripos* var. *atlanticum* Ostenfeld (figs 16–17), *C. tripos* var. *subsalsum* Ostenfeld (figs 18–19), and *C. tripos* f. *balticum* (figs 20–21); Dodge, 1982a: 227 (in key), 234–235 (descr., etc.), figs 30A–D; Carbonell, 1982: 88 (refs etc.), pl. I, fig. 10; Dowidar, 1983: 13 (variations incl. *atlanticum* (Ostenfeld) and *semipulchellum* Jörgensen), pl. II, fig. 9; Han & Yoo, 1983b: 58–59

(descr., refs, etc.), pl. VIII, fig. 8; Fornshell *et al.*, 1984: 15–27 *passim* (distrib. pattern/satellite temperature-imagery); Villar & Huerta, 1985: 81–85 (red tide); MacKenzie & Gillespie, 1986: 377 (table 3 : Tasman Bay); Plinski & Józwiak, 1986: 47–53 (dimensions related to salinity and temperature) 77–83; Boulding & Platt, 1986: 199 (photosynthesis); Taylor, 1987: 5; Taylor, 1987b: 41, 42, 80; Dodge, 1987: 93 (ultrastructure); Prézelin, 1987: 195 (photosynthesis); Gaines & Elbrächter, 1987: 259 (nutrition); Levandowsky & Kaneta, 1987: 360, 365–368, 383; Taylor, 1987d: 408, 440, 445, 446, 461, 471, 474; Pfiester & Anderson, 1987: 612, 624 (reprod.); Balech, 1988: 138–139 (diag., distrib., ecol.), pl. 58, figs 1–6; Subrahmanyan & Bhavanarayana, 1989: 251 (distrib., etc, pollution).

Ceratium sp. Brewin, 1952
Brewin, 1952: 619 (Otago Harbour).

Family CERATOCORYIDAE/ CERATOCORYACEAE
Genus **Ceratocorys** Stein, 1883

Ceratocorys gourreti Paulsen, 1930
Paulsen, 1930: 36, 38; Schiller, 1937: 446–447 (descr., syn., etc.), text-fig. 488B; Wood, 1954: 314–315 (descr., distrib., syn), text-figs 244a-b; Trégouboff & Rose, 1957: 117, pl. 27, fig. 5; Cassie, 1961: 18, 48 (N.Z. record from off New Plymouth); Wood, 1968: 42 (descr.), fig. 96; Sournia, 1973: 16 (listed); Taylor, 1975: 198 (Cassie's (1961) record listed); Gopinathan & Pillai, 1974: 845 (syn.), pl. IB; Taylor, 1976: 90–91 (features, refs), pl. 26, figs 274, 277; cf. Chen, 1981: 91–99 (thecal morphology); Sournia, 1986: 77 (generic diag.); Andreis *et al.*, 1982: 227, fig. 16 (thecal surface); Balech, 1986: 195 (diag., taxon., distrib.), pl. 80, figs 4, 5, 7 & 8.

Family CLADOPYXIDAE/CLADOPYXIDACEAE
Genus **Cladopyxis** Stein, 1883

Cladopyxis spinosa (Kofoid, 1907)
Kofoid, 1907: 194, pl. 11, fig. 66 (*Acanthodinium*); Schiller, 1937: 469–470, text-fig. 539 (descr.); Rampi, 1950: 10–11, text-fig. 20 ("Dana" Stn 3650, off N.Z.); Trégouboff & Rose, 1957: 118–119 (generic definition); Wood, 1968: 44 (descr.), fig. 103; Taylor, 1974: 198 ("Dana" record listed); Taylor, 1976: 93–94 (comparison with *C. brachiolata* Stein following Gaarder's (1954: 17) suggested syn.); Sournia, 1986: 75–76 (generic diag.).

Family GLENODINIIDAE/GLENODINIACEAE
Genus **Glenodinium** Ehrenberg, 1837

Glenodinium sp. Taylor, 1973
Taylor, 1973: 491 (Hauraki Gulf ecol.).

Glenodinium sp. Taylor, 1978
Taylor, 1978: 217 (Leigh record, Oct. 1968).

Family GONYAULACIDAE/ GONYAULACACEAE
* Genus **Gonyaulax** Diesing, 1866

Gonyaulax alaskensis Kofoid, 1911
Kofoid, 1911: 249, pl. XIV, fig. 32, pl. XVII, figs 45–46; Wailes, 1928: 3, pl. 3, fig. 29; Schiller, 1937: 304–305 (descr.), text-figs 315a-d; Rampi, 1943b: 325 (descr.), text-fig. 10; Kiselev, 1950: 217 (in key), 225 (descr.), figs 393a-b; Wood, 1954: 257 (in key), 264 (descr., distrib.), text-fig. 176; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities); Cassie, 1963: 8 (table 2); Hermosilla, 1973: 56–57 (descr., etc.), pl. 30, figs 1–18; Taylor, 1974: 196 (Cassie's 1960 records listed); Dodge, 1982a: 207 (in key), 207–208 (descr. etc.), fig. 25K.

Gonyaulax diegensis Kofoid, 1911
Kofoid, 1911: 217, pl. 13, figs 21–24, pl. 16, fig. 40; Schütt, 1895: pl. 9, figs 34, 1–2 (as *Gonyaulax spinifer)* Lebour, 1925: 95 (descr.), pl. XIII, figs 5a-b; Schiller, 1937: 281–282 (descr., etc.), text-figs 285a-i; Rampi, 1943: 319 (descr.), text-fig. 1; Kiselev, 1950: 217 (in key), 220 (descr.), figs 389a-c (descr.); Wood, 1954: 257 (in key), 259 (descr., distrib. — *G. diegensis, G. spinifera* and *G. digitale* suggested as forms of the same species), text-fig. 164; Cassie, 1961: 18, 48 (N.Z. record from Hawke Bay); Wood, 1964b: 558; Halim, 1967: 730, pl. IV, fig. 51; Wood, 1968: 58 (descr.), fig. 148; Steidinger & Williams, 1970: 31 (in key), 50, figs 59a-b; Taylor, 1974: 196 (Cassie's 1961 record listed); Taylor, 1976: 100–101 (features, refs), pl. 35, fig. 400; Dodge, 1982a: 207 (in key), 208 (descr., etc.), fig. 26G; Burns & Mitchell, 1983: 52–56, fig. 10 (N.Z. specimens); Withers, 1987: 324, 327, 335, 341 (sterols); Levandowsky & Kaneta, 1987: 377 (behaviour); Balech, 1988: 166–167 (diag., taxon., distrib., ecol.), pl. 74, fig. 10.

* See new generic diagnoses by Sournia (1986: 81–82), Balech (1988: 165) and Dodge (1989: 281).

Gonyaulax digitale (Pouchet 1883)

Pouchet, 1883: 443, pls 18–19, fig. 14 (*Protoperidinium*); Schütt, 1895: pl. 9, figs 34, 1–2; Paulsen, 1907: 8, fig. 6; Paulsen, 1908: 28–29, fig. 37 (as *G. spinifera*, *fide* Lebour, 1925: 92); Kofoid, 191 : 214–217 (syn.), pl. 9, figs 1–5; Lebour, 1925: 92 (descr., distrib.), text-fig. 28a; Schiller, 1937: 283–284 (descr., refs & syn.), text-figs 28a-k; Rampi, 1943b: 319–320 (descr.), text-figs 6–9; Kiselev, 1950: 217 (in key), 200–221 (descr., refs), figs 382, 390a-b; Massuti & Margalef, 1950: 62 (in key), fig. 30; Wood, 1954: 257 (in key), 259 (descr., distrib., refs & syn.), text-fig. 165; Trégouboff & Rose, 1957: 112, pl. 24, fig. 1; Cassie, 1960b: 328 (?) spores in NZOI Stn C201, red-water bloom, Cook Strait); Cassie, 1963: 8 (table 2) (S. of N.Z.); Wood, 1964b: 558 (ecol.); Wall & Dale, 1968: 269 (resting spores), pl. 1, figs 1–5, pl. 3, figs 1–2; Wood, 1968: 58 (descr.), fig. 149; Steidinger & Williams, 1970: 31 (in key), 50, figs 60a-b; Reid, 1972: 939–944 *passim*, table 1 (cyst as *Spiniferites bentori* (Rossignol)); Sarjeant, 1974: 44–45 (encystment), text-fig. 17, frontis. fig. 3; Drebes, 1974b: 143 (descr., as *G. digitalis*), figs 125b-c; Dodge, 1982a: 207 (in key), 208, 210 (descr., etc.), fig. 26A, pl. VI, figs c-d; Andreis *et al.*, 1982: 227, fig. 25 (thecal surface); Harland, 1983: 333, 386, text-fig. 10, pl. 44, figs 3–4 (cyst, distrib. etc. as *Spiniferites bentori* (Rossignol)); Burns & Mitchell, 1983: 52, figs 8–9 (2 N.Z. specimens, estuarine and coastal marine ecotype of same species, *G. spinifera* is "therefore probably a junior synonym of *G. digitale*"); Baldwin, 1987: 547, fig. 7 (as *G.* cf. *G. digitalis*, Marlborough Sounds: "... the cysts isolated did not exhibit the bifurcate and trifurcate processes commonly associated with *Gonyaulax digitale* cysts (Dodge, 1982a)"); Taylor, 1987c: 76; Sweeney, 1987: 270; Balech, 1988: 166 (diag., taxon., distrib., ecol.), pl. 74, figs 7–9.

Gonyaulax grindleyi Reinecke, 1967

Reinecke, 1967: 157–160, text-figs 1A–D, 1–3, pl. 1; Stosch, 1969a: 536–537 (transfer of "organism known under the name of *Protoceratium reticulatum* (Clap. & Lachm.) ... into the genus *Gonyaulax*; its correct name is *G. grindleyi* (Reinecke, 1967)."); includes also — Bergh, 1882: 242–244, pl. 14, fig. 36 (as *Protoceratium aceros*); Bütschli, 1885: 1007, pl. 52. fig. 2; Paulsen, 1904: 24, fig. 10 (as *Peridineum subinerme* n. sp.) [*q.v.*]; Paulsen, 1907: 18, figs 26–27 (as *P. subinerme* Paulsen — also the following refs — Paulsen, 1908: 40 (in key), 60–61 (descr.), text-figs 78a-f; Lebour, 1925: 114–115 (descr., distrib., refs), pl. XXII, figs 2a-f; Schiller, 1937: 243–245 (descr., refs & syn.), text-figs 244a-c; Braarud, 1945: 15, text-fig 6, pl. 4, figs a-k (as *Protoceratium aceros*); Wood, 1954: 228 (in key), 254 (descr., distrib., syn., as *P. subinerme*), text-fig. 151; also as *P. subinerme* — Trégouboff & Rose, 1957: 111; Cassie, 1961: 20, 49 (N.Z. localities); Cassie, 1963: 9 (table 2) (S. of N.Z., TAE Stn 408); Wood, 1964b: 566 (ecol.); Halim, 1967: 748 (ecol.), pl. VI, fig. 84, pl. VII, fig. 85; Wood, 1968: 109 (descr.) fig. 330; Stosch, 1968: 558–568; Stosch, 1969: 569–577; Grindley, 1970: 1–15 *passim* (blooms, toxicity, etc.); Grindley & Nel, 1970: 36–58 (red-water and mussel poisoning); Balech, 1971: 161–162 (descr., etc.), pl. XXXV, figs 670-676 (as *G. grindleyi*; but see also pp. 91–92, pl. XV, figs 249–252, pl. XVI, figs 252–257 (as *P. subinerme* Paulsen); Drebes, 1974b: 143 (descr.), fig. 127; Travers & Travers, 1975: 266; Dale, 1976: 53, etc., table II (taxon. correlation with cysts); Taylor, 1976: 109 (discuss. re identity with *P. reticulatum*); Horstman, 1981: 71–88 *passim* (red-water outbreak, shellfish poisoning etc. off South Africa); Dodge, 1982a: 207 (in key), 210–211 (descr., syn. etc.), figs 25 G–I, pl. VI, fig. b; Harland, 1983: 330, 386 (cyst, distrib. etc. as *Operculodinium centrocarpum* (Deflandre & Cookson)), text-fig. 6, pl. 43, figs 9–10; Han & Yoo, 1983b: 54–55 (descr., refs etc.), pl. VI, figs 10–11; Dodge & Lee, 1985: 34, fig. 49; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Baldwin, 1987: 545–547, figs 4–5 (descr. of motile cells etc., distrib., Marlborough Sounds); Taylor, 1987d: 445, 446, 460, 476 (*G. grindleyi*); Withers, 1987: 324, 341, 342 (sterols, *Protoceratium reticulatum*); Pfiester & Anderson, 1987: 618; Balech, 1988: 169 (diag., taxon., distrib., ecol.), pl. 77, figs 1–5; Hallegraeff, 1988: 73, 74 (SEM photos — cyst as *Operculodinium centrocarpum*); Dodge, 1989: 278 (junior synonym of *Protoceratium reticulatum*).

Gonyaulax hyalina Ostenfeld & Schmidt, 1902

Ostenfeld & Schmidt, 1902: 172, fig. 24; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay [first N.Z. record]).

Gonyaulax inflata (Kofoid, 1907)

Kofoid, 1907: 168–169, pl. 2, fig. 15 (*Steiniella*); Kofoid, 1911: 202, 204; Schiller, 1937: 308 (descr.), text-fig. 319; Rampi, 1950: 7–8, fig. 2 ("Dana" Stn 3651, off N.Z.); Balech, 1962: 157–159 (detailed descr.), pl. XXII, figs 343–348; Taylor, 1974: 196 ("Dana" record listed); Taylor, 1976: 103–104 (features, refs), pl. 36, fig. 417.

Gonyaulax minima Matzenauer, 1933

Matzenauer, 1933: 450, fig. 17; Schiller, 1937: 287, text-figs 291a-b, 292c-e; Kiselev, 1950: 217 (in key), 221, figs 383 a-d; Wood, 1954: 257 (in key), 264–265 (descr., distrib., syn.), text-fig. 179; Cassie, 1963: 8 (table 2) (S. of N.Z.); Wood, 1964b: 559; Wood,

1968: 59 (descr.), fig. 153; Sournia, 1973: 33 (listed); Burns & Mitchell, 1983: 51–52, figs 1–3 (N.Z. specimens).

Gonyaulax monacantha Pavillard, 1916

Pavillard, 1916: 21, pl. 1, fig. 78; Schiller, 1937: 287–288 (descr.), text-fig. 293; Rampi, 1943b: 320–321 (descr.), text-fig. 2; Massuti & Margalef, 1950: 62, fig. 129; Wood, 1954: 257 (in key), 260–261 (descr., distrib.), text-figs 169a-b; Trégouboff & Rose, 1957: 112, pl. 24, fig. 2; Cassie, 1961: 18, 48 (N.Z. record from Foveaux Strait); Wood, 1964b: 559 (ecol.); Wood, 1968: 60 (descr.), fig. 155; Saifullah & Hassam, 1973: 145, fig. 3; Taylor, 1974: 195 (Cassie's 1961 record listed); Taylor, 1976: 105 (features, refs & syn.), pl. 35, fig. 402; Shim *et al.*, 1981: 71–72, pl. IX, fig. 31; Andreis *et al.*, 1982: 227, fig. 22 (thecal surface).

Gonyaulax polyedra Stein, 1883

Stein, 1883: 13, pl. 4, figs 7–9; Schütt, 1896: 21 (descr.), fig. 29; Paulsen, 1907: 7, fig. 5; Paulsen, 1908: 28 (in key), 31–32 (descr., refs), text-fig. 40; Kofoid, 1911: 238, 244–245 (incl. injury to benthic species, discolouration etc., syn.), pl. 12, figs 16–20, pl. 14, figs 28–29, 31, pl. 17, fig. 43; Lebour, 1925: 97 (descr., distrib.), pl. XIV, figs 3a-d; Lebour *in* Russell & Yonge, 1936: pl. 40, fig. 4 (coloured); Schiller, 1937: 291–292 (descr., refs), text-figs 299a-f; Rampi, 1943b: 321–323 (descr.), text-fig. 14; Santos-Pinto, 1949: 94–96 (red-water bloom); Kiselev, 1950: 217 (in key), 222 (descr., refs), figs 386a-g; Massuti & Margalef, 1950: 62, fig. 131; Nordli, 1951: 207–212 (resting spores); Hayes & Austin, 1951: 530–541; Wood, 1954: 257 (in key), 261 (descr., distrib.), text-figs 171a-b; Haxo & Sweeney, 1955: 415–420 (bioluminescence), figs 1–2; Hastings & Sweeney, 1957: 209–225, figs (luminescent reactions); Sweeney & Hastings, 1957: 115–128 (luminescence diurnal rhythm); Trégouboff & Rose, 1957: 112, pl. 24, fig. 3; Brongersma-Sanders, 1957: 981, 983; Sweeney & Hastings, 1958: 217–224 (cell division); Hastings & Sweeney, 1958: 440–458 (diurnal rhythm of luminescence, ref)s, figs 1–10; Sweeney *et al.*, 1959: 285–299 (effects of light on luminescence); Hastings & Sweeney, 1959: 567–584 (bioluminescence); Sweeney, 1960: 145–148; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18, 20, 48 (N.Z. localities); Schradie & Bliss, 1962: 214–221 (cultivation and toxicity), figs; Bode *et al.*, 1963: 913–915 (luciferin activity); Reish, 1963: 265–270 (mass-mortality effects, refs); Sweeney, 1963: 177–181; Bode & Hastings, 1963: 488–499 (bioluminescence system); DeSa, 1964: thesis (discovery etc., bioluminescent particles); Russell, 1965: 265 (table I) (toxic nature); Hand *et al.*, 1965: 90–101 (swimming rates), figs 1–6; Halstead, 1965: 160 (toxic nature; see also Ballentine & Abbott (1957)); Brongersma-Sanders (1957); Price & Tschabold, 1966: 14–15; Reynolds *et al.*, 1966: 403; Cassie, 1966: 583 (Hauraki Gulf); Bouck & Sweeney, 1966: 205 *et seq.* (fine structure of trichocysts), figs 2–5, 10–16; Patton et al., 1966: 576–579; Torpey & Ingle, 1966: 1–28 (red tide, refs, etc.); Soli, 1966: 355–363 (bioluminescence); Patton *et al.*, 1967: 789–790 (food value); Wall *et al.*, 1967: 84–86 (cultures and resting spores), text-figs 1–2; Wall & Dale, 1968: 271–272 (resting spores, refs), pl. 1, figs 17–18, pl. 3, figs 3–6; DeSa & Hastings, 1968: 105–122 (bioluminescent particles, characterisation); Wood, 1968: 60 (descr.), fig. 156; Curtis, 1968: 99–101 (pop. acc. ofrhythms), figs 3.6–3.7; Dragovich, 1969: 175, text-figs 2a, 7, 8(4); Biggley *et al.*, 1969: 96–122 (bioluminescence), 14 figs; Loeblich, 1969: 870, 892, fig. 7 (cellular covering); Seliger *et al.*, 1969: 227–232 (photon emission), 2 figs; Steinger & Williams, 1970: 31 (in key), 51, fig. 63; Polikarpov & Tokareva, 1970: 66–69 (cellular cycle), text-figs 1–2; Dodge & Crawford, 1970: 54, 59 (fine structure), pl. 4, D, table 1: Schmitter, 1971: 147–173 (fine structure), 1 fig., 14 pls; Dodge, 1972: 292 (pusule morphol.); Bush & Sweeney, 1972: 446–451 (circadian rhythm of photosynthesis); Gaudsmith & Dawes, 1972: 123–132 *passim* (comparative ultrastructure); Robinson, 1972: 71–82, figs (distrib.); Anon., 1972: 149–150 (red-tide toxicity); McMurray & Hastings, 1972b: 1137–1139 (circadian rhythms); Fogel *et al.*, 1972: 305–317 (bioluminescent particles, identity); Hamman & Seliger, 1972: 397 (bioluminescence); Reid, 1972: 939–944 *passim*, table 1 (cyst as *Lingulodinium machaerophorum* (Deflandre & Cookson)); Taylor, 1973: 491 (Hauraki Gulf ecol.); Saifullah & Hassan, 1974: 144–145, fig. 2; Schmitter, 1973 thesis: (bioluminescence); Taylor, 1974: 196 (N.Z. listing, "widely distributed. 15 records"); Dürr & Netzel, 1974: 21–41 (fine structure); Sournia 1974: 325–389; Sarjeant, 1974: 29, 75, text-fig. 20a, pls 1–2; Prakash, 1975: 121–128 (blooms, an overview, refs, etc.); Hastings, 1975: 235–248 (bioluminescence, refs); Wall, 1975: 253 (possibly "multi-specific"); Eppley & Harrison, 1975: 11–22 (physiol. ecol.); Oguri *et al.*, 1975: 41–46 (red tides); Sweeney, 1975: 225–235 (red tides); Jeffrey *et al.*, 1975: 374–384 *passim* (chloroplast pigment patterns); Sweeney, 1976: 451–461 (thecal membranes); Harrison, 1976: 191–209, 6 figs (nitrate metabolism, refs); Dale, 1976: 53 etc., table II (taxonomic correlation with cysts); Taylor, 1976: 106–107 (features, refs), pl. 35, fig. 396; Scura & Jerde, 1977: 579–583 (as fish food); Blasco, 1977: 255–263 (red tide); Taylor, 1978: 217 (Leigh area records);

MacIsaac, 1978: 1–9 (nitrogen uptake cycles); Dale & Yentsch, 1978: 41–49 (red tide, shellfish poisoning, refs), 10 figs; Prézelin & Sweeney, 1978: 27–35 (photoadaptation); Prézelin & Sweeney, 1979: 101–106 (photosynthesis); cf. Taylor, 1979: 47–56; Dürr, 1979: 55–87, pls 1–11 (thecal growth, and division); Sweeney, 1979: 37–40; Govindjee *et al.*, 1979: 405–411 (chlorophyll fluorescence); Dunlap & Hastings, 1981: 10509–10518 (control of luciferase activity); Kobayashi *et al.*, 1981: 53–57 (cysts), pl. I; Shim *et al.*, 1981: 72, pl. XII, figs 38a-d; Meeson & Sweeney 1982: 241–245 (temperature adaptations, etc.); Dodge, 1982a: 207 (in key), 211–212 (descr. etc.), figs 25D–F, pl. VI, fig. a; Andreis, 1982: 227, fig. 20 (thecal surface); Prézelin, 1982: 129–135, 9 figs (light intensity/ageing); Harland, 1983: 328–329, 386 (cyst, distrib. etc. as *Lingulodinium machaerophorum* (Deflandre & Cookson)), text-fig. 4, pl. 43, figs 5–6; Burns & Mitchell, 1983: 52, fig. 7 (N.Z. specimens); Harding *et al.*, 1983: 84–85 (refs to photosynthesis etc.); Prézelin & Matlick, 1983: 141–150 (low-light adaptation); Sweeney *et al.*, 1983: 457–465 (stimulation of bioluminescence); Volknandt & Hardeland, 1984: 493–500, figs 1–9; Hoffmann & Hardeland, 1985: 39–43 (membrane fluidity and bioluminescence, refs), figs 1–3; Lalami-Taleb *et al.*, 1985: 159–166 (blooms); Marasovic & Pucher-Petkovic, 1985: 221–223 (eutrophication effects); Prézelin *et al.*, 1986: 1–12 (photosynthesis); Balzer, 1986: 440 (bioluminescence/rhythms); Balech, 1986: 86; Migas, 1986: 3[1] (molluscan toxicity); Rensing, 1986: 5–15; SooHoo *et al.*, 1986: 197–214 (absorption spectra); Rivkin & Voytek, 1986: 199 *et seq.* (cell division); Broda *et al.*, 1986: 251–263 (bioluminescence); Schroder-Lorenz & Rensing, 1986: 315–323 (protein synthesis); Hastings & Dunlap, 1986: 307–327 (bioluminescence/proteins); Nealson *et al.*, 1986: 77–83 (ident./bioluminescence); Lalami-Taleb *et al.*, 1986: 185 (population structure); Baldwin, 1987: 547, fig. 6 (descr. of cysts etc., distrib. Marlborough Sounds); Bary & Jenkinson, 1987: 29; Fraga, 1987: 19; Jenkinson, 1987: 47; Anderson *et al.*, 1987: 340 *et seq.* (life cycle/effects on); Balch, 1987: 107–118 (metabolism); Boczar & Prézelin, 1987: 805–812 (proteins); Thorey *et al.*, 1987: 85–89 (cell cycle); Nicholas *et al.*, 1987: 723–735 (bioluminescence); Harding *et al.*, 1987: 403–437 (photosynthesis); Schroder-Lorenz & Rensing, 1987: 7–13 (protein synthesis); Turner *et al.*, 1987: 98–102 (toxins); Taylor, 1987c: 25, 50–53; Dodge, 1987: 93, 95, 105 (ultrastructure); Rizzo, 1987: 145 (biochem./nucleus); Prézelin, 1987: 180, 185–187, 189, 191, 198, 199, 201–205, 207–210, 213–215, 217 (photosynthesis); Gaines & Elbrächter, 1987: 226, 235 (nutrition); Sweeney, 1987: 269–271, 273–276 (bioluminescence); Shimizu, 1987: 283, 284 (toxin); Withers, 1987: 317, 341 (sterols); Pfiester & Anderson, 1987: 619 (reprod.); Levandowsky & Kaneta, 1987: 383 (behaviour); Taylor, 1987d: 406, 411, 412, 414, 415, 422, 426, 429, 430, 439, 444, 459, 464, 466, 469, 470, 476; Homma & Hastings, 1988: 49–58; Vicker *et al.*, 1988: 5–17 (cell cycles); Lewis, 1988: 701–714 (cysts/sediment); Lewis & Burton, 1988: 49–60 (cell structure); Anderson *et al.*, 1988: 277–278 (luminescence); Blanco, 1988: 335–344 (vertical distrib./sediment); Costas *et al.*, 1988: 555–562 (ultrastructure); Homma, 1988: 3183 (cell division); Roenneberg & Hastings, 1988: 206–207 (circadian functions); Roenneberg *et al.*, 1988: 432–434; Griffis & Chapman, 1988: 305–314 (darkness/growth); Balech, 1988: 170–171 (diag., taxon., distrib., ecol.), pl. 75, figs 17–24; Wu, 1988: 305 (vertical distrib./red tide); Martin-Jezequel *et al.*, 1988: 303–313 (protein content); Ekelund & Hader, 1988: 1109–1114 (orientation); Balzer & Hardeland, 1989a: 297–310 (luminescence, neurophysiol.); Balzer & Hardeland, 1989b: 129–132 (bioluminescence); Marasovic, 1989: 35–41 (en/excystment); Roenneberg *et al.*, 1989: 201–216 (behaviour/vertical migration); Homma & Hastings, 1989a: 635–644 (cell division); Homma & Hastings, 1989b: 303–318 (cell cycle/growth); Broda *et al.*, 1989: 327–333 (circadian functions); Johnson & Hastings, 1989: 405–415 (circadian functions); Vernet *et al.*, 1989: 365–371 (red tide irruption etc.); Morse *et al.*, 1989a: 172–176 (luminescence/circadian regulation); Morse *et al.*, 1989b: 11822–11826 (luminescence/circadian reaction); Dodge, 1989: 291 (referred to *Lingulodinium* Wall, 1967, as cyst); Cetta & Anderson, 1990: 69–84 (cell cycles); Milos *et al.*, 1990 : 87–89 (protein synthesis).

Gonyaulax polygramma Stein, 1883

Stein, 1883: pl. 4, fig. 15; Schiller, 1937: 292, figs 300a-j; Nishiwaka, 1901: 31–34 (red-water effects); Massuti & Margalef, 1950: 62, fig. 132; Wood, 1954: 261, figs 172a-c; Taylor, 1962: 237–242 (taxon. related to morphol.); Wood, 1963b: 25 (refs); Wood, 1964a: 48–49 (east-central N.Z.); Grindley & Taylor, 1964: 111–130, pl. XIII (red water/mortality effects); Steidinger, 1968: 1–5 (descr., morphol. and thecal develop.), figs 1–14; Wood, 1968: 60 (descr., range), fig. 157; Grindley, 1970: 1–15 *passim* (blooms, toxicity, etc.); Saifullah & Hassan, 1973: 145, fig. 3; Sarjeant, 1974: 9; Taylor, 1974: 196 (Wood's record listed), pl. 35, fig. 398; Ricard, 1974: 126, 129 (SEM morphol.), pl. 2, figs 12–16; Taylor, 1976: 107 (features, refs etc.); Bodeanu & Usurelu, 1979: 151–154 (blooms); Ferraz-Reyes *et al.*, 1979: 155–160; Kamykowski, 1980: 39–43 (thermocline behaviour, refs); Filimonov & Tyul'kova, 1981: 43–49 *passim*, fig. 3,

table 1 (bioluminescence/stimulus); Dodge, 1982a: 207 (in key), 212 (descr., etc.), fig. 26J; Andreis *et al.*, 1982: 227, fig. 19 (thecal surface); Burns & Mitchell, 1983: 52, figs 4-6 (N.Z. specimens); Han & Yoo, 1983b: 55 (descr., refs etc.), pl. VII, fig. 6; Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound); Hallegraeff, 1987: 4, fig. 5; Taylor, 1987c: 50; Sweeney, 1987: 270 (bioluminescence); Levanadowsky & Kaneta, 1987: 383, 385 (behaviour); Taylor, 1987d: 426, 460; Pfiester & Anderson, 1987: 618; Chang *et al.*, 1990: table 1 (record of bloom, Breaksea Sound, 1987), table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989); Balech, 1988: 167 (diag., taxon., distrib., ecol.), pl. 74, figs 11–15.

Gonyaulax cf. **G. sphaeroidea** Kofoid, 1911, Burns & Mitchell, 1983

Burns & Mitchell, 1983: 56, fig. 11 (single N.Z. specimen from NZOI Stn N482 tentatively attributed to *G. sphaeroidea* Kofoid, 1911: 206, pl. 16, figs 41-42 ("However some reservation remains ..."); cf. Schiller, 1937: 296–297 (descr. etc.), figs 304a-d; Rampi, 1943b: 324; Gaarder, 1954a: 26, fig. 29; Balech, 1988: 169 (diag., taxon., distrib., ecol.), pl. 76, figs 2-6.

Gonyaulax spinifera (Claparède & Lachmann, 1859)

Claparède & Lachmann, 1859: 405, pl. 20, figs 4–5 (*Peridinium*); Diesing, 1866: 96, 382 (*Gonyaulax*); Paulsen, 1907: 8, fig. 8 (as *G. levanderi* (Lemmermann)); Paulsen, 1908: 28 (in key), 29–30, fig. 37 (*G. spinifera*), 28 (in key), 30–31, text-figs 38a-d (as *G. Levanderi*); Kofoid, 1911: 209–214 (syn.), text-figs A–D, pl. 10, figs 8–10, pl. 16, fig. 39; Lebour, 1925: 92 (descr., distrib., syn.), pl. XIII, figs 1a-b; Abé, 1927: 387, fig. 7; Martin, 1929: 23 (descr.), pl. III, fig. 33; Böhm, 1936: 33, figs 13a-b; Schiller, 1937: 297 (refs & syn.), text-figs 305a-n; Margalef & Durán, 1953: 33, figs 8p-q; Wood, 1954: 257 (in key), 263 (descr., distrib., syn.), fig. 174; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 20, 48, (N.Z. localities); Cassie, 1963: 9 (table 2) (S. of N.Z., TAE Stn 416); Wood, 1963b: 25 (refs); Silva, 1963: 1–24; Wood, 1964b: 559 (ecol.); Loeblich & Loeblich, 1966: 33 (listed as type species of *Gonyaulax* Diesing, 1866: 305, 382); Wall & Dale, 1968: 269–270 (resting spores, refs), pl. 1, figs 6–12, pl. 3, fig. 12; Wood, 1968: 61 (descr.), fig. 160 (incl. *G. digitale* and *G. polygramma* as ecoforms); Hada, 1970: 18, text-fig. 17; Steidinger & Williams, 1970: 31 (in key), 51; Wall & Dale, 1970: 51–52, text-figs 16–17, 19–22, pl. 1, figs 16–25 (derivation from *in vitro* germination of spores of *Spiniferites ramosus* (Ehrenberg)); Reid, 1972: 939– 944, table 1 (cyst as *Nematosphaeropsis balcombiana* Deflandre & Cookson); Sarjeant, 1974: 35, 60, 87, 90, pl. 5, figs 5-6; Taylor, 1974: 196 (records of Cassie, 1960 and 1961 listed); Drebes, 1974b: 143 (descr.), fig. 126; Dale, 1976: 53 etc. (taxon. correlation with cysts), pl. II; Balech, 1977b: 116–119, pl. I, figs 1–14; cf. Taylor, 1979: 47–56; Shim *et al.*, 1981: 72, pl. XI, pl. XII, figs 37a-f; Dodge, 1982a: 205 (type species of *Gonyaulax*), 207 (in key), 214–216 (descr., cyst types etc. —"... has always been a difficult species to identify with certainty ... There is no sharp dividing line between this species and *G. digitale*, and possibly *G. diegensis* and *G. alaskensis*."), figs 26C–F, pl. 6, fig. f; Andreis *et al.*, 1983: 227, fig. 23 (thecal surface); Harland, 1983: 327, 386, text-fig. 3, pl. 43, figs 3–4 (cyst, distrib. etc. as *Bitectatodinium tepikiense* Wilson), 329, 386, text-fig. 5, pl. 43, figs 7–8 (as *Nematosphaeropsis labyrinthea* (Ostenfeld)), 334, 386, text-fig. 11, pl. 44, figs 7–10 (as *Spiniferites elongatus* Reid (incl. *S. frigidus* Harland & Reid), 337–338, 386, text-fig. 13, pl. 45, figs 3–4 (as *S. membranaceus* (Rossignol)), 338, 386, text-fig. 14, pl. 45, figs 1–2 (as *S. mirabilis* (Rossignol)), 338, 386, text-fig. 15, pl. 45, fig. 8 (as *S. ramosus* (Ehrenberg) *sensu* Wall); Burns & Mitchell, 1983: 52 ("... probably a junior synonym of *G. digitale*"); Han & Yoo, 1983b: 55 (descr., refs etc.), pl. VI, figs 4–7; Dodge & Lee, 1985: 34, fig. 50; Baldwin, 1987: 545, figs 2–3 (descr., of cysts etc., distrib. Marlborough Sounds); Fraga, 1987: 19; Harland & Sharp, 1987: 25 *et seq.* (morphol./palaeoecol.); Bary & Jenkinson, 1987: 30; Hallegraeff, 1988: 71, 72 (SEM photos); Balech, 1988: 166 (diag., taxon., distrib., ecol.), pl. 74, figs 1–4; Riaux-Gobin & Lassus, 1989: 491-498 (irruption, red tide, etc.);

Gonyaulaux turbineyi Murray & Whiting, 1899

Murray & Whiting, 1899: 323, pl. 28, figs 4a-b; Chang, 1983a: 165 (Tasman Bay [first N.Z. record]); MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Balech, 1988: 168 (diag., taxon., distrib., ecol.), pl. 74, fig. 16, pl. 75, figs 1-4.

Gonyaulax sp. Lanigan, 1972

Lanigan, 1972: 170, fig. on p. 176 (Hauraki Gulf).

Gonyaulax spp. Burns & Mitchell, 1983

Burns & Mitchell, 1983: 56, fig. 12.

Gonyaulax spp. MacKenzie & Gillespie, 1986

MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay).

Gonyaulax sp. Bradford *et al.*, 1987

Bradford *et al.*, 1987: table 2 (listed from NZOI Stn T140, Pelorus Sound).

Gonyaulax sp. Baldwin, 1987

Baldwin, 1987: 547, fig. 8 (Marlborough Sounds: "Only one empty cyst was found ... appears similar to the fossil *Hystricosphaeridium recurvatum* (White) Lejeune-Carpentier (Deflandre & Cookson 1955).").

Genus **Protoceratium** Bergh, 1882

Protoceratium reticulatum (Claparède & Lachmann, 1859) [see also *Gonyaulax grindleyi* Reinecke, 1967]

Claparède & Lachmann, 1859: 405, pl. 20, fig. 3 (*Peridinium*); Bergh, 1882: fig. 36 (as *Protoceratium aceros*); Bütschli, 1885: 1007, pl. 52, fig. 2; Schütt, 1895: pl. 7, fig. 28; Schütt, 1896: 19 (descr.), text-fig. 27; Paulsen, 1907: 7, figs 3–4; Paulsen, 1908: 27 (descr., refs), text-figs 34a-c; Lebour, 1925: 89 (descr., distrib.), pl. XII, figs 7a-c; Martin, 1929: 22 (descr.), pl. IV, fig. 10; Schiller, 1937: 322–323 (descr., refs & syn.), text-figs 338a-d; Braarud, 1945: 1 (cysts); Massuti & Margalef, 1950: 61 (in key), fig. 126; Cassie, 1961: 20, 49 (N.Z. record from off New Plymouth); Trégouboff & Rose, 1957: 113 (key features); Evitt & Davidson, 1964: 5, pl. 1, fig. 12; Steidinger *et al.*, 1967: pl. V, fig. 5; Wall & Dale, 1968: 272 (resting spores), pl. 1, figs 19–21, pl. 3, figs 7–8; Wood, 1968 : 125 (descr.), fig. 389; Stosch, 1969: 563–567, text-figs 1A–D1–3, pl. 1 (transferred to *Gonyaulax grindleyi* Reinecke, 1967, *q.v.*); Steidinger & Williams, 1970: 37 (in key), figs 140a-c; Gaudsmith & Dawes, 1972: 123 *et seq.* (ultrastructure); Sarjeant, 1974: 195; Taylor, 1974: 196 (Cassie's 1961 N.Z. record listed); Jeffrey *et al.*, 1975: 374–384 *passim* (chloroplast pigment patterns); Travers & Travers, 1975: 266; Dodge, 1982a: 210–211 (under *Gonyaulax grindley, q.v.*); Burns & Mitchell, 1983: 56, fig. 13 (N.Z. specimens; "... common around the world ... but has not yet been well illustrated."); Sournia, 1986: 83 (generic diag.); Withers, 1987: 324, 341, 342 (sterols); Pfiester & Anderson, 1987: 618 (reproduction); cf. Balech, 1988: 169.

Genus **Protogonyaulax** Taylor, 1979

Protogonyaulax spp. MacKenzie *et al.*, 1986

MacKenzie *et al.*, 1986 : 402 (table 1 : Kenepuru Sound); cf. Cembella & Taylor, 1986 : 311–323; Cembella *et al.*, 1987 : 171–186.

Family HETERODINIIDAE/HETERODINIACEAE
Genus **Heterodinium** Kofoid, 1906

Heterodinium detonii Rampi, 1943

Rampi, 1943a: 152–155, text-figs 1–6; Rampi, 1950: 8 ("Dana" Stns 3624, 3626, off N.Z.); Trégouboff & Rose, 1957: 113 (key features), pl. 24, fig. 13; Sournia, 1973: 40 (listed); Dodge, 1982a: 252–253 (descr. etc. as *Palaeophalacroma unicinctum* Schiller, 1928: 65, fig. 27, incl. *H. detonii* Rampi), fig. 33J; Sournia, 1986: 76–77 (generic diag.); Balech, 1988: 156–157 (diag., taxon., distrib., ecol., etc. as *P. unicinctum* Schiller, incl. *Ebieridinium michaelsarsi* Gaarder, 1954).

Heterodinium dubium Rampi, 1941

Rampi, 1941a: 52, 58–59, pl. 1, fig. 4; Rampi, 1950: 8, fig. 14 ("Dana" Stn 3630, off N.Z.); Sournia, 1973: 40 (listed).

Heterodinium inaequale (Schiller, 1937)

Schiller, 1937: 342 (in key), 344–345 (descr., refs & syn.), text-figs 372a-c; Kofoid, 1907: 165, pl. 7, fig. 46 (as *H. laticinctum*); Pavillard, 1916: 40, pl. 2, figs 1–2 (as *H. kofoidi*); Rampi, 1950: 9, fig. 6 ("Dana" Stn 3641, off N.Z.); Wood, 1968: 73 (descr.), fig. 204; Taylor, 1976 : 118 (discuss., features), pl. 23, fig. 233 (*H. inaequale* Kofoid; *see* Kofoid & Adamson, 1933: 1–136, pl. 16, fig. 32).

Heterodinium minutum Kofoid & Michener, 1911

Kofoid & Michener, 1911: 285; Kofoid & Adamson, 1933: 34, figs 4–7, pl. 15, fig. 5; Schiller, 1937: 330 (in key), 331 (in subgenus *Sphaerodinium* Kofoid, 1906), fig. 345; Wood, 1968: 74 (descr.), fig. 208; Burns & Mitchell, 1982b: 76–79, fig. 23 (first N.Z. record); Balech, 1988: 153–154 (diag., taxon., distrib., ecol.), pl. 69, fig. 7.

Family OXYTOXIDAE/OXYTOXACEAE
Genus **Centrodinium** Kofoid, 1907
[syn. *Murrayella* Kofoid 1907, in part, *Pavillardinium* de Toni, 1936 in part]

Centrodinium pacificum Rampi, 1950

Rampi, 1950: 10, text-fig. 15 ("Dana" Stn 3651, off N.Z.) as *Pavillardinium (Murrayella)*); Sournia, 1973: 52 (listed); Taylor, 1976: 121 (transferred to *Centrodinium*).

Centrodinium splendidum (Rampi, 1941)

Rampi, 1941a: 54, 60–61, pl. 2, fig. 5 (*Murrayella*); Rampi, 1950: 9, text-fig. 9 ("Dana" Stn 3651, off N.Z.) (as *Pavillardinium (Murrayella)*); Trégouboff & Rose, 1957: 118; Sournia, 1973: 52 (listed); Taylor, 1976: 121 (transferred to *Centrodinium*).

Genus **Corythodinium** Loeblich & Loeblich, 1966
[syn. *Murrayella* Kofoid, 1907 in part,
Pavillardinium de Toni, 1936 in part]

Corythodinium compressum Kofoid, 1907
Kofoid, 1907: 188, pl. 10, fig. 63 (*Oxytoxum*); Schiller, 1937: 461, fig. 522; Wood, 1963b: 44, figs 162a-b; Taylor, 1976: 124 (discuss., transf. to *Corythodinium*), pl. 24, fig. 254; Burns & Mitchell, 1982b: 69–70, fig. 1 (first N.Z. record).

Corythodinium elegans Pavillard, 1916
Pavillard, 1916: 43, pl. 2, fig. 4 (*Oxytoxum*); Schiller, 1937: 464, fig. 530; Balech, 1971: 31, pl. 8, figs 138–141; Taylor, 1976: 123 (transf. to *Corythodinium*); Burns & Mitchell, 1982b: 70, figs 2–3 (first N.Z. record).

Genus **Oxytoxum** Stein, 1883

Oxytoxum gracile 1937
Schiller, 1937: 455, fig. 506; Wood, 1968: 90, fig. 259 (descr.); Sournia, 1986: 72–73 (generic diag.); Bradford *et al.*, 1987: 228, table 2 (listed from NZOI Stn T140, Pelorus Sound).

Oxytoxum laticeps Schiller, 1937
Schiller, 1937: 461, text-fig. 523; Wood, 1963a: 46, text-fig. 170; Wood, 1968: 190 (descr.), fig. 260; Taylor, 1976: 125–126 (descr., discuss.), pl. 24, fig. 249; Burns & Mitchell, 1982b: 70–74 figs 4–11 (first N.Z. records incl. *O. mediterraneum* Schiller, 1937: 459, 516; cf. Wood, 1968: 91 (descr.), fig. 262); Dodge, 1982a: 245–246 (descr., etc.), fig. 32J; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Hallegraeff, 1988: 88 (SEM photo.).

Oxytoxum longiceps Schiller, 1937
Schiller, 1937: 464–465, text-fig. 532; Rampi, 1950: 10, text-fig. 24 ("Dana" Stn 3630, off N.Z.); Massuti & Margalef, 1950: 61, fig. 125; Trégouboff & Rose, 1957: 118 (generic diag.); Balech, 1962: 167–168, pl. XIX, figs 288–289; Wood, 1963a: 46, text-fig. 171; Wood, 1968: 91 (descr.), fig. 261; Burns & Mitchell, 1982b: 74, figs 12–14 (descr. of N.Z. material).

Oxytoxum pachyderme Schiller, 1937
Schiller, 1937: 460, fig. 519; Wood, 1963b: 48, fig. 168; Taylor, 1976 : 127 (validation of name), pl. 24, fig. 250; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study).

Oxytoxum scolopax Stein, 1883
Stein, 1883: pl. 5, figs 1–3; Lebour, 1925: 141, fig. 44c; Schiller, 1937: 453–454 (descr., refs etc.), figs 502a-c; Wood, 1954: 315, fig. 245; Gaarder, 1954a: 38; Trégouboff & Rose, 1957: 118, pl. 27, figs 8A–B; Wood, 1963b: 34 (refs); Wood, 1968 : 93 (descr.), fig. 270; Taylor, 1976: 127–128 (descr., discuss.), pl. 24, figs 252–253, pl. 43, fig. 512; Burns & Mitchell, 1982b: 74–76, figs 15–17 (first N.Z. record); Dodge, 1982a: 246–247 (descr., distrib. etc.), fig. 32H; Balech, 1988: 182 (diag., taxon., distrib., ecol.), pl. 82, fig. 16.

Oxytoxum turbo Kofoid, 1907
Kofoid, 1907: 190, pl. 10, fig. 60; Schiller, 1937: 457, figs 512a-c; Wood, 1954: 315, fig. 246; Wood, 1968: 94 (descr.), fig. 274; Chang, 1983b: table 1 (first N.Z. record, West Coast productivity study); Balech, 1988: 181–182 (diag., taxon., distrib., ecol.), pl. 82, figs 13–15.

Oxytoxum sp. Lanigan, 1972
Lanigan, 1972: (Hauraki Gulf); Taylor, 1974: 198 (listed).

Oxytoxum spp. Taylor, 1974
Taylor, 1974: 200 ("Three unidentified *Oxytoxum* species [including that of Lanigan, 1972] occur in the Hauraki Gulf area").

Oxytoxum sp. 1, Chang, 1983
Chang, 1983b: 291, table 1 (West Coast productivity study).

Oxytoxum sp. 2, Chang, 1983
Chang, 1983b: 291, table 1 (West Coast productivity study).

Oxytoxum sp. 1, Bradford *et al.*, 1987
Bradford *et al.*, 1987: 228, table 2 (listed from NZOI Stn T140, Pelorus Sound);

Oxytoxum sp. 2, Bradford *et al.*, 1987
Bradford *et al.*, 1987: 228, table 2 (listed from NZOI Stn T1450, Pelorus Sound).

Family PERIDINIIDAE/PERIDINIACEAE
Genus **Diplopsalis** Bergh, 1882

Diplopsalis lenticula Bergh, 1882
Bergh, 1882: 244, 246, 249, figs 60–62; Stein, 1883: pl. VIII, figs 12–14, pl. IX, fig. 1; Schütt, 1896: 21–22 (descr.), text-figs 31A–B; Lemmermann, 1899: 315 (N.Z. record from French Pass; also *P. saccularis* Murr. & Whit.); Paulsen, 1908: 35–36 (in key, descr., refs), text-figs 44–45; Lebour, 1922: 795–798 (descr.,

ecol., refs etc.); Lebour, 1925: 99–100 (descr., distrib., syn. — not of Paulsen, 1908, except his ref. to Stein's pl. IX, fig. 1), pl. XV, figs 1a-e; Martin, 1929: 23, pl. IV, figs 11–13; Schiller, 1937: 103–107 (descr., forms, refs & syn.), text-figs 95a-h (*Glenodinium*); Kiselev, 1950: 131 (in key), 136 (descr.), figs 217a-e (in *Glenodinium*); Wood, 1954: 222 (descr., distrib.), text-figs 86a-c; Trégouboff & Rose, 1957: 109 (key features), pl. 23, figs 6A–B; Yamaji, 1959: fig. on p. 112; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities); Newell & Newell, 1963: 40, pl. XI, fig. 9; Wood, 1964b: 557 (ecol.); Loeblich & Loeblich, 1966: 27 (listed as type sp. of *Diplopsalis* Bergh, 1881: 244, 246); Steidinger *et al.*, 1967: pl. VI, fig. d; Wall & Dale, 1968: 279, text-fig. 7, pl. 4, fig. 19; Wood, 1968: 54 (descr.), fig. 132; Loeblich, 1969: 905 (*Dissodinium* Abé, 1941 substituted for some species within this genus because *Diplopsalis* preoccupied under International Rules of Zoological Nomenclature, but see Dodge & Hermes, 1981: 20, *Diplopsalis* available under International Code of Botanical Nomenclature 1979 and, therefore, conserved "as this name is central to any discussion of this group of dinoflagellates ..."; but see p. 22 for species included in *Dissodinium* group as differentiated); Steidinger & Williams, 1970: 29 (in key), 49, fig. 51; Subrahmanyan, 1971: 3–5 (descr., refs, etc.), pl. I, figs 1–3, 5, 7–9, 16, pl. III, figs 1–3, 8, 10; Taylor, 1976: 130–131 (refs etc.), pl. 28, figs 298–299; Dodge & Hermes, 1981: 18, figs 3–5; Abé, 1981: 25 (in key), 26–28 (and subsequent pages for other forms hitherto confused with this species, descr., discuss., etc.), fig. 3(4–6); Sournia, 1986: 87–88 (generic diag.); Taylor, 1987c: 63; Gaines & Elbrächter, 1987: 247 (nutrition).

Diplopsalis sp. MacKenzie & Gillespie, 1986
MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay).

Diplopsalis sp. Baldwin, 1987
Baldwin, 1987 : 550, fig. 25 (Marlborough Sounds).

Genus **Oblea** Balech, 1964

Oblea rotunda (Lebour, 1922)
Lebour, 1922: 804–808, text-figs 16–20 (*Peridinio psis*); Lindemann, 1924: 3, pl. 1, figs 10–13 (as *P. limnophilum*); Lebour, 1925: 101 (descr.), pl. XV, figs 4a-e; Lindemann, 1928: 91; Woloszynska, 1928: 189, 260, pl. VI, figs 11–17; Schiller, 1937: 107 (descr. ,etc.), text-figs 98a-e, 269A a-d (*Glenodinium*); Kiselev, 1950: 131 (in key), 137–138 (descr.), figs 223a-e; Wood, 1954: 223 (descr., distrib., misspelt as *rotundata*), text-figs 88a-b; Cassie, 1960a: 169 (E. of N.Z.) (in *Diplopsalis*; misspelt as *rotundata*); Cassie, 1961: 18 (N.Z. record from Hauraki Gulf); Wood, 1964a: 47 (ecol.); Wood, 1964b: 558; Wood, 1968: 54 (descr.), fig. 134; Steidinger & Williams, 1970: 29 (in key), 49; Subrahmanyan, 1971: 6 (descr., syn. etc.), pl. IV, figs 9–12, 14 (as *Peridiniopsis*); Sournia, 1973: 49 (status of *Oblea* etc., listed); Taylor, 1974: 195 (N.Z. records in genus *Oblea*, following Balech (1964)); Elbrächter, 1975: 61–62 (comparison with *Zygabikodinium pseudooblea* n.sp.); Taylor, 1978: 217 (Leigh record, Feb. 1974); Dodge & Hermes, 1981: 24; Dodge, 1982a: 152 (in key), 159 (descr., distrib. etc.), figs 18A–B; Dodge & Lee, 1985: 35, fig. 53; Sournia, 1986: 89–90 (generic diag.).

Oblea sphaeroideum (Stein, 1883)
Stein, 1883 : pl. 5, fig. 9 (*Oxytoxum*); Lebour, 1925: 140, fig. 44a; Schiller, 1937: 452, fig. 498 (descr., refs), fig. 498; Gaarder, 1954a : 38; Taylor, 1978 : 217 (Leigh records as *Oblea sphaerodium*).

Oblea sp. 1, Taylor, 1978
Taylor, 1978: 217 (Leigh records).

Oblea sp. 2, Taylor, 1978
Taylor, 1978: 217 (Leigh records).

* Genus **Protoperidinium** Bergh, 1881

Protoperidinium affine Balech, 1958
See Cassie (1963) entry under *Protoperidinium pellucidum* Bergh, 1881.

* Despite Loeblich's (1968) proposal of the name *Archaeperidinium* for marine peridinians, Balech (1971a: 3, 195) kept the name *Peridinium* "pending further studies on plate patterns". However, since the type species of *Peridinium* Ehrenberg, 1830 [1832] is the fresh-water *P. cinctum*, Balech (1974) has now "adopted the name *Protoperidinium*, Bergh, 1881 coined by Bergh, for the marine species ...". Balech redefined the genus *Protoperidinium*, analysed the general structural characters, and listed 231 transferred species, although this "does not intend to be a complete catalogue of the valid taxa today", also followed by Parke & Dixon (1976: 545, 549, note 63). However, F.J.R. Taylor (1976: 135) has argued for conservation of *Peridinium* on procedural grounds. His footnote indicates that his "hope of forestalling the creation of large numbers of new combinations" was dashed by Balech's (1974) transference of 231 marine peridinia to *Protoperidinium*. See also Abé (1981: 52–54, 164 (as subgenus)) and Dodge (1982a: 164–172, incl. key) and new subfamily Protoperidiniinae with subgeneric groupings proposed by Balech (1988: 81 *et seq.*), also generic diagnosis by Sournia (1986: 84–87).

Protoperidinium ampulliforme (Wood, 1954)

Wood, 1954: 242, fig. 160 (*Peridinium*); Sournia, 1973: 53 (listed); Taylor, 1974: 195 (unpubl. N.Z. record from Leigh listed); Taylor, 1978: 217 (Leigh record of Feb. 1974 listed).

Protoperidinium applanatum (Mangin, 1915)

Mangin, 1915: 79–80, text-fig. 58 (*Peridinium*); Wood, 1954: 242, fig. 159 (*P. obovatum*); Balech, 1968b: pl. 12, map 9 (appears to have been recorded from within New Zealand region); Subrahmanyan, 1971: 32, pl. XVIII, fig. 4; Balech, 1971a: 129–130, pl. XXIV, figs 429–441; Balech, 1974: 45 (fig. XXIV.5–6), 59 (in *Protoperidinium*); Taylor, 1987d: 450.

Protoperidinium breve (Paulsen, 1905)

Paulsen, 1905: 4, figs 3a-c, (*Peridinium steini* forma *brevis*); Paulsen, 1907: 13 (*P. breve*); Paulsen, 1908: 46, text-fig. 56; Lebour, 1925: 132 (descr., distrib., refs), text-fig. 41c; Schiller, 1937: 198–200 (descr., refs & syn.), text-figs 194a-j; Paulsen, 1949: 5 (considered to be a form of *P. pyriforme* (Paulsen); Massuti & Margalef, 1950: 66 (in key), 67; Wood, 1954: 227 (in key), 241 (descr., distrib., syn. — may be a cold-water form of *P. steinii* Jörgensen, *q.v.*), text-figs 121a-d; Trégouboff & Rose, 1957: 110, pl. 23, fig. 12; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 20, 48 (N.Z. localities); Cassie, 1963: 9 (table 2); Wood, 1964b: 560 (ecol.); Wood, 1968: 98 (descr., range), fig. 286; Balech, 1971: 101–102 (descr., ecol. etc., as *P. pyriforme* Paulsen, 1905, subspecies *breve* Paulsen, 1905, new combination), pl. XVIII, figs 311–313; Subrahmanyan, 1971: 37–38 (as *P. breve* Paulsen, 1907, descr., refs & syn. incl. *P. steinii* forma *brevis* Paulsen, 1905), pl. XVI, figs 4–15; Taylor, 1974: 195 (N.Z. records listed); Abé, 1981: 176 (in key); Dodge, 1982a: 199.

Protoperidinium brevipes (Paulsen, 1908)

Paulsen, 1908: 108, text-fig. 151 (*Peridinium*); Lebour, 1925: 131–132 (descr., distrib., refs & syn.), pl. XXVII, figs 2a-d; Martin, 1929: 29 (descr.), pl. VII, figs 8–10; Schiller, 1937: 200–201 (descr., refs & syn), text-figs 195a-m; Wood, 1954: 227 (in key), 241 (descr., distrib., syn.), text-fig. 122; Cassie, 1960a: 169; Cassie, 1961 : 20 (N.Z. record from Wellington Harbour); Cassie, 1963: 9 (table 2) (S. of N.Z.); Wood, 1964b: 560; Wood, 1968: 98 (descr.), fig. 287; Balech, 1971: 144 (descr., ecol., etc.), pl. XXX, figs 561–577; Subrahmanyan, 1971: 38 (descr., refs & syn.), pl. XX, figs 1–12, pl. XXI, fig. 1; Drebes, 1974:b 134 (descr.), fig. 116; Taylor, 1974: 195 (listed Cassie's (1961) record from Wellington Harbour); Balech, 1974: 60 (transferred to *Protoperidinium*), figs XII (5), XIII (24), XVI (43), XIX (12); Abé, 1981: 179 (in key), 179–182 (descr., discuss., refs & syn. esp. as *P. varicans* Paulsen, 1911), fig. 10(a-e); Shim *et al.*, 1981: 66, pl. IV, figs 18a-b; Dodge, 1982a: 171 (in key), 190 (descr., refs etc.), fig. 22B, pl. IV, fig. d; Hallegraeff, 1988: 90 (SEM photo.); Balech, 1988: 105 (diag., taxon., distrib., ecol.), pl. 39, figs 6–9.

Protoperidinium brochi (Kofoid & Swezy, 1921)

Kofoid & Swezy, 1921: 183 (*Peridinium*); Lebour, 1925: 128 (as *P. adriaticum*); Böhm, 1936: 41, fig. 16d; Schiller, 1937: 221–222 (refs & syn.), text-figs 218 a-i; Wood, 1954: 228 (in key), 247 (distrib., syn.), text-fig. 135; Trégouboff & Rose, 1957: 111, pl. 23, fig. 15; Cassie, 1961: 20, 48 (W. of N.Z.); Riedl, 1963: 33, pl. 5; Wood, 1964a: 50–51 (ecol.); Wood, 1964b: 561; Halim, 1967: 734–735 (ecol., etc.) pl. VI, figs 72–73; Wood, 1968: 98 (descr.), fig. 288; Subrahmanyan, 1971: 93 (descr., refs & syn.), pl. LXII, figs 7–12, pl. LXIII, figs 7, 10, 12; Taylor, 1974: 195 (Cassie's (1961) record W. of Hawera listed); Balech, 1974: 60 (transferred to *Protoperidinium*); Taylor, 1976: 146–147 (taxon. problems, refs & syn.), pl. 31, figs 332, 335; Sweeney, 1987: 270; Balech, 1988: 108–109 (diag., taxon., distrib., ecol.), pl. 41, figs 4–7.

Protoperidinium claudicans (Paulsen, 1907)

Paulsen, 1907: 16, fig. 22 (*Peridinium*); Paulsen, 1908: 39 (in key), 55–56, text-figs 71a-d; Lebour, 1925: 123 (descr.), text-fig. 37; Martin, 1929: 26 (descr), pl. V, figs 1–3, pl. VII, fig. 3; Böhm, 1936: 44–45, fig. 19a; Schiller, 1937: 249 (descr., refs & syn.), text-figs 250a-g; Massuti & Margalef, 1950: 67 (in section Oceanica Jörg., key, p. 66), fig. 150; Wood, 1954: 228 (in key), 225 (descr., distrib., syn.), text-fig. 154; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 48 (N.Z. localities); Wood, 1964a: 51 (ecol.); Wood, 1964b: 561 (ecol.); Wall, 1965: 307, text-fig. 16 (as *P.* sp.); Halim, 1967: 735–736 (ecol.), pl. V, figs 70–71, pl. VIII, fig. 118; Wall & Dale, 1968: 273, pl. 1, fig. 30, pl. 2, figs 1–2, pl. 3, fig. 12 (resting spores); Wood, 1968: 99 (descr.), fig. 290; Yamaji, 1971: 89, pl. 43, fig. 3; Subrahmanyan, 1971: 83 (descr., refs), pl. LVII, figs 1–11; Tu & Chiang, 1972: 142, fig. 23; Hermosilla, 1973: 16 (in key), 24–26 (detailed descr., distrib., etc.), pl. 7, figs 1–11, pl. 8, figs 1–21; Taylor, 1974: 195 (unpubl. Hauraki Gulf and Leigh records listed and Cassie, 1960, 1961); Drebes, 1974b: 135 (descr.), fig. 117a; Sarjeant, 1974: 87; Balech, 1974: 57, fig. XIVI (4); Reid, 1977: 431 (table I), 445–446, pl. 2, figs 24–26 (cyst/theca correlation = *Votadinium spinosum* sp. nov.); Reid, 1978: 217 (Leigh records); Abé, 1981: 315 (in key), 323–324 (discuss. etc., refs & syn.), fig. 46 (298–299); Dodge, 1982a: 162 (in key), 182 (descr., cysts etc.), figs 20G–H; Harland, 1982:

380 (cyst), text-fig. 13; Harland, 1983: 367, 387, text-fig. 36, pl. 48, fig. 4 (cyst, distrib. etc. as *Notadinium spinosum* Reid); Han & Yoo, 1983b: 52 (descr., refs etc.), pl. IV, figs 6–9; Sweeney, 1987: 270; Levandowsky & Kaneta, 1987: 364, 383; Balech, 1988: 86–87 (diag., taxon., distrib., ecol.), pl. 24, figs 5–9.

Protoperidinium conicoides (Paulsen, 1905)

Paulsen, 1905: 3, text-fig. 2 (in subgenus *Euperidinium* of *Peridinium*); Paulsen, 1907: 18, Paulsen, 1908: 39 (in key), 58–59, text-figs 75a-e; Lebour, 1925: 112 (descr., distrib.), pl. XX, figs 2a-d; Schiller, 1937: 231–233 (descr.), figs 228a-d; Wood, 1954 : 228 (in key), 250 (descr., distrib.), text-fig. 145; Cassie, 1963: 9 (table 2) (S. of N.Z.); Wall & Dale, 1968: 277 (resting spores), pl. 2, figs 28–30, pl. 3, figs 26–28; Wood, 1968: 99 (descr.), fig. 291; Subrahmanyan, 1971: 66 (descr., refs), pl. XLI, figs 1–8; Balech, 1974 : 58 (*Protoperidinium*), figs II(2), VI(7), XIII(25), XV(46), XVII(13), XIX(18), XXII(4), XXVII(3); Dale, 1976: pl. I, fig. 13 (cyst); Matsuoka, 1976: 358–359 (descr., cyst form = *Chytroeisphaeridea simplicia* Wall, 1966: 308, text-figs 7 & 20), pl. II, figs 5–9; Reid, 1977: 431 (table I), 435–436, pl. 1, figs 3–4 (cyst/theca correlation, as *Brigantedinium simplex* comb. nov. from *Chytroeisphaeridia simplicia* Wall, 1965); Reid, 1978: 219–229; Abé, 1981: 347 (in key), 355–359 (desc., discuss., etc., refs), figs 50(336–347)–51(348); Harland, 1982: 382, 384 (cyst etc.), text-fig. 18, pl. 38, figs 1–3; Dodge, 1982: 170 (in key), 184–186 (descr., etc.), fig. 21A; Harland, 1983: 359, 387, text-fig. 29, pl. 47, figs 2–3 (cyst, distrib., etc. as *Brigantedinium simplex* (Wall)); Lewis *et al.*, 1984: 26 (cyst/theca relationships), text-figs 2e-f, pl. 1, fig. 5; Baldwin, 1987: 550, fig. 19 (Marlborough Sounds (as *P.* cf. *P. conicoides* (Paulsen) Balech, 1974: "The oblique compression typical of *P. conicoides* (Wall & Dale 1968a) was not always apparent but its distinctive archeopyle ... suggests the cysts are related to this species."); Balech, 1988: 92 (diag., taxon., distrib., ecol.), pl. 26, figs 7–11.

Protoperidinium conicum (Gran, 1900)

Gran, 1900: 47–48 (*Peridinium divergens* Ehrenberg var. *conica*); Ostenfeld & Schmidt, 1901: 174; Gran, 1902: 185, 189, fig. 14; Paulsen, 1908: 39 (in key), 58–59 (descr., refs & syn.), fig. 74; Lebour, 1925: 111 (descr., distrib.), pl. XIX, figs 1a-d; Schiller, 1937: 233 (descr., refs & syn.), text-figs 299a-j; Balech, 1949: 405–407, pl. VI, figs; Wood, 1954 : 228 (in key), 250–251 (descr., distrib., syn.); Trégouboff & Rose, 1957: 111, pl. 23, fig. 18; Yamaji, 1959: fig. on p. 112; Cassie & Cassie, 1960: 181 (table 1) (Waitarere Beach); Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 48 (N.Z. localities.); Klement, 1964: 351 (descr., dimensions, etc.), pl. 1, fig. 6; Wood, 1964b: 561 (ecol.); Wall, 1965: 308 (as *P.* sp.), text-figs 17, 23; Halim, 1967: 736 (ecol.), pl. VI, fig. 74; Wall & Dale, 1968: 273–274 (resting spores), pl. 2, figs 3–5, pl. 3, fig. 13; Wood, 1968: 99 (descr.), fig. 292; Subrahmanyan, 1971: 66–67 (descr., refs & syn.), pl. XLII, fig. 19, pl. XLIV, fig. 1; Hermosilla, 1973: 17 (in key), 32–33 (detailed descr., distrib.), pl. 14, figs 1–20; Taylor, 1974: 195 (N.Z. records listed: Cassie, 1960, 1961, Cassie & Cassie, 1960); Drebes, 1974b: 135–136 (descr.), fig. 117b; Balech, 1974: 58 (*Protoperidinium*), figs XVII(8), XXV(19); Dale, 1976: pl. I, fig. 17 (cyst); Taylor, 1976: 139–140 (var. etc., refs), pl. 33, figs 361–362; Dodge, 1977: 333; Reid, 1977: 431 (table I), 448–449, pl. 3, figs 30–33 (cyst/theca correlation = *Multispinula quanta* Bradford, 1975); Reid, 1978: 431 (table 1), 448–449 (correlation with cyst); Abé, 1981: 371–374 (descr., discuss., refs), fig. 55 (375–381); Filimonov & Tyul'kova, 1981: 43–49 *passim*, table 1 (bioluminescence/stimulation); Shim *et al.*, 1981: 67–68, pl. VI, figs 22a-c; Dodge, 1982a: 170 (in key), 186 (descr., cysts etc.), figs 21G–H; Sournia, 1982: 151–168; Harland, 1982: 384–385 (cyst descr. etc.), text-fig. 19, pl. 39, figs 1–3, pl. 42, figs 1 & 10; Harland, 1983: 362, 387 (cyst, distrib., etc. as *Selenopemphix quanta* (Bradford), new comb.), text-fig. 32, pl. 47, figs 9–10; Han & Yoo, 1983b: 53 (descr., refs etc.), pl. III, fig. 12; Gaines & Elbrächter, 1987: 249; Sweeney, 1987: 270; Balech, 1988: 87–88 (diag., taxon., distrib., ecol.), pl. 26, figs 1–4.

Protoperidinium crassipes (Kofoid, 1907)

Kofoid, 1907a: 309, pl. 31, figs 46–47 (*Peridinium*); Böhm, 1936: 41, fig. 16c; Massuti & Margalef, 1950: 67 (in section Divergentia Jörg., key, p. 66), fig. 151; Wood, 1954: 247, figs 137a-d; Wood, 1968: 99 (descr.), fig. 293; Taylor, 1974a: 195 (unpubl. N.Z. record from Jellicoe Channel listed); Elbrächter, 1975: 60 (comparison with *P. curtipes* Jörgensen, 1912, history of confusion etc.); Taylor, 1976: 147–148 (features, refs), text-fig. 4d, pl. 31, figs 327, 331; Abé, 1981: 262 (in key), 268–271 (discuss., descr., refs & syn.), fig. 3 (230–236); Filimonov & Tyul'kova, 1981: 43–49 *passim*, fig. 3, table 1 (bio-luminescence/stimulation); Shim *et al.*, 1981: 69, pl. IX, figs 28a-b; Han & Yoo, 1983b: 53 (descr., refs etc.), pl. IV, fig. 5; Dodge & Lee, 1985: 37, fig. 60; Baldwin, 1987: 549, fig. 13 (descr. of cysts etc., distrib. Marlborough Sounds); Gaines & Elbrächter, 1987: 247; Levandowsky & Kaneta, 1987: 383.

Protoperidinium curtum (Balech, 1958)

Balech, 1958: 393, pl. III, figs 62–70 (*Peridinium*); Cassie, 1963: 9 (table 2) (S. of N.Z.); Wood, 1954: 236,

figs 112c-d (as *P. ovatum* Pouchet); Balech & El-Sayed, 1965: 109; Hada, 1970: 18–19, text-fig. 19; Subrahmanyan, 1971: 99–100 (descr.), pl. LXIX, figs 1–9; Balech, 1974: 29 (fig. XIV.14), 38 (fig. XXII.1), 60; Sournia, 1973: 54 ("Sans diagnose latine", see also remarks on p. viii); Balech, 1974: 29 (fig. XVI.14), 38 (fig. XXII.1), 60 (*Protoperidinium*); Balech, Balech, 1976: 69, 72, fig. 51.

Protoperidinium curvipes (Ostenfeld, 1903)

Ostenfeld, 1903 [1906]: 581, fig. 128 (*Peridinium decipiens* var. *curvipes*); Paulsen, 1908: 38 (in key), 45 (descr., refs), text-fig. 55; Lebour, 1925: 135 (descr., distrib.), pl. XXXIX, figs 1a-c; Schiller, 1937: 20 (descr., refs & syn.), figs 197a-b; Wood, 1954 : 227 (in key), 242–243 (descr., distrib., syn.), text-fig. 124; Trégouboff & Rose, 1957: 111; Cassie, 1961: 20, 48 (N.Z. localities); Wood, 1968: 100 (descr.), fig. 294; Subrahmanyan, 1971: 49 (descr., refs), pl. XXVIII, figs 6, 9, 13, 15–16; Taylor, 1974: 195 (unpubl. record from Jellicoe Channel and Cassie (1961) listed); Drebes, 1974b: 137 (descr.), fig. 118c; Balech, 1974 : 65 (in *Protoperidinium*, remarks); Abé, 1981: 176 (in key); Dodge, 1982a: 172 (in key), 199–200 (descr., etc.), figs 22L–M; Balech, 1988: 117 (diag., taxon., distrib., ecol.), pl. 48, figs 9–15.

Protoperidinium depressum (Bailey, 1855)

Bailey, 1855: 12, figs 33–34 (*Peridinium*); Paulsen, 1908: 39 (in key), 53–54 (descr., refs), text-fig. 67; Lebour, 1925: 119 (descr., distrib., refs & syn.), pl. XXIII, figs a-f; Lebour *in* Russell & Yonge, 1936 [and later edns]: pl. 40, fig. 3 (coloured); Böhm, 1936: 45–46, fig. 17b; Schiller, 1937: 250–254 (descr., refs & syn.), text-figs 251a-t; Graham, 1942: 18–24 (detailed descr., classification of known varieties), figs 14, 21–22, 25, 27–28; Balech, 1949: 390–396, pls I–II; Massuti & Margalef, 1950: 67 (in Section Oceanica Jörg, key, p. 66), fig. 156; Wood, 1954: 228 (in key), 255 (descr., distrib., syn.), text-figs 155a-b; Hardy, 1956: pl. I, fig. 15 (coloured), pl. III; Trégouboff & Rose, 1957: 111, pl. 23, fig. 20; Yamaji, 1959: fig. on p. 31; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities); Fraser, 1962: frontisp., figs 45a-b, pl. VII, fig. 19; Newell & Newell, 1963: 40, pl. XI, fig. 7; Cassie, 1963: 9 (table 2) (S. of N.Z., Ross Sea etc.); Wood, 1963b: 38 (refs); Wood 1964b: 562 (ecol.); Klement, 1964: 349 (in Section Oceanica Jörgensen); Cassie, 1966: 584 (Hauraki Gulf); Halim, 1967: 739 (ecol.); Wood, 1968: 100 (descr.), figs 295a-b; Dodge & Crawford, 1970: 55, 59 (fine structure), table 1; Subrahmanyan, 1971: 80–82 (descr., refs & extensive syn.), pl. LIII, figs 8–10, pl. LV, figs 1–10, pl. LVI, figs 1, 11, pl. LXXVIII, figs 1–2, 4; Lanigan, 1972 : 170, fig. on p. 175 (Hauraki Gulf); Dodge, 1972: 294, fig. 12 (pusule morphol.); Hermosilla, 1973: 16 (in key), 27–28 (descr., etc.), pl. 10, figs 1–18; Sarjeant, 1974: 4, 22, 48, fig. 2; Taylor, 1974: 195 (listed "Widely distributed, 16 records"); Gocht & Netzel, 1974: 381–410, text-fig. 1, pls 43, 45–46, 51 (figs 1–3), 52 (fig. 3)); Drebes, 1974b: 137–138 (descr.), fig. 119; Balech, 1974: 57 (*Protoperidinium*); Taylor, 1976: 160–161 (status, refs & syn.), pl. 34, fig. 383, pl. 45, fig. 526; Dodge, 1977: 333; Taylor, 1978: 217 (Leigh records); Abé, 1981: 315 (in key), 321–323 (descr., discuss., etc. refs & syn.), fig. 45(290–297); Filimonov & Tyul'kova, 1981: 43–49 *passim*, figs 2–3, table 1 (bioluminescence/stimulation); Shim *et al.*, 1981: 70, pl. X, figs 32a-d; Dodge, 1982a: 169 (in key), 177–178 (descr. etc.), fig. 20A, pl. V, fig. e; Taylor, 1987a 6; Taylor, 1987c: 51; Gaines & Elbrächter, 1987: 239, 247; Sweeney, 1987: 270; Balech, 1988: 87 (diag., taxon., distrib., ecol.), pl. 25, figs 4–8.

Protoperidinium diabolum (Cleve, 1900)

Cleve, 1900: 16, pl. 7, figs 19–20 (*Peridinium*); Lebour, 1925: 135–136, pl. XXIX, figs 2a-c; Schiller, 1937: 204–205 (descr., refs & syn.), 273, figs 198a-h; Massuti & Margalef, 1950: 67 (in Section Pellucida Jörg., key p. 66), fig. 145; Wood, 1954: 243, fig. 125; Wood, 1963b: 38 (refs); Wood, 1968: 100 (descr., range), fig. 296; Trégouboff & Rose, 1957: 110 (in key, etc., incl. *P. formosum* Pavillard), pl. 23, fig. 13; Taylor, 1974: 196 (unpubl. first N.Z. record, from Jellicoe Channel listed); Balech, 1974: 66 (in *Protoperidinium*, remarks etc.); Balech, 197c6: 43–44, fig. 7; Taylor, 1976: 163 (features, variants, refs & syn.), pl. 32, fig. 354, pl. 45 fig. 525; Abé, 1981: 250 (in key); Dodge, 1982a: 172 (in key), 200 (descr., etc.), figs 23 D–E.

Protoperidinium divergens (Ehrenberg, 1840)

Ehrenberg, 1840a: 201 (*Peridinium*); Ehrenberg, 1844: 76, pl. V, fig. 7; Schütt, 1896: 22–23 (descr.), text-figs 14, 16, 32A–D; Lemmermann, 1899: 315 (N.Z. record from French Pass), 325, 326, 349; Pavillard, 1905: 57; Paulsen, 1907: 16, fig. 23; Paulsen, 1908: 39 (in key), 56–57 (descr., refs), text-figs 72a-h; Meunier, 1919: 1–59; Lebour, 1925: 127–128 (descr., distrib., refs & syn.), pl. XXVI, figs 2a-c; Haye, 1930a: 1 *et seq.*; Schiller, 1937: 226–228 (descr., refs & syn.), text-figs 222a-e; Dakin & Colefax, 1940: 60, fig. 67; Crawford, 1949: 174 (Cook Strait); Wood, 1954: 228 (in key), 248–249 (descr., distrib., syn.), text-fig. 139; Trégouboff & Rose, 1957: 111, pl. 23, fig. 17; Yamaji, 1959: fig. on p. 112; Cassie, 1961: 20, 49 (N.Z. record from Marlborough Sounds); Wood, 1963b: 38–39 (refs); Klement, 1964: 352 (descr., dimensions, etc.);

Wood, 1964a: 52 (ecol.); Wood, 1964b: 562 (ecol.); Steidinger *et al.*, 1967: pl. VIII, figs c-d; Wood, 1968: 101 (descr.), fig. 248; Subrahmanyan, 1971: 88–89 (descr., refs & syn.), pl. LIX, figs 1–2, pl. LXI, fig. 6; Taylor, 1974: 196 (N.Z. records listed); Drebes, 1974: 138 (descr.), fig. 118e; Balech, 1974: 60 (*Protoperidinium*); Taylor, 1976: 148 (features, status, refs etc.), text-figs 4a-b, pl. 31, figs 319–320, 324, pl. 46, fig. 530; Shim *et al.*, 1981: 69, pls IX, X, figs 29a-c; Abé, 1981: 262 (in key); Dodge, 1982a: 171 (in key), 193–194 (descr., etc.), fig. 22D; Chang, 1983b: table 1 (West Coast productivity study, as *Peridinium*); Han & Yoo, 1983b: 53 (descr., refs etc.), pl. V, figs 1–2; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay), as *Peridinium*); Sweeney, 1987: 270; Taylor, 1987d: 434, 433, 450; Hallegraeff, 1988: 91 (SEM photo.); Balech, 1988: 109–110 (diag., taxon., distrib., ecol.), pl. 41, figs 11–13, pl. 42, fig. 1.

Protoperidinium grani (Ostenfeld, 1903)

Ostenfeld, 1903 [1906]: 15 (*Peridinium*); Paulsen, 1907: 15, fig. 18 (in part); Paulsen, 1908: 39 (in key), 52 (descr., refs), text-figs 66b-f (not a); Meunier, 1919: 1–59; Lebour, 1925: 124–125 (descr., distrib.), pl. XXV, figs 2a-b; Schiller, 1937: 189–192 (descr., refs & syn.), text-figs 188a-g; Wood, 1954: 227 (in key), 238 (descr., distrib., syn.), text-figs 116a-c; Hardy, 1956: fig. 15a; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities); Newell & Newell, 1963: 40, pl. XI, fig. 6; Wood, 1968: 103 (descr.), fig. 304; Subrahmanyan, 1971: 46–47 (descr. etc., refs & syn.), pl. XXVI, figs 1–17; Balech, 1971a: 138–139 (descr., ecol., etc.), pl. XXVII, figs 514–519; Hermosilla, 1973: 15 (in key), 22–24 (detailed descr., forms, etc.), pl. 6, fig 1–17; Balech, 1974: 65 (in *Protoperidinium*, study of Ostenfeld's first descr. etc.), figs XII(2), XVII(16); Taylor, 1976: 150–151 (features, refs & syn. etc.), pl. 32, fig. 341; Staker & Bruno, 1980: 167–172 *passim* (diurnal migration); Abé, 1981: 179 (in key), 182–184 (descr., discuss., refs & syn.), fig. 11 (56–62); Dodge, 1982a: 171 (in key), 196 (descr., etc.), fig. 23A; Sweeney, 1987: 270 (bioluminescence); Balech, 1988: 107 (diag., taxon., distrib., ecol.), pl. 40, figs 9–12.

Protoperidinium humile (Schiller, 1937)

Schiller, 1937: 235–236, fig. 235 (*Peridinium*); Taylor, 1974: 1965 (unpubl. first N.Z. record from Leigh listed); Balech, 1974: 57 (in *Protoperidinium*; also prob. incl. *P. perbreve* Balech & de Oliveira Soares, 1966: 103, figs 1–10), figs XVI(5), XXV(15); Taylor, 1978: 217 (Leigh record of June 1966 listed); Balech, 1988: 188–189 (diag., taxon., distrib.), pl. 84, figs 7–12.

Protoperidinium leonis (Pavillard, 1916)

Pavillard, 1916: 32, text-fig. 6 (*Peridinium*); Lebour, 1925 : 112–113 (descr., distrib., refs & syn), pl. XXI, figs 1a-d; Martin, 1929: 27, pl. VI, figs 3–5; Schiller, 1937: 236–238 (descr., refs & syn.), text-figs 236a-m; Massuti & Margalef, 1950: 67 (in Section Conica Jörg., key, p. 66), fig. 153; Wood, 1954: 228 (in key), 251–253 (descr., distrib., syn.), text-figs 148a-c; Trégouboff & Rose, 1957: 111, pl. 23, fig. 19; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities.); Klement, 1964 : 351 (descr., dimensions etc.), pl. 1, fig. 9; Wood 1964b: 563; Cassie, 1966: 584 (Hauraki Gulf); Steidinger *et al.*, 1967: pl. VIII, fig. e; Wall & Dale, 1968: 276, pl. 2, figs 18–21, pl. 3, fig. 22; Wood 1968: 104 (descr.), fig. 310; Subrahmanyan, 1971: 68–69 (descr., refs & syn.), pl. XLIII, figs 1–13, pl. XLIV, figs 10–14; Hermosilla, 1973: 17 (in key), 34–36, pl. 16, figs 1–21; Sarjeant, 1974: 74; Taylor, 1974: 196 (N.Z. records listed); Balech, 1974: 58 (*Protoperidinium*), figs XXVII(2); Taylor, 1976: 141–142 (identif. features, refs etc.), pl. 33, fig. 369; Matsuoka, 1976 : 359 (thecate and cyst forms), pl. III, fig. 9; Balech, 1976c: 30–33, fig. 2; Reid, 1977: 431 (table I), 441–442 (cyst/theca correlation [probable] = *Trinovantedinium sabrinum* sp. nov.); Reid, 1978: 219–229; Taylor, 1978: 217 (Leigh record of July 1967 listed); Shim *et al.*, 1981: 68, pl. VII, figs 23a-c; Abé, 1981: 384–386 (descr. etc.), fig. 58 (398–404); Dodge, 1982a: 170 (in key), 187 (descr., etc.), figs 21D–F, pl. V, fig. d; Harland, 1982: 385–386 (cyst descr., etc.), text-fig. 21; Harland, 1983: 361, 387, text-fig. 31, pl. 47, figs 7–8 (cyst, distrib., etc. as *Quinquecuspis concretum* (Reid)); Lewis *et al.*, 1984: 25–34 *passim* (cyst/theca relationships, cyst as *Quinquecuspis concretum*), pl. 2, figs 3, 4 & 6; Dodge & Lee, 1985: 37, fig. 62; Baldwin, 1987: 549, figs 15–17 (descr. of cysts, distrib. Marlborough Sounds) cf. also p. 550, figs 21–22 as *Peridinium* sp. — "... the general shape of *Peridinium* and resembled *P. leonis*."); MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay), as *Peridinium*; Sweeney, 1987: 270 (bioluminescence); Hallegraeff, 1988: 92, 93 (SEM photos).

Protoperidinium marielebourae (Paulsen, 1930)

Paulsen 1930 [1931]: 69, fig. 40 (*Peridinium*); Lebour, 1925: 121, pl. 24, fig. 2 (as *P. obtusum*); Schiller, 1937: 239–240 (descr., refs & syn), text-figs 239a-i; Massuti & Margalef, 1950: 67 (in Section Conica Jörg., key, p. 667), fig. 154; Wood, 1954 : 228 (in key), 253 (descr., distrib., syn.), text-fig. 149; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities); Wood, 1964b: 563; Cassie, 1966 : 584 (Hauraki Gulf); Subrahmanyan, 1971: 69–70 (descr., refs & syn), pl. XLV, figs 3–11, pl. XLVI, figs 2–12; Sournia, 1973: 56

(listed); Taylor, 1974: 196 (listed "Widely distributed, 8 records"); Balech, 1974: 57 (*Protoperidinium);* Elbrächter, 1975: 60-61, fig. 3 (small plates figured, comparison with often confused *P. conicum* Gran and *P. leonis* Pavillard); Taylor, 1978: 217 (Leigh record of June 1969 listed); Dodge, 1982a: 169 (in key), 178 (descr., etc.), figs 20H–J; Han & Yoo, 1983b: 53–54 (descr., refs etc.), pl. V, figs 3–4.

Protoperidinium oblongum (Aurivillius, 1898)

Aurivillius, 1898: 96–97 (as *Peridinium divergens* Ehrenberg var. *oblongum*); Bergh, 1882: 241, pl. 15, figs 39–40 (as *P. divergens* Ehrenberg); Broch, 1906: 155, text-fig. 4 (as *P. oceanicum* Vanhöffen forma *oblonga* Aurivillius); Paulsen 1907: 16, text-fig. 20; Paulsen, 1908: 55, text-figs 70a-e (as *P. oceanicum* var. *oblongum*); Lebour, 1925: 121 (descr., distrib.), pl. XXIV, figs 1a-c; Dangeard, 1927: 7–11, text-figs 5–7; Böhm, 1936: 46-49 (status etc.), fig. 20; Schiller, 1937: 260–262 (descr., refs & syn.), text-figs 257a-k (in syn. of *P. oceanicum* Vanhöffen, 1897); Graham, 1942: 16, 26; Wood, 1954: 228 (in key), 256–257, text-figs 158a-c; Trégouboff & Rose, 1957: 111; Yamaji, 1959: fig. 3 on p. 91 (as *P. oceanicum* var. *oblongum*); Cassie, 1961: 20, 49 (N.Z. localities); Wood, 1964a: 52–53 (ecol.); Wood, 1964b: 564; Wall, 1965: 304–307 (as *P.* sp.), text-figs 8–9, 11, 13–15, 22; Halim, 1967: 742–743, 745 (ecol., as *P. oceanicum* Vanhöffen var. *oblongum* Aurivillius), pl. VII, fig. 88; Steidinger *et al.*, 1967: pl. VIII, fig. b; Wall & Dale, 1968: 272–273, pl. 1, figs 22–29, pl. 3, figs 9–11; Hermosilla, 1973: 16 (in key), 29–30 (detailed descr. etc.), pl. 11, figs 1–16; Sarjeant, 1974: 87; Taylor, 1974: 196 (Cassie (1961) records and Taylor unpubl. listed); Balech, 1974: 57 (incl. in *P. oceanicum*); Reid, 1977: 431 (table 1), 444–445 (cyst/theca correlation = *Votadinium calvum* sp. nov.); Reid, 1978: 219–229; Taylor, 1978: 217 (Leigh records); Abé, 1981: 315 (in key), 327–329 (discuss. etc., refs & syn. esp. identifications in part as *P. oceanicum*); Dodge, 1982a: 169 (in key), 180–181 (descr., cysts etc.), figs 20B–D; Harland, 1982: 380–381 (cyst descr., etc.), text-fig. 14, pl. 40, figs 10–12; Harland, 1983: 368, 387, text-fig 37, pl. 48, figs 6–7 (cyst, distrib., etc. as *Votadinium calvum* Reid); Baldwin, 1987: 549, fig. 14 (descr. of cysts, intermediate "... represent intermediate forms to those described by Wall & Dale (1968) ...", distrib. Marlborough Sounds).

Protoperidinium obtusum (Karsten, 1906)

Karsten, 1906: 149, pl. 23, fig. 12 (*Peridinium divergens* var. *obtusum*); Fauré-Fremiet, 1908: 223–224 (fig. and descr.; interpreted, later, as *P. marielebourae, q.v.*); text-fig. 9, pl. XV, fig. 8 (*P. obtusum*); Balech, 1949: 396–398, pl. III, figs 41–68; Balech, 1968: 8, 9, pl. 8, map 6 [appears to have been recorded from within N.Z. region]; Hermosilla, 1973: 17 (in key), 33–34, pl. 15, figs 1–21; Elbrachter, 1975: 61 (identif. features and comparison with *P. leonis* Pavillard and *P. marielebourae* Paulsen), fig. 4; Hermosilla, 1977: 27, 29, pl. 2, figs 1–3; Abé, 1981: 379–383 (descr., discuss., refs), figs 56 (382–387) –57 (388–397); Dodge, 1982a: 169 (in key), 187–188 (descr., etc.), fig. 21C; Taylor, 1987d: 450; Balech, 1988: 88–89 (diag., taxon., distrib., ecol., etc. in new comb. *Protoperidinium,* omission in Balech, 1974, *q.v.*), pl. 28, figs 3–6.

Protoperidinium oceanicum (Vanhöffen, 1897)

Vanhöffen, 1897: pl. V, fig. 2 (*Peridinium*); Paulsen, 1908: 39 (in key), 54–55 (refs), figs 69a-c; Lebour, 1925: 120–122 (descr.), text-fig. 36b; Böhm, 1936: 49–51 (varieties etc.), fig. 21; Schiller, 1937: 260–262 (descr., refs & syn., incl. *P. oblongum* Aurivillius, 1898), text-figs 257a-k; Massuti & Margalef, 1950: 67 (in Section Oceanica Jörg., key p. 66), fig. 157 ("con varias formas" incl. *P. oblongum* Auriv. (fig. 158), *P. claudicans* Paulsen (fig. 161)); Wood, 1963b: 42 (refs); Halim, 1967: 742 (ecol.), pl. VII, fig. 87; Wood, 1968: 105 (descr.), fig. 313; Yamaji, 1971: 86, pl. 41, fig. 14; Subrahmanyan, 1971: 84–85 (descr., refs & extensive syn.), pl. LVII, figs 12–15, pl. LX, fig. 1, pl. LXI, figs 1–3, pl. LXXIX, figs 1, 3; Lanigan, 1972: 170, fig. on p. 175 (Hauraki Gulf); Tu & Chiang, 1972: 141–142, figs 22a-b; Hermosilla, 1973: 16 (in key), 26–27 (descr., distrib., etc.), pl. 9, figs 1–15; Sarjeant, 1974: 48; Taylor, 1974: 190 (Cassie (1961) and Taylor unpubl. records listed); Balech, 1974: 57 (in *Protoperidinium,* and incl. *P. oblongum* Aurivillius, 1898, *q.v.*), figs XVI (1), XVII (3); Taylor, 1978: 217 (Leigh records); Abé, 1981: 316 (in key), 324–326 (discuss., esp. incl. diffs from *P. oblongum* etc., refs & syn.), fig. 46 (300–302); Dodge, 1982a: 169 (in key), 180 (descr., distrib., etc.), fig. 20E; Sweeney, 1987: 270 (bioluminescence); Balech, 1988: 85–86 (diag., taxon., distrib., ecol.), pl. 23, figs 7–10.

Protoperidinium ovatum Pouchet, 1883

Pouchet, 1883 [1884] : 35, pl. 18, fig. 18 (*Protoperidinium*); Schütt, 1895: pl. 1, fig. 49; Schütt, 1896: text-fig. 19; Lemmermann, 1896: 315 (N.Z. record from French Pass), 325, 326; Paulsen, 1908: 38 (in key), 44–45 (descr., refs), text-fig. 54 (*Peridinium*); Fauré-Fremiet, 1908: 218–219, text-fig. 6, pl. XV, fig. 6; Lebour, 1925: 125 (descr., distrib.), pl. XXVI, figs 1a-d; Schiller, 1937: 186–189 (descr., refs & syn.), text-figs 187a-i (as *P. globulus* Stein, 1883 var. *ovatum* (Pouchet)); Wood, 1954: 227 (in key), 236–237 (descr., distrib., syn., but see Balech, 1976c: 69 (as *Protoperi-*

dinium curtum Balech, 1958), text-figs 112a-d; Hardy, 1956: fig. 15g; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities); Cassie, 1963: 9 (table 2) (S. of N.Z.); Wood, 1964b: 554 (ecol.); Cassie, 1966: 584 (Hauraki Gulf); Wood 1968: 106 (descr.), fig. 316; Balech, 1971: 112–114 (descr., ecol., etc.), pl. XXI, figs 376–383 (not of Peters, 1928 = *Peridinium penitum* n. sp.); Balech, 1971: 119–121; Subrahmanyan, 1971: 34–35 (descr., refs & syn.), pl. XIII, figs 1–12, pl. XVII, figs 3–6, 8, 10); Taylor, 1974: 196 (listed: "Widely distributed, 12 records"); Drebes, 1974b: 138 (descr.), figs 121a-b; Balech, 1974: 64 (*Protoperidinium*); Balech, 1976: 35–38, fig. 4; Dodge, 1977: 333; Abé, 1981: 187 (in key); Shim *et al.*, 1981: 66–67, pl. IV, figs 17a-b; Dodge, 1982a: 170 (in key), 195 (descr., etc.), figs 22H–J, pl. IV, fig. f, pl. V, fig. b; Sweeney, 1987: 270 (bioluminescence); Levandowsky & Kaneta, 1987: 383 (behaviour); Pfiester & Anderson, 1987: 619; Balech, 1988: 99–100 (diag., taxon., distrib., ecol.), pl. 36, figs 10–13.

Protoperidinium pallidum (Ostenfeld, 1899)

Ostenfeld, 1899: 60 (*Peridinium*); Ostenfeld, 1903: 581–582, figs 130–131; Karsten, 1905b: 150, pl. XXIII (IV), figs 13a-b; Paulsen, 1907: 14; Paulsen, 1908 : 39 (in key), 48–49 (descr., refs), text-fig. 60; Lebour, 1925: 134 (descr., distrib.), pl. XXVIII, figs 1a-d; Martin, 1929: 28 (descr.), pl. VI, figs 1–2; Schiller, 1937: 209– 211 (descr., refs & syn.), text-figs 206a-m; Massuti & Margalef, 1950: 67 (in Section Pellucida Jörg., key, p. 66), fig. 147; Wood, 1954: 227 (in key), 244 (descr., distrib.), text-figs 129a-b; Trégouboff & Rose, 1957: 110; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. locality); Cassie, 1963: 9 (table 2) (S. of N.Z. at 60°S, and Ross Sea); Wood, 1964b: 564; Wood, 1968: 106 (descr.), fig. 318: Subrahmanyan, 1971: 54–55 (descr., refs), pl. XXXI, figs 1–8, pl. XXXII, figs 1–5; Taylor, 1974: 196 (Cassie (1960, 1961) and Taylor unpublished records listed); Drebes, 1974b: 138–140 (descr.), fig. 121c; Balech, 1974: 67 (*Protoperidinium*), figs IV (4), VI(1), XIII (14), XVII (21), XIX (28); Taylor, 1978: 217 (Leigh record of Feb. 1973 listed); Abé, 1981: 220 (in key), 229–234 (descr., discuss., refs & syn. incl. mis-identifications of this species), figs 22–24 (146–160); Shim *et al.*, 1981: 67, pl. V, pl. VI, figs 21a-f; Filimonov & Tyul'kova, 1981: 43–49 *passim*, fig. 3, table 1 (bioluminescence/stimulation); Dodge, 1982a: 172 (in key), 201–202 (descr., etc.), fig. 23H; Han & Yoo, 1983: 54 (descr., refs etc.), pl. V, fig. 5; Gaines & Elbrächter, 1987: 239; cf. Balech, 1988: 117.

Protoperidinium pedunculatum (Schütt, 1895)

Schütt, 1895: pl. XIV, fig. 47 (*Peridinium*); Paulsen, 1908: 39 (in key), 48 (descr., refs), text-fig. 59; Schiller, 1937: 211–212 (descr., refs), text-figs 208a-e; Wood, 1954: 227 (in key), 244–245 (discuss., distrib.), text-fig. 130; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities); Wood, 1964: 564; Wood, 1968: 106 (descr.), fig. 319; Subrahmanyan, 1971: 55 (descr., refs), pl. XXXII, figs 6–11; Taylor 1974: 196 (Cassie (1960, 1961) records listed); Balech, 1974: 64 (*Protoperidinium*).

Protoperidinium pellucidum Bergh, 1881

Bergh, 1881: 227, figs 46–48 (*Protoperidinium*); Schütt, 1895: pl. XIV, fig. 45; Pavillard, 1905: 57; Paulsen, 1907: 14; Paulsen, 1908: 39 (in key), 49–50 (descr., refs), text-fig. 61; Meunier, 1919: 1–59; Lebour, 1925: 134–135 (descr., distrib.), pl. XXVIII, figs 2a-d; Martin, 1929: 29 (descr.), pl. VII, figs 1–2; Schiller, 1937: 212–214 (descr., refs & syn.), text-fig. 209; Massuti & Margalef, 1950: 67 (in Section Pellucida Jörg.); Wood, 1954 : 227 (in key), 245 (descr., syn.), text-figs 131a-b; Trégouboff & Rose, 1957: 110 (key features), pl. 23, fig. 14; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20, 49 (N.Z. localities); Cassie, 1963: 4 (see Balech, 1976: 94 — "El *Peridinium pellucidum* de Cassie (1963) es *Protoperidinium affine*"), 9 (table 2), text-fig 2 (latitudinal distrib. S. of N.Z.), pl. I, fig. f (TAE Stn 453); Wood, 1963b: 43 (refs); Wood, 1964b: 565; Balech, 1964: 191–194 (detailed discuss.), pl. III, figs 56–66; Wood, 1968: 107 (descr.) fig. 320; Dragovich, 1969: fig. 5c; Subrahmanyan, 1971: 55–59 (detailed descr. [after Balech, 1964: 191, pl. III, figs 56–66], refs & syn.), pl. XXXIII, figs 1–11, pl. XXXIV, figs 1–12, pl. XXXV, figs 1–11; Hermosilla, 1973: 15 (in key), 18–19 (descr., comments etc.), pl. 3, figs 1–9; Taylor, 1974: 196 (Cassie (1960, 1961) records listed); Drebes, 1974b: 140 (descr.), fig. 121d; Balech, 1974: 67 (in *Protoperidinium*, type of genus), fig. XVII (22); Taylor, 1978: 217 (Leigh record of Sept. 1967 listed); Abé, 1981: 219 (in key), 226–229 (descr., discuss., refs & syn.), fig. 21 (132–145); Dodge, 1982a: 172 (in key), 202 (descr., etc.), fig. 23J, pl. V, fig. c; Taylor, 1987d: 443; cf. Balech, 1988: 94 (taxon., distrib., ecol., as *P. pyriforme breve*), pl. 31, figs 20–21.

Protoperidinium pentagonum (Gran, 1902)

Gran, 1902: 185, 190–191, fig. 15 (*Peridinium*); Karsten, 1905b: 149, pl. XXIII, figs 11a-b (as *P. divergens pentagonum*); Paulsen, 1908: 40 (in key), 59–60 (descr., refs), text-figs 76–77; Lebour, 1925: 112 (descr., distrib.), text-fig. 242 (descr., refs & syn.); Balech, 1949: 401–403, pl. V (figs 92–110); Wood, 1954: 228 (in key), 253 (descr., distrib., syn.), text-fig. 150a; Trégouboff & Rose, 1957: 111; Yamaji, 1959: fig. on p. 112; Cassie, 1960a: 170 (E. of N.Z.); Cassie,

1961: 20, 49 (N.Z. localities); Cassie, 1963: 9 (table 2); Wood 1963b: 43 (refs); Wood, 1964b: 565 (ecol.); Klement 1964: 351–352 (dimensions etc.); Cassie, 1966: 584 (Hauraki Gulf); Wall & Dale, 1968: 274, pl. 2, figs 8–10, pl. 3, fig. 15; Wood, 1968: 107 (descr.), fig. 321; Subrahmanyan, 1971: 71–72 (descr., refs & syn.), pl. XLVII, figs 4–9, pl. XLVIII, figs 1–3; Hermosilla, 1973: 16 (in key), 30–32 (detailed descr., etc.), pl. 12, figs 1–12, pl. 13, figs 1–9; Taylor, 1974: 196 (N.Z. occurrence listed, as var. *pentagonum*: "Widely distributed, 9 records"); Drebes, 1974b: 140 (descr.), figs 121e-f; Balech, 1974: 59 (*Protoperidinium*), figs VI (13), VII(3), XI(5), XII(11), XV(6), XVI(3), XVIII(4), XIX(17), XXVII(14); Dale, 1976: pl. I, fig. 16 (cyst); Reid, 1977: 431 (table 1), 437–438, pl. 1, figs 6–8 ((?) cyst/theca correlation as *Trinovantedinium capitatum* sp. nov.); Reid, 1978: 219–229; Shim *et al.*, 1981: 68, pl. VII, figs 24a-b; Abé, 1981: 386–392 (discuss., etc., refs), figs 59(405–411) –60(412–413); Dodge, 1982a: 170 (in key), 188–189 (descr., cysts etc.), figs 21L–N; Harland, 1982: 386 (cyst descr. etc.), text-fig. 22, pl. 39, figs 7–11, pl. 42, fig. 8; Harland, 1983: 364, 387 (cyst, distrib., etc. as *Trinovantedinium capitatum* Reid), text-fig. 35, pl. 48, figs 2–3 ; Lewis *et al.*, 1984: 25–34 *passim* (cyst/theca relationships, cyst as *Trinovantedinium capitatum*), pl. 2, figs 1–2 & 5; Baldwin, 1987: 547, 549 (descr. of cysts, distrib. Marlborough Sounds), fig. 12; Sweeney, 1987: 270; Levandowsky & Kaneta, 1987: 383; Balech, 1988: 88 (diag., taxon., distrib., ecol.), pl. 27, figs 1– 6; Akselman, 1987: 17–32, figs.

Protoperidinium pentagonum (Gran, 1902) var. **latissimum** (Kofoid, 1907)

Kofoid, 1907: 175, pl. 5, figs 31–32 (as *Peridinium latissimum*); Schiller, 1937: 242–243 (descr., distrib., refs), text-figs 243a-j; Wood, 1954: 252–253 (descr., distrib., syn.), text-figs 150b-c (as *P. pentagonum* var. *latissimum*); Cassie, 1961: 20, 49 (N.Z. record from Bay of Plenty); Klement, 1964: 352 (dimensions etc.), pl. 1, fig. 8; Wall & Dale, 1968: 274 (resting spores), pl. 2, figs 6–7, pl. 3, fig. 14 (as *P. latissimum*); Subrahmanyan, 1971: 72, pl. XLVIII, figs 4–11, pl. XLIX, figs 1–10; Taylor, 1974: 196 (Cassie (1961) and Taylor unpublished records listed); Balech, 1974: 67 (in *Protoperidinium* as *P. latissimum*), fig. XVII (14); Taylor, 1978: 217 (Leigh record of July 1967 listed, as var. *latissimum*).

Protoperidinium cf. **P. punctulatum** (Paulsen, 1907), Baldwin, 1987

Baldwin, 1987: 549, fig. 18 (as *Protoperidinium* cf. *punctulatum* (Paulsen) Balech, 1974: —— "Several cysts ...were isolated ... several species are known to produce this type of cyst including *P. dentriculatum*, *P. punctulatum* and *P. avellana* (Wall & Dale, 1968)" distrib. Marlborough Sounds); cf. Paulsen, 1907: 19, fig. 28 [note cysta/theca correlation, *P. punctulatum* = *Brigantedinium cariacoense* comb. nov., *fide* Reid, 1977: 431 (table I), 434 (summary), pl. 1, fig. 2); see also Harland, 1982: 381–382, text-figs 15–17, pl. 42, figs 3–6]; Balech, 1974: 58; Balech, 1988: 90-91 (diag., taxon., distrib., ecol.), pl. 30, figs 1–5.

Protoperidinium pyriforme pyriforme (Paulsen, 1904)

Paulsen, 1904 [1905]: 24, fig. 10 (*Peridinium steini* f. *pyriformis*); Paulsen, 1905: 4, figs 3d-e; Paulsen, 1907: 13, fig. 15; Paulsen, 1908: 38 (in key), 46–47, text-fig. 57; Lebour, 1925: 126–127 (descr., distrib.), text-fig. 38; Schiller, 1937: 194–196 (descr., refs & syn), text-figs 191a-n; Massuti & Margalef, 1950: 67 (in Section Piriformia Jörg., key p. 66), fig. 143; Cassie, 1961: 20, 49 (N.Z. record from off New Plymouth); Cassie, 1963: 9 (table 2) (S. of N.Z.); Klement, 1964: 352; Wood, 1964b: 565 (ecol.); Balech & El-Sayed, 1965: 109, 110, 112; Wood, 1968: 107 (descr.), fig. 322; Balech, 1971: 101–102 (descr., ecol., etc. as *P. pyriforme* Paulsen subspecies*pyriforme* nov.), pl. XVIII, figs 301–310; Subrahmansyan, 1971: 42–44 (descr., discuss., refs & syn.), pl. XXII, figs 1-15; Taylor, 1974: 196 (Cassie (1961) record listed, as *P. pyriforme* (Pauls.)); Drebes, 1974b: 140 (descr.), fig. 123a; Balech, 1974: 63 (*Protoperidinium*), figs XII (6), XV (20); Abé, 1981: 202 (in key); Dodge, 1982a: 171 (in key), 198–199 (descr., etc.), figs 23F–G; Balech, 1988: 93 (diag., syn., etc. — note that *P. breve* (Paulsen, 1905), *q.v.* is included as subspecies of *pyriforme* by Balech, 1988: 94), pl. 31, figs 16–19.

Protoperidinium quarnerense (Schröder, 1900)

Schröder, 1900: 18 (*Peridinium globulus* var. *quarnerense*); Broch, 1910: 183, fig. 3; Schiller, 1937: 184–185 (descr., refs & syn.), figs 186a-z; Massuti & Margalef, 1950: 67 (in Section Piriformia Jörg., key, p. 66, syn. *P. cerasus* Paulsen), fig. 140; Wood, 1954: 236, fig. 111; Wood, 1968: 108 (descr.), fig. 325; Taylor, 1974: 196 (unpubl. first N.Z. record from Leigh listed); Balech, 1974: 61 (*Protoperidinium*), figs XV (28), XXVII (7); Balech, 1976: 33–35, fig. 3; Taylor, 1978: 217 (Leigh record of March 1969 listed); Abé, 1981: 192 (in key), 196 (refs & syn.), fig. 14 (78–84); Balech, 1988: 112 (diag., taxon., distrib., ecol.), pl. 45, figs 6–8.

Protoperidinium roseum (Paulsen, 1904)

Paulsen, 1904: 23, fig. 9 (*Peridinium*); Paulsen, 1908: 38 (in key), 44 (descr., refs), fig. 53; Lebour, 1925: 130 (descr., distrib.), text-fig. 41a; Cassie, 1961:

20, 49 (N.Z. record from off New Plymouth); Wood, 1964b: 565 (ecol.); Wood, 1968: 108 (descr.), fig. 326; Subrahmanyan, 1971: 44 (descr., refs), pl. XXI, figs 9–13; Taylor, 1974: 196 (Cassie (1961) record listed); Balech, 1974: 65 (*Protoperidinium*); Abé, 1981: 179 (in key), 184–186 (descr., etc.), fig. 12 (63–69).

Protoperidinium steinii (Jörgensen, 1899)

Jörgensen, 1899: 38 (*Peridinium*); Paulsen, 1905: 57; Paulsen, 1907: 13, fig. 14; Karsten, 1907: 415–416; Paulsen, 1908: 38 (in key, descr., refs), text-figs 58a-d; Kofoid, 1909: 25–47 (detailed study); Lebour, 1925: 125 (descr., distrib., syn.), pl. XXV, figs 4a-d; Haye, 1930a: 1 *et seq.*; Schiller, 1937: 196–198 (descr., refs & syn.), text-figs 192a-h; Massuti & Margalef, 1950: 67 (in Section Piriformia Jörg. key, p. 66), fig. 144; Wood, 1954: 227 (in key), 240–241 (descr., distrib., syn.), text-fig. 120a; cf. also Trégouboff & Rose, 1957: 110, pl. 23, fig. 11; Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 20,49 (N.Z. localities); Wood, 1963b: 45 (refs); Wood, 1964a: 53–54 (ecol.); Wood, 1964b: 566 (ecol.); Klement, 1964: 352; Cassie, 1966: 584 (Hauraki Gulf); Wood, 1968: 109 (descr.), fig. 329; Subrahmanyan, 1971: 45–46 (descr., refs & syn.), pl. XXIII, figs 1–13; Hermosilla, 1973: 15 (in key), 40–41 (descr., obs., etc.), pl. 19, figs 1–12; Taylor, 1974: 196 (N.Z. records, incl. Taylor unpubl., listed); Drebes, 1974b: 141 (descr.), fig. 123b; Balech, 1974: 63 (*Protoperidinium*); Taylor, 1978: 217 (Leigh record of June 1969 listed); Taylor & Durbin, 1978: 222 (Whangateau Harbour records); Abé, 1981: 202 (in key); Dodge, 1982a: 171 (in key), 199 (descr., etc.), fig. 23d; Dodge & Lee, 1985: 37, fig. 59; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay), as *Peridinium*); Taylor, 1987a: 13; Sweeney, 1987: 270.

Protoperidinium stellatum Wall, 1968

Wall *in* Wall & Dale, 1968: 275, pl. 2, figs 13–15, pl. 3, figs 16–21; Baldwin, 1987: 550, fig. 20 (descr. of cysts, distrib. Marlborough Sounds).

Protoperidinium subinerme (Paulsen, 1904) [see *Gonyaulax grindleyi* Reinecke, 1967

Paulsen, 1904: 24, fig. 10 (*Peridineum*); Paulsen, 1907: 18, figs 26–27; Paulsen, 1908: 40 (in key), 60–61 (descr.), text-figs 78a-l (not d-e *fide* Abé, 1981: 365); Lebour, 1925: 114–115 (descr., distrib., refs), pl. XXII, figs 2a-f; Böhm, 1936: 44, fig. 16a; Schiller, 1937: 243–245 (descr., refs & syn.), text-figs 244a-o; Massuti & Margalef, 1950: 67 (in Section Conica Jörg., key p. 66), fig. 155; Wood, 1954: 228 (in key), descr., distrib., syn.), text-fig. 151; Trégouboff & Rose, 1957: 111; Cassie, 1961: 20, 49 (N.Z. localities); Cassie, 1963: 9 (table 2) (S. of N.Z., TAE Stn 408, 57°31'S, 175°09'E.); Wood, 1964b: 566 (ecol.); Halim, 1967: 748 (ecol.), pl. VI, fig. 84, pl. VII, fig. 85; Wood 1968: 109 (descr.), fig. 330; Balech, 1971: 91–92 (descr., ecol., etc.), pl. XV, figs 249–252, pl. XVI, figs 253–257; Subrahmanyan, 1971: 75–78 (descr., remarks, comparison with *P. punctulatum* Paulsen, 1907, refs & syn. incl. (?) *P. multistriatum* Kofoid, 1907, *P. punctulatum* Paulsen, 1907, etc.), pl. L, figs 8–14, pl. LI, figs 2–15, pl. LII, figs 1–6, 8; Hermosilla, 1974: 45; Sournia, 1973: 59, 71 (listed under *Protoperidinium* Bergh following Loeblich, 1970: 905); Taylor 1974: 196 (Cassie's 1961) records listed); Balech, 1974: 59 (*Protoperidinium*), figs VII(4), XIX (16), XXVII(8); cf. Matsuoka, 1976: 362 (thecate and cyst forms), pl. III, fig. 1; Dodge, 1977: 332; Abé, 1981: 347 (in key), 365–368 (descr., discuss., refs), fig. 54 (368–374); Dodge, 1982a: 169 (in key), 189–190 (descr., cysts etc.), figs 21I–K, pl. V, fig. f; Harland, 1982: 388 (cyst descr.), text-fig. 23, pl. 39, fig. 6; Harland, 1983: 364, 387 (cyst, distrib., etc. as *Selenopemphix nephroides* Benedek), text-fig. 33, pl. 48, figs 11–12; Han & Yoo, 1983b: 54 (descr., refs, etc.), pl. III, fig. 13; Lewis *et al.*, 1984: 25–34 *passim* (cyst/theca relationships), text-figs 2k-i, pl. 2, fig. 7; Baldwin, 1987: 547 (descr. of cysts, distrib. Marlborough Sounds), figs 9–11; Sweeney, 1987: 270; Levandowsky & Kaneta, 1987: 383; Taylor, 1987d: 450.

(?) **Protoperidinium variegatum** (Peters, 1928)

Peters, 1928: 35, figs 9a-g (*Peridinium*); Schiller, 1937: 216, text-figs 213a-h; Wood, 1954: 227 (in key), 246, text-figs 134a-b; Cassie, 1963: 9 (table 2) (doubtful identif. from N.Z.); Balech & El-Sayed, 1965: 109, 110, 111; Wood, 1968: 111 (descr.), fig. 336; Subrahmanyan, 1971: 63–65 (descr., refs), pl. XXXIX, figs 1–13, pl. XL, figs 1–8; Balech, 1971: 152–153, pl. 36, figs 604–614; Balech, 1974: 66 (*Protoperidinium*), figs XIII (10), XVI(26), XVII(25), XIX(35); Balech, 1976: 85, fig. 64; Hermosilla, 1977: 19–21, pl. 1, figs 1–7; Abé, 1981: 176 (in key).

Protoperidinium sp. Brewin, 1952

Brewin, 1952: 619 (Otago Harbour, as *Peridinium*).

Protoperidinium spp. Taylor, 1978

Taylor, 1978: 217 ("Unidentified species were seen at irregular intervals" at Goat Is Bay, Leigh area); Taylor & Durbin, 1978: 221 (Whangateau Harbour).

Protoperidinium sp. MacKenzie *et al.*, 1986

MacKenzie *et al.*, 1986: 402 (table 1 : Kenepuru Sound).

Protoperidinium spp. MacKenzie & Gillespie, 1986
MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay), as *Peridinium* spp.

Protoperidinium sp. 1, Bradford *et al.*, 1987
Bradford *et al.*, 1987: 228, table 2 (listed from NZOI Stn T140, Pelorus Sound, as *Peridinium*).

Protoperidinium sp. 2, Bradford *et al.*, 1987
Bradford *et al.*, 1987: 228, table 2 (listed from NZOI Stn T140, Pelorus Sound, as *Peridinium*).

Protoperidinium sp. Bradford *et al.*, 1987
Bradford *et al.*, 1987: 228, table 2 (listed from NZOI Stn T140, Pelorus Sound).

Protoperidinium sp. Chang *et al.*, 1990
Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, January 1989).

Protoperidinium sp. Baldwin, 1987
Baldwin, 1987: 550, figs 21–22 (as *Peridinium* sp.: "One small-walled dark brown cyst ... had the general shape of *Peridinium* and resembled *P. leonis*."), distrib. Marlborough Sounds.

Genus **Scrippsiella** Balech *ex* Loeblich, III, 1965

Scrippsiella trochoidea (Stein, 1883)
Stein, 1883: pl. III, figs 27–29 (*Glenodinium*); Lemmermann, 1910 : 336; Martin, 1929: 27 (descr.), pl. V, figs 11–12, pl. VII, figs 5–6, pl. VIII, fig. 7 (*Peridinium*); Schiller, 1937: 137, figs 134a-g; Oliveira, 1950: 363 (mortality effects); Braarud, 1958: 41; Silva, 1963: 1–24 (cultures); Wall & Dale, 1968: 1401 (descr. of cyst, incubation, etc.), text-fig. 2, 1–3, pl. 172, figs 1–4, 27; Wood, 1968: 110, fig. 333 (descr,. etc.); Wall *et al.*, 1970: 151–156 (cysts); Fine & Loeblich, 1976: 275–288; Loeblich, 1976: 25 (*Scrippsiella*); Dale, 1977b: 248, fig. 13, table II (differentiating features); Steidinger & Balech, 1977: 72 (*Scrippsiella trochoidea* comb. nov., incl. *Peridinium faeroense* Paulsen, 1905 and some *Peridinium trochoideum* (Stein) Lemmerman of authors); Dale, 1978: 187–193(life cycle); Shim *et al.*, 1981: 65–66, pl. IV, figs 14a-b; Bujak & Davies, 1983: 163 (transf. from *Peridinium*, new comb.); Balch, 1985: 121–124 (metabolism); Sournia, 1986: 90–91 (generic diag.); Binder & Anderson, 1986: 659–661 (light effects, etc.); Costas, 1986c: 67 *et seq.*; Costas, 1986d: 73–76; Indelicato & Loeblich, 1986: 153 *et seq.* (taxon.); Van Alstyne, 1986: 187–190 (copepod predation); Hallegraeff, 1987: 4, fig. 3; Gill & Harris, 1987: 785–801 (copepod predation); Taylor, 1987c: 51, 73, 83; Harvey *et al.*, 1987: 3031 (copepod predation); Dodge, 1987: 104; Gaines & Elbrächter, 1987: 227, 234, 235, 247; Taylor, 1987c: 372, 383 (as *P. trochoideum*), 410, 412, 415, 422, 439, 443 (as *S. trochoidea*); Rizzo, 1987: 145, 146, 150, 151, 154 (biochem./nucleus); Pfiester & Anderson, 1987: 619, 636 (reprod., as *P. trochoideum*), 632, 633, 635 (reprod., as *S. trochoideum*); Blanco, 1987: 17–20 (metals/population growth); Costas *et al.*, 198b7: 107–112 (locomotion); Dixon & Syrett, 1988: 297–302 (lab. culture); Blanco, 1988: 335–344 (vertical distrib./sediments); Harrison *et al.*, 1988: 89–96 (diet, morphol.); Balech, 1988: 159 (diag., taxon., distrib., refs etc.), pl. 71, figs 9–11; Martin-Jezequel *et al.*, 1988: 303 (protein con-tent); Montressor & Zingone, 1988: 387 (diag. characters); Griffis & Chapman, 1988: 305 *et seq.*, (light/survival); Schnepf, 1988: 22–28 (cytokinesis etc.); Costas *et al.*, 1988a: 555 *et seq.* (ultrastructure); Costas & Varela, 1989: 265–270 (cyst/growth rate etc.); Gao Xiaoping *et al.*, 1989a: 153–165 (ultra-structure/encystment); Gao Xiaoping *et al.*, 1989b: 342–351 (gamete mating, etc.).

Scrippsiella sp. Chang *et al.*, 1990
Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, January 1989).

Family PODOLAMPADIDAE/
PODOLAMPADACEAE
Genus **Podolampas** Stein, 1883

Podolampas curvatus Schiller, 1937
Schiller, 1937: 476, text-fig. 549; Wood, 1963a: 50, text-fig. 185 ("north Tasman off New Zealand"); Abé, 1966: 147 (listed); Wood, 1968: 119 (descr.), fig. 363; Taylor, 1974: 198 (Wood's 1963 record listed).

Podolampas elegans Schütt, 1895
Schütt, 1895: pl. 18, fig. 57; Lebour, 1925: 160, fig. 5; Kofoid, 1909: 48, pl. 3; Schiller, 1937: 475 (descr.), fig. 546; Wood, 1963a: 50, text-fig. 186; Abé, 1967c: 149; Wood, 1968: 119 (descr.), fig. 364; Taylor, 1976: 171 (recog. features, refs), pl. 27, figs 280–281; Burns & Mitchell, 1982b: 76, fig. 18 (first N.Z. record); Balech, 1988: 124 (diag., taxon., distrib., ecol.), pl. 53, figs 7, 8, & 12.

Podolampas palmipes Stein, 1883
Stein, 1883: pl. VIII, figs 9–11; Lebour, 1925: 159, fig. 52a; Schiller, 1937: 475–476 (descr., refs), fig. 547; Wood, 1954: 317, figs 252a-b; Balech, 1963: 12–13, pl. 2, figs 20–27; Wood, 1963: 50 (refs); Wood, 1968: 119 (descr.), fig. 363; Ricard, 1974: 129 (SEM morphol.,

refs), pl. 3, figs 25–26; Taylor, 1976: 171–172 (recog. features, refs etc.), pl. 27, figs 278, 279, ?286; Andreis & Andreoli, 1975: 387–397 (SEM thecal plates); Andreis *et al.*, 1982: 226 (thecal surface); Burns & Mitchell, 1982b: 76, fig. 19 (first N.Z. record); Dodge, 1982a: 254–255 (descr., etc.), fig. 33I; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Balech, 1988: 124–125 (diag., taxon., distrib., ecol.), pl. 52, fig. 21, pl. 53, figs 3–4.

Podolampas spinifer Okamura, 1912

Okamura, 1912: 17, pl. 2, figs 35–36; Pavillard, 1916: 41, pl. 2, figs 6–7; Schiller, 1937: 476, text-fig. 548; Rampi, 1941b: 142, 148, pl. V, fig. 10; Massuti & Margalef, 1950: 54, fig. 77; Trégouboff & Rose, 1957: 119 (key features), pl. 27, fig. 18; Wood, 1963a: 50, fig. 187; Balech, 1963: 14–15, pl. II, figs 28–33; Cassie, 1966: 577 (Hauraki Gulf); Abé, 1966: 145–147 (morphol., distrib., etc.), figs 39–44; Sournia, 1967: 429 (questions identity of fig. 187 in Wood, 1963); Steidinger *et al.*, 1967: pl. IV, fig. b; Steidinger & Williams, 1970: 35 (in key), 60, fig. 129; Yamaji, 1971: 107, pl. 51, fig. 17; Tu & Chiang, 1972: 142–143, fig. 24; Taylor, 1974: 198 (Cassie's 1966 record listed); F.J.R. Taylor, 1976: 172, pl. 27, figs 284–285; Burns & Mit-chell, 1982b: 76 (listed); Balech, 1988: 125 (diag., taxon., distrib., ecol.), pl. 52, fig. 22, pl. 53, figs 9, 10 & 13 [as *P. spinifera* alternative spelling].

Family PROTASPIDIDAE/PROTASPIDACEAE
* Genus **Protaspis** Skuja, 1939

Protaspis tanyopsis Norris, 1961

Norris, 1961: 175–176, text-fig. 18 (NZOI Stn B67, off Kermadec Is); Sournia, 1973: 71 (listed).

Family PTYCHODISCIDAE/PTYCHODISCACEAE
Genus **Ptychodiscus** Stein, 1883

Ptychodiscus noctiluca Stein, 1883

Stein, 1883: 23, pl. 23, figs 7–10; Boalch, 1969: 781–784 (generic review); Dodge, 1982a: 108–109, figs 13B–C (descr., etc. as *P. noctiluca* Stein, incl. *P. inflatus* Pavillard, 1916: 12, pl. 1, figs 3a-b; Schiller, 1937: 77, figs 62a-b; Rampi, 1950: 6, fig. 22 ("Dana" Stn 3642, off N.Z.); Massuti & Margalef, 1950: 51 (in key), fig. 52; Trégouboff & Rose, 1957: 108 (key features), pl. 23, fig. 3; cf. Balech, 1962: 141–143, pl. XIX, figs 277–280; Rampi, 1969: 324 (descr., Mediterranean refs), pl. 3, fig. 7; Balech, 1971: 37–38); Sournia, 1986: 60–61 (generic diag.); Taylor, 1987c: 42, 43; Balech, 1988: 22–23 (diag., taxon., distrib., ecol.), pl. 2, figs 11–12.

Family PYROPHACIDAE/PYROPHACACEAE
Genus **Pyrophacus** Stein, 1883

Pyrophacus horologium Stein, 1883

Stein, 1883: 28, pl. 24, figs 6–13; Lebour, 1925: 139, pl. 29, figs 4a-c; Schiller, 1937: 87, figs 73a-e; Massuti & Margalef, 1950: 51 (in key), fig. 53; Wood, 1963: 54 (refs); Cassie, 1966: 577, 584 (Hauraki Gulf); Wood, 1968: 128 (descr.), fig. 398; Wall & Dale, 1971: 221–225 *passim* [esp. 230–231, 234] (status review, theca and cyst morphol. analysis), figs 1A, 4D–G, 5, 9, 31–37, table 2; Sarjeant, 1974: 82–83, fig. 15b; Taylor, 1974a: 195 (N.Z. records of Cassie (1966) (Jellicoe Channel) and Taylor unpubl. (Leigh) listed; Drebes, 1974: 129–130 (descr.), fig. 110; Dale, 1977a: 29–34 (comparison of cysts with *Gonyaulax excavata*), figs 1H–I; Taylor, 1978: 217 (Leigh records); Filimonov & Tyul'kova, 1981: 43–49 *passim*, fig. 3, table 1 (bioluminescence/stimulation); Dodge, 1982a: 144 (descr., etc.), figs 17A–B; Dodge & Lee, 1985: 38, fig. 65; Sournia, 1986: 92 (generic diag.); Pfiester & Anderson, 1987: 619; Balech, 1988: 183 (diag., taxon., distrib., ecol.), pl. 88, figs 1–5.

Pyrophacus [horologicum Stein, 1883 var.] **steinii** Schiller, 1935

Schiller, 1935: 87–88, text-figs 74a-b (not c-d); Stein, 1883: 28, pl. 24, figs 1, 2, 4 (as *P. horologium*, in part, see also Schütt, 1896: 18–19, text-figs 17, 20, 25; Lemmermann, 1899: 315 (N.Z. record from French Pass); Paulsen, 1908: 67 (refs), text-fig. 89; Lebour, 1925: 139, pl. XXXIX, figs 4a-c); Trégouboff & Rose, 1957: 108–109 (key features), pl. 23, figs 5A–B; cf. Yamaji, 1959: figs on p. 21 and p. 112; Cassie, 1961: 20, 50 (N.Z. record from Wellington Harbour); Wood, 1964b: 568 (ecol.); Cassie, 1966: 577, 584 (Hauraki Gulf); Loeblich & Loeblich, 1966: 53 (type species listed as *P. horologicum* Stein, 1883: 9, 26, 28, 29); Halim, 1967: 751 (ecol.); Steidinger *et al.*, 1967: pl. IX, figs b-c; Sournia, 1967: 426-427; Wood, 1968: 128 (descr.), fig. 398; Steidinger & Williams, 1970: 38 (in key), 62, fig. 147; Wall & Dale, 1971: 226–230, 234, figs 1B, 26–30, table 2 (review, etc., as *P. steinii* (Schiller), nov. comb.); Taylor, 1974: 195 (N.Z. records of Cassie (1961) from Wellington Harbour

* Sournia (1973: 71) commented : "Ce genre possède un homonym antérieur dans le règne animal (*Protaspis* Bryant : Poissons) mais n'en pas moins légitime dans le règne végétal."

and Taylor unpubl. from Leigh as this variety — Taylor commented: "Sournia (1967) is doubtful of the validity of this variety and also questions the identity of figures 84 b-c under this name in Wood (1954)"); Balech, 1988: 183–184 (diag., taxon., distrib., ecol.), as *P. steinii* subsp. *steini*), pl. 88, figs 6–9.

Family THECADINIIDAE/THECADINIACEAE
Genus **Thecadinium** Kofoid & Skogsberg, 1928

Thecadinium petasatum (Herdman 1922)

Herdman, 1922: 26–27, fig. 3 (*Amphidinium kofoidi* var. *petasatum*); Herdman, 1924: 60 (*Phalacroma kofoidi*); Kofoid & Skogsberg, 1928: 32 (*Thecadinium petasatum*); Lebour, 1925: 77, pl. XI, figs 1a-g); Schiller, 1933: 51–52 (descr., syn.), text-figs 51a-g; Norris, 1964: 274 (Wellington Harbour); Loeblich & Loeblich, 1966: 58 (type species of *Thecadinium* Kofoid & Skogsberg, 1928: 29, 31–33, 35 as "*T. petasatum* (Herdman) Kofoid & Skogsberg, 1928 = *Amphidinium kofoidii* var. *petasatum* Herdman, 1922, p. 26 = invalid combination, *Phalacroma kofoidii* (Herdman) Herdman, 1924, p. 60; SD [subsequent designation] Loeblich Jr. & Loeblich III, herein"); Sournia, 1973: 75; Sarjeant, 1974: fig. 16a; Taylor, 1974: 198 (Wellington Harbour record of Norris (1964), listed); Dodge, 1982a: 57 (descr., syn., as *T. petasatum* (Herdman)), figs 5A-C.

Family TRIADINIIDAE
Genus **Triadinium** Dodge, 1981
[formerly *Goniodoma* Stein, 1883]*

Triadinium polyedricum (Pouchet, 1883)

Pouchet, 1883: 440, pl. 20, fig. 34 (*Peridinium*); Stein, 1883: 12, pl. 7, figs 1–16, pl. 8, figs 1–2 (in part as *Goniodoma acuminatum* (Ehrenberg, 1838)); Schütt, 1895: pl. 8, fig. 30; Jörgensen, 1899: 33; Lemmermann, 1899: 315 (N.Z. record from French Pass as *Goniodoma acuminatum*); Paulsen, 1908: 33–34 (descr., refs), text-fig. 42; Schiller, 1937: 438–439, text-figs 479a-e; Graham, 1942: 46, fig. 60; Massuti & Margalef, 1950: 62, fig. 136; Wood, 1954: 313 (descr., distrib., syn.), text-figs 241a-c; Trégouboff & Rose, 1957: 117 (key features), pl. 27, fig. 2; Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 20, 48 (N.Z. localities); Riedl, 1963: 33, pl. 5; Wood, 1963a: 42, text-fig. 154; Wood, 1963b: 26 (refs); Wood, 1964a: 49 (ecol.); Wood, 1964b: 559–560 (ecol.); Loeblich & Loeblich, 1966: 33 (type species listed as *G. acuminatum* (Ehrenberg, 1836 [1835]: 575, pl. 2, fig. 5); Halim, 1967: 729–730 (ecol.), pl. IV, figs 53–54; Steidinger *et al.*, 1967: pl. IX, fig. a; Drugg & Loeblich, 1967: 183 (in *Heteraulacus* Diesing, 1850); Wood, 1968: 62 (descr.), fig. 163; Loeblich, 1970: 904 (*Heteraulacus*); Taylor, 1974: 198 (N.Z. records listed); Ricard, 1974: 129 (SEM morphol.), pl. 3, figs 17–21; Taylor, 1976: 115 (refs etc., as *Heteraulacus*), pl. 28, figs 291–294, pl. 43, fig. 513; Dodge, 1981b: 278, 279 (*Triadinium*, new name for *Goniodoma* Stein, 1883, pre-occupied in Insecta [cf. Sournia, 1973: 32] and note also comments against use of *Heteraulacus*); Dodge, 1982a: 219 (descr., refs & syn. in *Triadinium*), figs 27A–B; Andreis *et al.*, 1982: 227 (thecal surface), fig. 17; Burns & Mitchell, 1983: 56 (N.Z. specimens, as *Heteraulacus*), fig 15–16; Dodge & Lee, 1985: 38, figs 67–68; Taylor, 1987a: 10; Taylor, 1987c: 34, 58, 62; Taylor, 1987d: 436; Cachon & Cachon, 1987: 585; Pfiester & Anderson, 1987: 618; Hallegraeff, 1988: 68–70 (SEM photos, as *Goniodoma polyedricus*).

Triadinium sphaericum (Murray & Whitting, 1899)

Murray & Whitting, 1899: 325, pl. 27, fig. 3 (*Goniodoma*); Matzenauer, 1933: 452; Schiller, 1937: 439–440 (refs, distrib.), figs 480a-d; Gaarder, 1954a: 31; Trégouboff & Rose, 1957: 117, pl. 27, fig. 3; Wood, 1968: 62 (descr.), fig 164; Loeblich, 1970: 904 (in *Heteraulacus*); Taylor, 1976: 115 (refs etc. in *Heteraulacus*), pl. 28, fig. 290; Shim *et al.*, 1981: 76, pl. XV, figs 49a-d; Dodge, 1981b: 279 (nov. comb. in new genus *Triadinium*); Dodge, 1982a: 219 (descr., distrib.), fig. 27C; Andreis *et al.*, 1982: 227 (thecal surface), fig. 18; Burns & Mitchell, 1983: 56 (single N.Z. specimen, NZOI Stn N430, in *Heteraulacus*), fig. 17.

Suborder PROROCENTRINA/
(PROROCENTRALES)
Family PROROCENTRIDAE/
PROROCENTRACEAE

Genus **Mesoporos** Lillick, 1937

Mesoporos adriaticus (Schiller, 1928)

Schiller, 1928: 56, text-figs 14a-b (*Porella*); Schiller, 1933: 29, text-fig. 28 (descr., etc.); Lillick, 1937: 497 (*Mesoporos*); Rampi, 1950: 2 (distrib.), text-fig. 19 ("Dana" Stn 3651, off N.Z.); Trégouboff & Rose, 1957:

* Sournia (1973: 32) commented : "L'existence d'un homonyme antérieur dans le règne animal (*Goniodoma* Zeller : Lépidoptères est sans importance tant que *Goniodoma* Stein est considéré comme un genre végétal", but compare note by Dodge (1982a: 218).

97 (key features as *Porella*); Loeblich & Loeblich, 1966: 40 (type designation listed); Sournia, 1973: 47, 65 (listed); Taylor, 1974: 194 (listed); Sournia, 1986: 38 (generic diag.).

* Genus **Prorocentrum** Ehrenberg, 1833
[syn. *Exuviaella* Cienkowski, 1881]

Prorocentrum balticum (Lohmann, 1908)

Lohmann, 1908: 17, pl. 1, fig. 265 (*Exuviaella*); Schiller, 1933: 17, figs 10a-d; Massuti & Margalef, 1950: 49, fig. 50; Silva, 1953: 75-86 (red-water effects); Gaarder, 1954a: 23; Paredes, 1962: 87–114 (red-water effects); Wood, 1963a: 4, fig. 1; Halstead, 1965: 160 (suspect toxic species; see also Silva (1956), Ballantine & Abbott (1957) and Provasoli (1962)); Wood, 1968: 55 (descr., distrib.), fig. 136, Rampi, 1969: 314, pl. I, fig. 4; Sakshaug, 1970: 1–8 (surface-temperature relations); Balech, 1971: 40-41 pl. II, figs 15-17; Lanigan, 1972: fig. on p. 175 (N.Z. record); Sournia, 1973: 30 (listed), 69 (Hasle's (1969: 153) combination in *Prorocentrum* regarded as invalid; Loeblich's (1970: 906) placing in *Proro-centrum* listed); Dodge & Bibby, 1973: 175–187*passim* (*Prorocentrum*); Faust, 1974: 315–322; Taylor, 1974: 185 (listed); Drebes, 1974: 114 (descr., etc.), fig. 93b; Dodge, 1976: 118–119 (descr., syn., in *Proro-centrum*), 121 (in key), 122, figs 4A–B, pl. 4, fig. 4; Zotter, 1979: 195–198; Shim *et al.*, 1981: 59–60, pl. I, figs 1a-b; Dodge, 1982a: 26 (in key), 35–36 (descr., distrib., syn.), figs 2M–N, pl. I, fig. e; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay); Sournia, 1986: 38 (generic diag.); Tangen & Edler, 1987: 18 (spreading phenomenon); Gaines & Elbrächter, 1987: 234; Shimizu, 1987: 306 (toxin); Taylor, 1987d: 409, 410, 414, 415, 441, 443, 444, 446, 449, 459; Balech, 1988: 33 (diag., taxon., distrib., ecol.), pl. 4, figs 5-6; Chang *et al.*, 1990: table 3 (N.Z. record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Prorocentrum compressum Bailey, 1850

Bailey, 1850: 40, pl. 2, figs 13–14 (*Pyxidicula*); Ostenfeld, 1899: 59 (*Exuviaella*); Stein, 1883: pl. 1, figs 34–38 (*Dinopyxis*); Schütt, 1895: pl. 1, fig. 1 (as *E. marina*, not of Cienkowski, 1881, *fide* Paulsen, 1908); Ostenfeld, 1903: 579; Paulsen, 1908: 6–7, text-fig. 2; Lebour, 1925: 13–14 (descr., distrib.), pl. I, fig. 2; Martin, 1929: 10–11 (descr.), pl. III, figs 5–6; Schiller, 1933 [1937]: 17–18, text-figs 11a-d (descr., distrib., syn. incl. (?) *Pyxidicula compressa* Bailey, 1851); Böhm, 1936: 12; Kiselev, 1950: 55 (in key), 58 (descr.); Wood, 1954: 178, text-fig. 2 (descr., distrib.); Gaarder, 1954a: 23, fig. 25; Trégouboff & Rose, 1957: 97, pl. 20, fig. 2 (key features); Hasle, 1960a : 40; Cassie, 1961: 18 (N.Z. record from off New Plymouth), 48; Balech, 1962: 121, pl. XVI, fig. 203: Wood, 1964a: 47 (ecol.); Dodge, 1965: 607–610 (*E. baltica*, *E. compressa* and *E. marielebourae* may belong to new genus); Steidinger *et al.*, 1967: pl. I, fig. d; Abé, 1967: 373, figs 2a-d (*Prorocentrum*); Wood, 1968: 55 (descr.), fig. 137; Steidinger & Williams, 1970: 37 (in key as *Prorocentrum*), 60, fig. 133; Balech, 1971: 39–40, (morphometric var., ecol.), pl. II, figs 6–14; Sournia, 1973: 30 (listed), 69 (in *Prorocentrum*, citation of basionyms, etc.); Taylor, 1974: 194 (N.Z. occurrence listed); Dodge, 1976: 110–111 (descr., syn.), figs 2F, 4H–I, pl. 4, figs E–F; Taylor, 1976: 21–22 (discuss., refs & syn.), pl. 1, figs 8–9; Iwasaki, 1981: 64–65 (laboratory strains); Shim *et al.*, 1981: 60, pl. I, figs 2a-b; Dodge, 1982a: 26 (in key), 31 (descr., distrib., syn.), fig. 2I; Balech, 1988: 33–34 (diag., taxon., distrib., ecol.), pl. 4, figs 3–4; Hernandez & Becerril, 1988: 517–531.

Prorocentrum gracile Schütt, 1895

Schütt, 1895: pl. 1, fig. 3; MacKenzie & Gillespie, 1986: 388 (table 3 : Tasman Bay [first N.Z. record]); MacKenzie *et al.*, 1986: 402 (table 1: Kenepuru Sound); Balech, 1988: 32 (diag., taxon., distrib., ecol.), pl. 4, fig. 2; Hernandez & Becerril, 1988: 517–531.

Prorocentrum lima (Ehrenberg, 1859)

Ehrenberg, 1859: 793, fig. 73, pl. I, fig. 25 (*Cryptomonas*); Cienkowski, 1881: 159, figs 36–37 (*Exuviaella marina*); Stein, 1883: figs 27–30 (*Dinopyxis laevis*); Schütt, 1896: 7, fig. 9 (as *E. lima*) 8, text-fig. 11 (*E. marina*); Paulsen, 1908: 5 (as *E. marina* incl. in syn. of *E. lima* (Ehrenberg, 1859)), text-figs 1a-b; Lebour, 1925: 13 (descr., distrib., as *E. marina*), pl. I, figs 1a-d; Martin, 1929: 11, pl. I, figs 1–2, pl. III, figs 7–9; Schiller, 1933: 20, figs 15a-g (descr., refs & syn. as *E. marina*, incl. *Cryptomonas lima* Ehrenberg, 1873: 2, figs 24–25), 21–22, figs 16a-b (as *E. marina*, var. *lima* (Schiller) based on Ehrenberg, 1859); Carter, 1938:

* Hulbert (1965), Abé (1967a), and Parke and Dixon (1976: 547–551) have combined the genera *Exuviaella* and *Prorocentrum* but Balech (1971) and Sournia (1973) retained their identity. Dodge and Bibby (1973) demonstrated "that there is no basic distinction between the two genera". Taylor (1974: 199) commented that a decision was "probably premature before more species have been studied with the electron microscope (see Dodge, 1965)". Dodge (1976) abandoned the genus *Exuviaella* based on the most comprehensive review since Schiller (1933–37); see also Travers and Travers, 1975: 263, and Taylor, 1976: 20–21.

57, pl. 6, figs 32–34; Massuti & Margalef, 1950: 49, fig. 42; Kiselev, 1950: 55 (in key), 59 (descr.); Wood, 1954: 178 (descr., distrib.), text-fig. 1; Trégouboff & Rose, 1957: 97 (key features); Cassie, 1960a: 169 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities), 48; Wood, 1964a: 47 (ecol.); Wood, 1964b: 558 (ecol.); Cassie, 1966 : 574, 575; Loeblich & Loeblich, 1966 : 30 (listed as type species of *Exuviaella* Tsenkovskiy [Cienkowski], 1881: 189); Halim, 1967: 728, pl. V, fig. 61; Wood, 1968: 56 (descr.), fig. 139; Steidinger & Williams, 1970: 37 (in key, as *Prorocentrum marinum*), 61; Hada, 1970: 10, text-fig. 2; Lanigan, 1972: 169, fig. on p. 175 (Hauraki Gulf, as *E. baltica*); Sournia, 1973: 30 (listed), 69 (invalid new combination in *Prorocentrum* cited); Dodge & Bibby, 1973: 175–187 *passim* as *Prorocentrum marinum* new comb.); Taylor, 1974: 195 (N.Z. records listed); Dodge, 1976: 109 (descr., syn., to *P. lima*), 121 (in key), 122, figs 1E–F, pl. 1, figs B–C; Taylor, 1978: 217 (Goat Is Bay records as *E. marina*); Cienk.); Taylor & Durbin, 1978: 221 (Whangateau records, as *E. marina*); Iwasaki, 1981: 64–65 (laboratory strains); Fukuyo, 1981: 967 (descr., etc.), fig 1-4, 46; Nakajima *et al.*, 1981: 1029–1033 *passim* (toxicity); Dodge, 1982a: 27 (in key), 30 (descr., distrib., syn.), figs 2G–H; Murakami *et al.*, 1982: 69–72 (toxic component); Bomber *et al.*, 1985: 45–50 (heterogeneity, ecol.); Bagnis *et al.*, 1985: 177–182 (dynamics/toxicity); Shimizu, 1987: 283, 304–306 (toxin); Bomber *et al.*, 1988: 204–214 (population density); Torigoe *et al.*, 1988: 7876–7877 (toxin).

Prorocentrum micans Ehrenberg, 1833

Ehrenberg, 1833: 307; Stein, 1883: 16, pl. I, figs 1–12; Claparède & Lachmann, 1859: 412, pl. 20, figs 6, 8; Schütt, 1896: 8–9 (descr.), text-fig. 12; Lemmermann, 1899: 315 ((?) N.Z. record as *P. gracile* Schütt, from French Pass); Paulsen, 1908: 7 (in key), 8 (descr., refs), text-fig. 4; Fauré-Fremiet, 1908: 213, fig. 1; Lebour, 1925: 16 (descr., distrib.), pl. I, figs 5a-c; Martin, 1929: 11 (descr.), pl. III, figs 10–13, pl. VII, fig. 4, pl. VIII, fig. 3; Peters, 1930: 53, fig. 21; Schiller, 1933: 35–36 (descr., refs & syn.), text-figs 37a-f and 38, figs 40a-e (as *Prorocentrum schilleri* Böhm); Allen, 1933: 12–13 (red water); Böhm, 1936: 13 (variations), fig. 4a; Kiselev, 1950: 60 (in key), 62, figs 85a-c (descr.); Braarud & Rossavik, 1951: 3–18 (in culture); Gaarder, 1954a: 57–58; Wood, 1954: 179–180 (descr., distrib.), text-fig. 5; Pinto & Silva, 1956: 1–20 (shellfish toxicity); Brongersma-Sanders, 1957: 981 (red-water occurrences); Trégouboff & Rose, 1957: 97 (key features), pl. 20, fig. 5; Bursa, 1959: 1–31 *passim* (morphodynamics, taxon., etc.); Yamaji, 1959: fig. on p. 112; Bursa, 1959: 1–2 (refs), 4–5 (morphol. var.), figs 1–29, 36-41, 48–66, 71–74, 79–94, 125–127 as *P. levantinoides*); Silva, 1959: 1–15; Kain & Fogg, 1960: 33–50, 7 figs (growth); Cassie & Cassie, 1960: 181 (table 1) (Waitarere Beach); Cassie, 1960a: 170 (E. of N.Z.); Cassie, 1961: 18 (N.Z. localities), 49; Fraser, 1962: frontisp., fig. 37; Wood, 1963a: 8 (as *P. pacificum*), fig. 5; Newell & Newell, 1963: 38, pl. IX, fig. 7; Riedl, 1963: 33, pl. 5; Wood, 1963b: 51 (refs); Wood, 1964: 567 (ecol.); Grassé *et al.*, 1965a: 1743–1749; Grassé *et al.*, 1965b: 6975–6978 (chromosome ultrastructure), pl. I; Halstead, 1965: 160, pl. VI, fig. 4 (toxic nature, etc.); de Sousa e Silva, 1965: 5–30 *passim* (cytophysiology); Russell, 1965: 265 (table I) (toxic nature); Cassie, 1966: 575, 584 (Hauraki Gulf); Loeblich & Loeblich, 1966: 51 (listed as type species of *Prorocentrum* Ehrenberg, 1835: 307; Bouck & Sweeney, 1966: 205 *et seq.*, figs 1, 6-9 (fine structure and ontogeny of trichocysts); Abé, 1967a: 371–372 (morphol., refs), figs 1a-k ; Vien, 1967: 108– 110, figs (reprod.); Halim, 1967: 740; Steidinger *et al.*, 1967: pl. I, fig. 3; Wood, 1968: 123 (descr.), fig. 380; Loeblich, 1970: 870, 900–901 (cellular covering); Akinina, 1969: 301–305; Kayser, 1969: 21 (industrial wastes and population growth); Throndsen, 1969: 168; Kayser, 1969: 21–44 *passim* (rearing experiments); Kowallik, 1969: 251– 269, 3 figs, 10 pls (matrix lattice); Steidinger & Williams, 1970: 36 (in key), 61, figs 136a-b; Dodge & Crawford, 1970: 55, 60 (fine structure), table 1; Kowalik, 1971: 154–165; Kowallik & Haberkorn, 1971: 252–261, 2 pls (chloroplast); Lanigan, 1972: 169, fig. on p. 175 (Hauraki Gulf); Dodge, 1972: 296 (pusule morphology); Sournia, 1973: 69 (listed); Dodge & Bibby, 1973: 175–187 *passim*, pl. 2, fig. D, pl. 3, fig. C, pl. 5, figs B–C; Taylor, 1973: 491 (Hauraki Gulf ecol.); Haapala & Soyer, 1973: 195–197 (chromosome structure); Sarjeant, 1974: 19, 24, 35, fig. 3; Taylor 1974: 194 (N.Z. records listed); Sournia, 1974: 325–389; Iizuka & Komaki, 1974: 60-66; Drebes, 1974b: 113–114 (descr., etc.), fig. 93a; Soyer, 1975: 306–307 (chromosomal division); Dodge, 1976: 112– 114 (descr., distrib., syn.), 122 (in key), figs 3A, E, pl. 2, figs A–C, E–F; Taylor, 1976: 23–24 (discuss., refs), pl. 1, fig. 1; Elbrächter, 1977: 192–200; Uschida, 1977: 1–4 (diatom-inhibitory substance); Taylor, 1978: 217 (Goat Is Bay, Leigh); Taylor & Durbin, 1978: 222 (Whangateau Harbour); Kayser, 1979a: 121–123 (culture); Kayser, 1979b: 357– 369 (multispecies growth interractions); Avaria, 1979: 161–164; Kat, 1979: 215–220; Staker & Bruno, 1980: 167–172 (diurnal migration); de Billy & Soyer, 1980: 45–54 (toxic effects of 2-4-5T); Kayser & Sperling, 1980: 89–102 (effects of cadmium); Shim *et al.*, 1981: 60, pl. I, figs 4a-b; Stolbova, 1981: 63–67 [204–208] (nuclear division); Cassie, 1981: 181–184 (non-toxic blooms, off Karamea, refs); Iwasaki, 1981:

64–65 (laboratory strains); Soyer & Prevot, 1981: 308–313 (damage by cadmium); Avaria & Muñoz 1982: 101–115 (as red tide in Chile, refs); Andreis *et al.*, 1982: 226 (thecal surface), fig. 1; Dodge, 1982a: 27 (in key), 32–33 (descr., distrib., syn.), fig. 2K, pl. I, figs c-d; Burns & Mitchell, 1982b: 76, figs 20-22; Chang, 1983b: 291, table 1 (West Coast productivity study); Han & Yoo, 1983a: 38 (refs), pl. I, fig. 1; Lembe & Campodonico, 1984: 491–493; Yamochi, 1984: 97–106 (nutrient factors in growth); Villa & Huerta, 1985: 81–85 (red tide); Pagou, 1985: 97–98 (eutrophication/effects); Ilyash & Fedorov, 1985: 67–74 (dynamics); Filipic & Revelante, 1985: 99–100 (vertical migration); Lalami-Taleb *et al.*, 1985: 159; Revelante & Gilmartin, 1985: 89; Kat, 1985: 73 (toxin source); Gavrila & Mihaescu, 1986: 1–25 (fine structure/chromosomes); Lalami-Taleb *et al.*, 1986: 185; Prevot & Soyer-Gobillard, 1986: 42–47 (chemicals/growth); Costas, 1986a: 173–182 (reproductive productivity); Costas, 1986b: 61–66 (genetics/hybrids); Costas, 1986c: 67–72; Costas, 1986d: 73–76 (genetics); Yamochi & Joh, 1986: 266–275 (cell liberation/temperature); Dubinsky *et al.*, 1986: 1335–1349 (photosynthesis); Polikarpov *et al.*, 1986: 74–77 (environment); Rodriguez *et al.*, 1986: 75–96 *passim* (production, ecol.); Bhaud & Soyer-Gobillard, 1986: 23–30 (cell cycle); Yamaguchi *et al.*, 1986: 5–14 (sterols); Smirnov *et al.*, 1986: 227 (primary production); Muñoz & Avaria, 1986: 141–155 (taxon.); McKenzie & Gillespie, 1986: 377, 388 (table 3: Tasman Bay); Costas & Delgado, 1987: 1–5 (cell ultrastructure); Costas *et al.*, 1987a: 91–94 (trichocysts); Costas & Varela, 1987b: 101–106 (interspecific competition); Jenkinson, 1987: 47; Hallegraeff, 1987: 4, fig. 7; Taylor, 1987a: 6; Taylor, 1987c: 28, 29, 54; Dodge, 1987: 93, 101, 103, 105 (organelles); Rizzo, 1987: 145–147, 149–154, 160, 161, 165 (biochem./nucleus); Prézelin, 1987: 211; Gaines & Elbrächter, 1987: 227, 334; Shimizu, 1987: 305; Levandovsky & Kaneta, 1987: 372, 383; Taylor, 1987d: 401, 403, 409, 414, 415, 418, 419, 422, 427, 430, 439, 440, 445, 446, 460; Pollingher, 1987: 520; Aubert & Franceschi, 1987: 43–50 (productivity); Costas & Goyanes, 1987: 435–441 (chromosomes etc.); Klut *et al.*, 1987: 736–744 (organelles); Kristiansen, 1987: 739 (nitrates); Gill & Harris, 1987: 785 (predation/copepods); Gavrila & Mihaescu, 1987: 89–93 (chromosomes); Meixner, 1988: 163–166 (toxin transmission); Bhaud *et al.*, 1988: 197–206 (gametes/mating, genetics); Klut, 1988: 2526 (chemical composition); Costas *et al.*, 1988a: 555 (ultrastructure); Costas *et al.*, 1988b: 37–45 (cell ultrastructure); Costas & Varela, 1988: 223–226 (cyclical functions); Sarkisova & Skopnik, 1988: 44–48 (photosynthesis); Lenaers *et al.*, 1988: 215 (protein content); Livolant & Maestre, 1988: 3056 (nucleoplast); Park *et al.*, 1988: 1–26 *passim* (succession etc.); Prevot & Soyer-Gobillard, 1988: 267–271 (chemical/growth); Dixon & Synett, 1988: 297–302 (growth); Hallegraeff, 1988: 52 (SEM photo); Griffis & Chapman, 1988: 305 *et seq.* (darkness survival/palaeoceanogr.); Blanco, 1988: 335; Balech, 1988: 32 (diag., taxon., distrib., ecol.), pl. 4, fig. 1; Dodge, 1989: 275; Klut *et al.*, 1989a: 89–95 (cell structure); Klut *et al.*, 1989b: 645 (cytochem.); Subrahmanyan & Bhavaranayana, 1989: 251–258; Vernet *et al.*, 1989: 365–371 (photosynthesis/red tide); Wiadnyana & Rossoulzadegan, 1989: 37–45 (predation/copepods); Rill *et al.*, 1989: 280–286 (DNA etc.); Schnepf & Winter, 1990: 89–91 (morphol.); Schnepf *et al.*, 1990: 234–242 (cell division); Granelli & Moreira, 1990: 89 *et seq.* (river water/growth); Chang *et al.*, 1990: table 1 (N.Z. records of blooms 1976, 1978, 1982).

Prorocentrum rostratum Stein, 1883

Stein, 1883: pl. 1, figs 16–17; Lohmann, 1920: 156 fig. 46e (as *P. stylifer*), 156 (as *P. tenue*); Schiller, 1933: 43–44 (descr.), text-figs 47a–b; Böhm, 1936: 15, fig. 4c; Rampi, 1950: 2–3 (distrib., etc.), text-fig. 5; Gaarder, 1954a: 58; Wood, 1954: 181 (descr., distrib.), text-fig. 7; Cassie, 1960a: 170 (E. of N.Z.); Hasle, 1960a: 31, text-figs 22a-b; Cassie, 1961: 18 (N.Z. localities); Halim, 1967: 750, pl. VII, fig. 97; Wood, 1968: 123 (descr.), fig. 384; Steidinger & Williams, 1970: 37 (in key), 61, fig. 138; Taylor, 1974: 194 (N.Z. records listed); Dodge, 1976: 112 (descr.), 121 (in key), figs 3F–G; Taylor, 1978: 217 (Leigh record); Chang, 1983b: 289, table 1 (West Coast productivity study, as "*P. rostrum*"); Balech, 1988: 185 (diag., taxon., distrib.), pl. 4, fig. 8.

Prorocentrum rotundatum Schiller, 1918

Schiller, 1918: 253–254, text-fig. 3; Schiller, 1928: 60, figs 19a-b; Schiller, 1933: 31 (descr.), text-figs 30a-b; Böhm, 1936: 15, fig. 3a; Rampi, 1950: 2, text-fig. 23 ("Dana" Stn 3651, off N.Z.); Taylor, 1974: 194 (N.Z. records listed); Dodge, 1976: 112 (descr.), 121 (in key), figs 2D–E; Andreis *et al.*, 1982: 226 (thecal surface).

Prorocentrum triestinum Schiller, 1918

Schiller, 1918: 252, figs 1a-b; Schiller, 1931: 40, figs 43a-f; Dodge, 1965: 609, fig. 2; Taylor, 1976: 25–26 (discuss., etc.), pl. 1, fig. 2 (4, 5?); Dodge, 1982a: 32, fig. 2J (descr., distrib., syn., incl. *P. redfeldii* and *P. pyrenoideum* Bursa, 1959); Yamochi & Joh, 1986: 266–275 (temperature/cell liberation); MacKenzie *et al.*, 1986: 402 (table 1 : Kenepuru Sound); Costas, 1986b: 61–66 (hybrids); Costas & Varela, 1987a: 29–35 (populations/genetics); Costas *et al.*, 1987a: 105

(chromosomes); Costas *et al.*, 1987b: 107–112 (nuclear ultrastructure); Costas *et al.*, 1987c: 459–466; Costas & Goyanes, 1987: 435–441, figs; Costas *et al.*, 1988a: 555–562 (chromosome/ultrastructure etc.).

Prorocentrum sp. MacKenzie *et al.*, 1986

MacKenzie *et al.*, 1986: 402 (table 1 : Kenepuru Sound).

Suborder PYROCYSTINA (PYROCYSTALES) Family PYROCYSTIDAE/PYROCYSTACEAE

* Genus **Pyrocystis** Murray *in* Thomson & Murray, 1885

Pyrocystis lunula (Schütt, 1895)

Schütt, 1895: 4, pls 24–25, fig. 80 (*Gymnodinium*) (*not* fig. 80, 10–11 = *Pyrocystis obtusa* Pavillard, 1931, *fide* Schiller, 1937 : 492); Schütt, 1896: 4, pl. 3, figs 2b-e (not f, *fide* Elbrächter *et al.*, 1987: 237); Lemmermann, 1899: 315 (N.Z. record from French Pass), 327; Dogiel, 1906: pl. I, figs 1–25; Apstein, 1906: 263–269 (life cycle), 1 pl; Paulsen, 1908: 110–111, figs 153–155; Kofoid & Swezy, 1921: 191, text-fig. BB, 10, pl. 2, fig. 14, (as *Gymnodinium bicorne*) 229, text-fig. J, pl. V, fig. 55 (*G. lunula*); Peters, 1930: 83, fig. 47 (*Dissodinium*); Schiller, 1937: 488–489 (descr., refs & syn.), text-figs 559, 1–11; Massuti & Margalef, 1950: 48, fig. 38; Kiselev, 1950: 266 (descr.), fig. 455; Wood, 1954: 319–320 (descr., distrib., syn.), text-figs 257a-b (in subgenus *Dissodinium* Paasche, 1916); Trégouboff & Rose, 1957: 124 (key features), pl. 28, figs 13A–C; Cassie, 1961: 20, 49 (N.Z. record from Cook Strait); Riedl, 1963: 33, pl. 5; Newell & Newell, 1963: 38, 39, pl. X, fig. 1; Wood, 1963b: 53 (refs); Wood, 1964: 567 (ecol.); Cassie, 1966: 584 (Hauraki Gulf); Loeblich & Loeblich, 1966: 53 (type designation listed); Sournia, 1967: 430–431, text-fig. 6; Swift & Taylor, 1967: 77–81 (bioluminescence, etc.) Steidinger *et al.*, 1967: pl. I, figs a-b (as "*Dissodinium* (= *Gymnodinium*)"); Stosch, 1967: 626–636 *passim*; Swift & Reynolds, 1968: 439–440; Wood, 1968: 126 (descr.), fig. 393; Loeblich, 1970: 858 (cellular covering); Throndsen, 1969: 171; Seliger *et al.*, 1969: 227–232 (photon emission), 2 figs; Biggley *et al.*, 1969: 96–122 *passim* (bioluminescence), 14 figs; Swift & Remsen, 1970: 79–86 (cell wall); Swift & Durbin, 1971: 89–96 (sexual reproduction, species comparisons); Swift & Durbin, 1972: 189–198 (population estimates and cytology); Taylor, 1972: 53 etc. (generic distinctions, discuss., cyst stages, etc.), 54 (*Dissodinium*); Taylor, 1973: 163 (*Gymnodinium*, ecol., etc.); Loeblich, 1974: 435; Drebes, 1974a: 1–9; Drebes, 1974b: 50–52 (descr. etc. *Dissodinium pseudolunula* Swift, 1973), figs 133–134; Taylor, 1974: 198 (N.Z. records listed); Jeffrey *et al.*, 1975: 374–384 *passim* (chloroplast pigment patterns); Parke & Dixon, 1976: 549; Swift & Meunier, 1976: 14–22 (effects of light intensity); Bhovichitra & Swift, 1977: 73–83 (uptake of nitrate and ammonium); Elbrächter & Drebes, 1978: 358–360 (life cycle), 363–364 (taxon.), fig. 5; Taylor, 1978: 217 (listed from Goat Is Bay, Leigh); Taylor & Durbin, 1978: 219–222 (March 1968 record from Whangateau Harbour); Dodge, 1982a: 257, fig. 35; cf. Rivkin *et al.*, 1982: 181–192 (light-shade adaptation in allied species); Han & Yoo, 1983a: 43, pl. II, fig. 9 (descr., dimensions etc. as *Dissodinium pseudolunula* Swift ex. Elbrächter & Drebes — see also Swift, 1973: 90–91 and Drebes, 1974b: 150; Sweeney *et al.*, 1983: 457–465 (stimulation of bioluminescence); Hastings & Dunlap, 1986: 307 *et seq.* (bioluminescence etc.); Fresneau *et al.*, 1986: 495–503 (bioluminescence); Nealson *et al.*, 1986: 77 *et seq.* (identif./luminescent characters); Prézelin, 1987: 208 (photosynthesis); Sweeney, 1987: 270, 274, 275, 277 (bioluminescence); Withers, 1987: 318, 337, 340, 341, 344 (sterols); Elbrächter *et al.*, 1987: 233–241 *passim*, esp. p. 237 (taxon., etc.); Fresneau & Arri, 1988: 22–27 (bioluminescence).

Suborder THORACOSPHAERINA (THORACOSPHAERALES) Family THORACOSPHAERIDAE/ THORACOSPHAERACEAE

Genus **Thoracosphaera** Kamptner, 1927

Thoracosphaera heimii (Lohmann, 1920)

Lohmann, 1920: 117, fig. 29 (*Syracosphaera*): Kamptner, 1927: 180–184, fig. 6 (as *T. pelagica*); Schiller, 1930: 240, fig. 48; Kamptner, 1941: 118; Bernard, 1942: 95; Kamptner, 1944: 145; Kamptner, 1954: 40–42, figs 41–42; Hasle, 1960b: 78, 85, *et seq*;. Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Stradner, 1961: 8, fig. 75; Cohen, 1964: 248, pl. 5, fig. 7; Cohen, 1965: 30–31, pl. 5, fig. 7; Loeblich & Tappan, 1966: 168, 172 (listed); Takayama, 1967: 193 (refs & syn.); Kamptner, 1967: 158, pl. 13, figs 89–90, pl. 14, figs 91–92, 95, pl. 17, fig. 104; Gaarder & Hasle,

* [*Pyrocystis* Murray, 1876, not of Carpenter, 1891, provisional name, invalid *fide* International Code of Botanical Nomenclature, Article 34, para. 1 — see Loeblich & Loeblich, 1970b: 201; see also delimitation of *Pyrocystis* against *Dissodinium* by Elbrächter & Drebes, 1978, and references in Sournia, 1967. See generic diagnosis in Sournia (1986: 48–49 for *Pyrocystis* and 1986: 49 for *Dissodinium*).]

1971: 539; Edwards, 1972: 174 (table 1, ecological preferences); Winter *et al.*, 1979: 210, pl. V, fig. 11; Chan, 1980: 143, pl. 4, fig. 6 (syn.); Heimdal & Gaarder, 1981: 62 (remarks, Fütterer's conclusions that *T. heimii* is a dinoflagellate); Tangen *et al.*, 1982: 193–212 (morphol., life cycle, now established as a dinoflagellate in new order Thoracosphaerales); Jones *et al.*, 1983: 416-420, figs; Sournia, 1986: 47-48 (generic diag.); Dale, 1986: 65–72 *passim* (life-history strategies); Griffis & Chapman, 1988: 305 *et seq.* (darkness effects/palaeoclimatology).

[Subclass EBRIOPHYCIDAE]
Suborder EBRIINA /EBRIALES
Family EBRIIDAE (EBRIACEAE)

Genus **Ebria** Borgert, 1891

Ebria tripartita (Schumann, 1867)

Schumann, 1867: 50, 67, pl. I, fig. 28 (*Dictyocha*); Lemmermann, 1899: 375 (*Ebria*) (syn.); Lemmermann, 1901: 268–269; Lemmermann, 1908: 32 (descr., refs & syn.), text-fig. 108; Gemeinhardt, 1930: 79–80 (descr., distrib., refs & syn.), figs 66a-f; Deflandre, 1951: 5, fig. 2D–E, 57, fig. 231, 80 (type species of genus); Deflandre, 1952a: 424, text-fig. 323F; Trégouboff & Rose, 1957: 83 (key features), pl. 18, figs 13–14; Cassie, 1961: 20 (NZOI Stns Z607, Z608, Hauraki Gulf), pl. VIII, fig. 5; Tsumara, 1963: 73–74 (discuss., refs & syn.), pl. XV, figs 1-4, pl. XXVI, figs 16–17; Gleser, 1966: 231; Loeblich *et al.*, 1968: 45 (*Dictyocha*), 50 (*Ebria*), 152 (orig. descr.), 186, text-fig. 16(I–F), pl. 38, figs 8–11, pl. 45, fig. 18; Wood, 1968: 132 (descr., etc.), fig. E; Mandra *et al.*, 1973: 6 (occurrence in Oamaru diatomite, N.Z. Eocene); Drebes, 1974b: 161 (descr.), fig. 143b.

[Subclass ELLOBIOPHYCIDAE]
Suborder THALASSOMYCETINA
(THALASSOMYCETALES)
Family THALASSOMYCETIDAE/
THALASSOMYCETACEAE
[Ellobiopsidae]

Genus **Thalassomyces** Niezabitowski, 1914

Thalassomyces marsupii Kane, 1964

Kane, 1964: 292–302, text-figs 2–7 (NZOI Stn B33, parasitic on pelagic amphipod *Parathemisto gaudichaudii* (Guérin)); Vader & Kane, 1968: 13–20, text-figs 1–4, tables 1–2 (new hosts and distrib. records); Tencati & Geiger, 1968: (parasitic on *Parathemisto abyssorum* (Boeck)); Galt & Whisler, 1970: 295–303 (dinospores descr.); Vader, 1973: 178 (bibliography and hosts incl. *Eusirus leptocarpus* Sars, *E. longipes* Boeck, *Parathemisto abyssorum* (Boeck), *P. gaudichaudii* (Guérin), *P. pacifica* Stebbing, *Rhachotropis aculeata* (Lepechin), *R. helleri* Boeck, *R. macropus* Sars); Sournia *et al.*, 1975: 14 (listed); Dawson, 1979: 23 (type data).

† Class PHYTOMASTIGOPHORA
*Order CRYPTOMONADIDA /CRYPTOPHYCEAE
[Cryptophyta]
Family CRYPTOMONADIDAE
(CRYPTOMONADACEAE)

Genus **Chroomonas** Hansgirg, 1885

Chroomonas minutissima (Norris, 1964)

Norris, 1964: 274 (Wellington Harbour, in *Cryptochrysis* Pascher, 1911), fig. 16 (coloured); Kudo, 1954: 274 (generic definition); Taylor, 1974c: 397 (Norris' record in new combination under *Chroomonas* Hansg.), 400; cf. Santore, 1987: 83 *et seq.*; Chrétiennot-Dinet, 1990: 51 (generic diag.).

Genus **Cryptomonas** Ehrenberg, 1838

Cryptomonas acuta Butcher, 1952

Butcher, 1952: 188, pl. II, figs 51–53; Butcher, 1967: 40-41, pl. V, fig. 4, pl. XVIII, fig. 6; cf. Santore, 1985: 1 *et seq.*; Bradford *et al.*, 1987: 228 (Table 2, NZOI Stn T140, Pelorus Sound); Chrétiennot-Dinet, 1990: 50 (generic diag., etc.).

Cryptomonas mikrokuamosa Norris 1964

Norris, 1964: 273 (Wellington Harbour), fig. 17 (coloured); Kudo, 1954: 273 (generic definition).

Cryptomonas profunda Butcher, 1967

Butcher, 1967: 40, pl. IV, fig. 7, pl. XVIII, fig. 5; Bradford *et al.*, 1987: 228 (Table 2, NZOI Stn T140, Pelorus Sound).

† See also Cox (1980) for a comprehensive series of reviews on the phytoflagellates (note taxonomic status comment on p. 2 and comparative table on p. 4).

* See Norris (1982b: 126) and Santore and Leedale (1985: 20–22); also Klaveness (1985) for review of criteria for determining species.

Cryptomonas spp. MacKenzie *et al.*, 1986
MacKenzie *et al.*, 1986: 402 (table 1: Kenepuru Sound).

Cryptomonas spp. MacKenzie & Gillespie, 1986
MacKenzie & Gillespie, 1986 : 377 (table 3: Tasman Bay).

Cryptomonas spp. Chang *et al.*, 1990
Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Genus **Leucocryptos** Butcher, 1967

Leucocryptos marina (Braarud, 1935)
Braarud, 1935: 115, text-fig. 36 (*Bodo*); Halldal, 1953: 58–59, text-fig. 21 (*Chilomonas*); Norris, 1961: 183, fig. 22 (NZOI Stns B65, B69, off Kermadec Is); Parke & Dixon, 1964: 512 (listed); Butcher, 1967: 49 (descr., etc., in *Leucocryptos* n.g.); Throndsen, 1969: 167; Chrétiennot-Dinet, 1990: 54 (generic diag.).

Genus **Rhodomonas** Karsten, 1898

Rhodomonas baltica Karsten, 1898
Karsten, 1898: 15, pl. I, figs 8–12; Zimmerman, 1925: 4–9, pl. I, figs 1a-c (detailed descr., phototaxis, etc.); Carter, 1937: 54–55, pl. 8, figs 4–5; Taylor, 1978: 216 (Leigh area).

Order EUGLENIDA (EUGLENOPHYCEAE)
[Euglenophyta]
Suborder EUTREPTIINA (EUTREPTIALES)

Genus **Eutreptiella** Cunha, 1913

Eutreptiella marina Cunha, 1913
Cunha, 1913: 203; Hollande, 1952a: 268 (generic definition); Kudo, 1954: 301–302 (generic definition), fig. 120j; Butcher, 1961: 5 (in key, descr., distrib.); Norris, 1964: 271 (Wellington Harbour), fig. 8 (coloured); Leedale, 1967: 14 (characters), fig. 3; Taylor, 1974: 397 (N.Z. records listed); Taylor, 1968: 214 (Goat Is Bay records); Taylor, 1978: 214 (Leigh, Nov. to Jan.); Taylor & Durbin, 1978: 220 (Nov. and Dec. 1967 at Whangateau); Chrétiennot-Dinet, 1990: 58 (generic diag.).

Suborder EUGLENINA/EUGLENALES

* Genus **Euglena** Ehrenberg, 1830

Euglena deses Ehrenberg, 1833
Ehrenberg, 1833: a, d, j, pl. VII, fig. 8; Gojdics, 1934: 299–310, 3 pls. (morphol., cell division); Gojdics, 1953: 3, 7, 12, 14, 32, 34, 35, 36, 53 (in key), 133–134 (descr.), pl. 23, figs 2a-c; Pringsheim, 1956: 118 ("... an outstanding example of a species composed of a considerable number of closely related taxonomic forms ..."), 121 (descr., etc.), 134 (listed as a "... collective species of common occurrence), fig. 37; Butcher, 1961: 8 (in key), 12–13 (descr., etc.), pl. I, fig. 10, pl. II, fig. 9; Buetow, 1968: 118 (movement), 115 (shape), 117 (cysts), 146 (dispersal of stigma), 153, 154 (contractile vacuole); Cook, 1968: 246 (avail-ability of culture, etc.), 274 (oxygen requirements); Jahn & Bovee, 1968: 48–50, 51, 53 (movement), 61 (pattern swimming), 74 (flagellum), 82 (undulation), 91; Johnson, 1968: 4 (pyrenoids), 12–13 (chromatophores), 20 (characteristics), fig. 4 (p. 17); Lackey, 1968: 30 (culture), 31–33 (habitat), 33 (movement), 38 (wheat infusions), 39 (soils), 42 (distrib.); Leedale, 1968: 185, 186, 220, 230 (mitosis), 188 (interphase nucleus); Taylor, 1974c: 397 (first N.Z. record, Leigh and Kaipara Harbours); Bovee, 1982: 160, 161 (crawling behaviour, based on Uhlehla, 1911); Cassie, 1984: 239 (N.Z. freshwater distrib. and refs, incl. Maskell, 1886: as *Amblyophis viridis* Ehrenberg); Zakrys, 1986: 491–540.

Euglena limosa Gard, 1919
Gard, 1919: 1423–1425; Bracher, 1919: 93–108, 9 figs; Bracher, 1929: 36–81 *passim*; Carter, 1933: 223, fig. 25; Bracher, 1937: 23 *et seq.*, 4 figs (light relations); Gojdics, 1953: 36, 48 (in key), 53 (in key), 86–87 (descr., refs, incl. Gard, 1920–22), 180, pl. 7, fig. 3; Pringsheim, 1956: 86–88, fig. 21 (as syn. of *E. obtusa* Schmitz, 1884: 24, pl. I, fig. 24; "Gard (1920; 1922) gave the same species the name *E. limosa*". See particularly Carter, 1933), 136 (listed); Butcher, 1961: 7 (in key as *E. obtusa*), 11 (descr., etc. incl. *E. limosa*

* References to brackish-water species of *Euglena* (*E. obtusa* Schmitz, 1884 and *E. salina* Liebetanz, 1925) can be found in Steffensen's account (1964); see also Gojdics (1953: 8, 26, 34, 43 (in key), 147 (descr.), pl. 28, fig. 3, 63, 147, 181 for *E. obtusa* and pp. 52 (in key), 140 (descr.), pl. 21, fig. 5, 185 for *E. salina*) and Leedale (1967: 23 (characters), fig. 13, 120) for *E. obtusa*. Note also Jones, 1983: 97. See discussion by Lackey (1968: 31) re "saltwater" species of *Euglena*. Cassie (1984: 239–240) has included two of the three species listed here (*E. deses, E. limosa*) in her list of freshwater algae of New Zealand; see also Cassie (1983) for guide to *Euglena* species found in oxidation ponds in the Auckland district. See Chrétiennot-Dinet (1990: 88) for generic diagnosis.

Gard), pl. I, fig. 18, pl. II, fig. 6; Palmer & Round, 1965: 567–582 (as *E. obtusa*); Leedale, 1967: 23, fig. 13 (redescr. as *E. obtusa* Schmitz 1884, cf. Gojdics, 1953: 87, 147–148, pl. 28, fig. 3); Lackey, 1968: 31 (habitat), 42 (distrib.); Jahn & Bovee, 1968: 53 (metabolic movement), 69 (phototaxis), 91, 96 (contractile body movements); Knox & Kilner, 1973: 213–220, 249, 349, figs 7.13–7.15, 7.22 (taxon., distrib., etc. in Avon-Heathcote Estuary, based on reports of Bruce, 1953, Williams, 1959, Rosenberg, 1963, Steffensen, 1969, etc., see their refs); Bovee, 1982: 161 (crawling behaviour based on Conrad, 1940); Cassie, 1984: 239 (N.Z. distrib. and refs).

Euglena salina Liebetanz, 1925

Liebetanz, 1925: 1–116; Gojdics, 1953: 52 (in key), 130 (descr.), 186, pl. 21, fig. 5; Pringsheim, 1956: 123 ("... the incompletely known *E. salina* ... may be related to *E. mutabilis* Schmitz, 1884" — see Pringsheim, pp. 122–123, fig. 38), 138 (listed); see also Buetow, 1968; Knox & Kilner, 1973: 349; Steffensen, 1974: 85–94.

Euglena sp. MacKenzie & Gillespie, 1986

MacKenzie & Gillespie, 1986: 380 (table 3 : Tasman Bay).

Euglena sp. Chang *et al.*, 1990

Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Genus **Euglenopsis** Klebs, 1893

Euglenopsis zabra Norris, 1961

Norris, 1961: 173, fig. 21 (NZOI Stn B67, off Kermadec Is).

Suborder SPHENOMONADINA (SPHENOMONADALES)

Genus **Petalomonas** Stein, 1859

Petalomonas micra Norris, 1964

Norris, 1964: 271–272, fig. 41 (Wellington Harbour); Hollande, 1952a: 281–282 (generic definition); Kudo, 1954: 302–303 (generic definition); Taylor, 1974c: 397 (N.Z. record listed).

Suborder HETERONEMATINA (HETERONEMATALES)

Genus **Colacium** Ehrenberg, 1834

Colacium sp. Taylor, 1974

Taylor, 1974c: 397 (first N.Z. record, Leigh); Taylor, 1978: 214 (listed from Leigh area, June 1968); cf. Johnson, 1968: 11, fig. 2D (generic characters).

Genus **Entosiphon** Stein, 1878

Entosiphon limenites Norris, 1964

Norris, 1964: 272, figs 34–48, 48–49 (Wellington Harbour); Hollande, 1952a: 279–280 (generic definition); Kudo, 1954: 304–305 (generic definition); Throndsen, 1969: 182 (Norwegian record), 193, 194; Taylor, 1974c: 397 (N.Z. record listed).

* Order CHRYSOMONADIDA/CHRYSOPHYCEAE
[Chromophycota]

Genus **Apedinella** Throndsen, 1971
[Pedinellales: Pedinellaceae]

Apedinella spinifera (Throndsen, 1969)

Throndsen, 1969: 175–176, figs 10 & 12 (*Pseudopedinella*); Throndsen, 1970a: 55; Throndsen, 1971: 47–84 (fine structure, in new genus *Apedinella*); Leadbeater, 1972c: 113 (listed), 186 (recognition); Leadbeater, 1974: 186 (recognition); Throndsen, 1976: 269–293, figs *passim* (productivity); Hibberd, 1976: 73; Thomsen, 1978: 35 (listed); Moestrup, 1979: 64 (N.Z.); Espeland & Throndsen, 1986: 214 (distrib., etc.).

Genus **Calycomonas** Lohmann, 1908+

Calycomonas ovalis Wulff, 1919

Wulff, 1919: 111, pl. II, figs 20a-b; Lund, 1960: 427, pl. 87(1), figs 20–21; Norris, 1964: 209 (NZOI Stn B198, Wellington Harbour); Throndsen, 1969: 174 (descr., distrib.), 193, 194, 207, text-fig. 7; Taylor 1974c: 398 (listed); Espeland & Throndsen, 1986: (distrib., etc.), figs 14–16.

Calycomonas vangoorii (Conrad, 1938)

Conrad, 1938: 4, figs 4–6 (*Codonomonas Van Goorii*); Lund, 1960: 427, pl. 87(1), figs 9–11 (from

* Suborders and families not included in full, following Hibberd & Leedale, 1985: 54; but cf. Christensen (1962) and Bourrelly (1981) for their arrangement.

+ For discussion of generic relationships see Bourrelly (1960).

Conrad, 1938), figs 12–13 (from Lohmann, 1908–1909: 291, pl. XVII, figs 13b-d(?) as *C. gracilis*, in part); Norris, 1964: 269, fig. 40 (NZOI Stn B198, Wellington Harbour); Parke & Dixon, 1964: 520 (listed); Throndsen, 1969: 174 (descr., distrib.), 191, 193, 194, 202, 207, text-figs 8a-b; Taylor, 1974c: 398 (listed).

Genus **Thaumatomastix** Lauterborn, 1899
[Chrysosphaerales : Chrysosphaeraceae]

Thaumatomastix salina (Birch-Andersen, 1973)
Birch-Andersen, 1973: 140–144 (as *Chrysosphaerella* Lauterborn, 1896, a freshwater genus — see Chrétiennot-Dinet, 1990: 44); Moestrup, 1979: 64, figs 5 & 7 (N.Z. record); MacKenzie & Gillespie, 1986: 377 (table 3: Tasman Bay).

Genus **Dinobryon** Ehrenberg, 1835
[Ochromonadales : Dinobryaceae]

Dinobryon aff. **balticum** (Schütt, 1892) Moestrup, 1979
Moestrup, 1979: 64, fig. 3 (N.Z. record); Schütt, 1892: 275; Lemmermann, 1900: 518; Huber-Pestalozzi, 1941: 230 (distrib. of *Dinobryon* spp.); Bird & Kalff, 1989: 155 (energy etc.).

Dinobryon cylindricum Imhof, 1883
Imhof, 1883: 656 (freshwater); Lemmermann, 1900: 516, pl. 19, figs 1–5; Krieger, 1930: 309, fig. 47; Ahlstrom, 1937: 141, 142 (in key), 148–149 (review, "*D. balticum* is probably a regional form of *D. cylindricum*"), pl. II, figs 26–43; Nygaard, 1945: pl. II, figs 11–12 (coloured); Norris, 1964: 258, fig. 32 (NZOI Stn B198, Wellington Harbour, but (?) freshwater derivation); Schneider, 1970: 353, 1 pl.; Taylor, 1974c: 398 (listed), 399 ("... extremely unlikely that these freshwater species will survive in the sea"); Lehman, 1976: 646-658 (ecol., nutrition); Sandgren, 1981: 199–210, figs 1–4.

Dinobryon divergens Imhof, 1883
Imhof, 1883: 656; Haye, 1930b: 295–302; Seitler, 1935: 282–286; Nygaard, 1945: 24–26 (in key), pl. II, fig. 10 (coloured); Ahlstrom, 1937: 141 (in key), 142–146 (review, refs), text-fig. 1, pl. I, figs 1–36; Kudo, 1954: 265 (generic definition); Cassie, 1961: 20 (N.Z. records); Taylor, 1974c: 398 (listed), 399 (comment as above); Sheath *et al.*, 1975: 131–138 (statopore, formation etc.), 33 figs; Lehman, 1976: 646–658 (ecol., nutrition).

Genus **Meringosphaera** Lohmann, 1902

Meringosphaera mediterranea Lohmann, 1902
Lohmann, 1902a: 68; Schiller, 1916a: 198, text-figs 1–2, 5–6; Schiller, 1925: 80 (distrib.), text-fig. P, pl. 3, fig. 3; Pascher, 1932: 204, figs 8–11 (in Xanthophyceae); Parke & Dixon, 1968: 808, 809 (Xanthophyceae, position uncertain); Norris, 1971: 111 (in Chrysophyceae); Leadbeater, 1974 : 180, 187 (descr., remarks, systematic position etc.), pl. IV, figs A–F; Moestrup, 1979: 64–65, figs 2 & 6 (N.Z.); MacKenzie & Gillespie, 1986: 377 (table 3: Tasman Bay).

Genus **Paraphysomonas** De Saedeleer, 1929
[Ochromonadales : Synuraceae]

Paraphysomonas butcheri Pennick & Clarke, 1972
Pennick & Clarke, 1972: 45–48; Leadbeater, 1972d: 179; Leadbeater, 1974: 186 (remarks etc.), pl. V, figs G–H; Thomsen, 1975: 120 (variation); Moestrup, 1979: 65 (N.Z. record).

Paraphysomonas imperforata Lucas, 1967
Lucas, 1967: 330, pl. I, figs A–B & D; Boney, 1970: 264; Manton & Leadbeater, 1974: 23; Thomsen, 1975: 120–122; Thomsen, 1978: 35 (listed); Moestrup, 1979: 65, figs 4 & 60; Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Jan. 1989).

Genus **Spumella** Cienkowsky, 1870
[= *Monas* Müller, 1773;
see Hibberd & Leedale, 1985 : 60]

Spumella sp. 1 (Norris, 1964)
Norris, 1964: 268, fig. 43 (Wellington Harbour, as *Monas*); Hollande, 1952b: 520 (generic definition; in family Ochromonadidae); Kudo, 1954 : 360 (generic definition, as *Monas*).

Spumella sp. 2 (Norris, 1964)
Norris, 1964: 268, fig. 42 (Wellington Harbour, as *Monas*).

Spumella sp. 3 (Norris, 1964)
Norris, 1964: 268, figs 45–46 (Wellington Harbour, as *Monas*).

Genus **Tetrasporopsis** Lemmermann, 1899

Tetrasporopsis pelagica Norris, 1961
Norris, 1961: 171–172 (NZOI Stn B67, off Ker-

madec Is), figs 28a-c (coloured); Hollande, 1952b: 514 (generic status "insuffisament connu").

Genus **Ruttnera** Geitler, 1943
[Ruttneraceae]

Ruttnera pringsheimii Subrahmanyan, 1962

Subrahmanyan, 1962: 219–225, figs 1–12; Norris, 1964: 269–270, figs 11, 15 (coloured) (Wellington Harbour); Taylor, 1974c: 398 (listed from Norris, 1964); Green & Parke, 1974: 546, 547 (status discuss., "... a haptophycean species but more closely related to *Phaeocystis* ... than to *Ruttnera*"; Taylor, 1982: 63 (table I), 64 (symbiosis).

Genus **Heliapsis** Pascher, 1940
[Chrysamoebidales: Chrysamoebidaceae]
[Rhizochrysidaceae]

Heliapsis achromatica Norris, 1964

Norris, 1964: 269, figs 33a-e (Wellington Harbour); Hollande, 1952b: 557 (generic definition).

*Order HAPTOMONADIDA/HAPTOPHYCEAE
[= Prymnesiida, Prymnesiophyceae]
[PRYMNESIOPHYCEAE : ISOCHRYSIDALES]
Family GEPHRYOCAPSIDAE (GEPHRYOCAPSACEAE)
[Prinsiaceae]

Genus **Emiliana** Hay & Mohler, 1967

Emiliana huxleyi (Lohmann, 1902)

Lohmann, 1902b: 129, 130, pl. 4, figs 2–9, pl. 6, fig. 69 (*Pontosphaera*); Lemmerman, 1908: 33, text-figs 109–110; Schiller, 1925: 8–9, text-figs A–B; Schiller, 1930: 90–95, 97, 107–112, 114, 117–120, 134–137, 139, 141, 142, 145, 148, 179–180 (descr., distrib., etc.), figs 3a, 23, 29a-c, 59a-c; Kamptner, 1930: 155–156, 159–160 (*Hymenomonas*); Kamptner, 1941: 79, 99, pl. 2, fig. 27, pl. 3, figs 29–30 (*Pontosphaera*); Kamptner, 1943: 43-49 (revision) (*Coccolithus*); Lecal-Schlauder, 1951: 264–265, 311 (in key), 325–326, pl. XI, figs 5, 8–9; Kamptner, 1952: 234, figs 7–9; Deflandre *in* Grassé, 1952: 457 (generic definition, etc.); Braarud & Nordli, 1952: 361–362; Braarud *et al.*, 1952: 129–134 (morphol.), 4 text-figs, 2 pls; Gaarder, 1954b: 7; Kamptner, 1954: 67–69; Braarud *et al.*, 1955: 157–159; Hardy, 1956: fig. 151; Mjaaland, 1956: 251–255, 4 figs; Kamptner, 1956: 178 (morphol.), pl. 1, figs 1–3; Trégouboff & Rose, 1957: 72 (key features), pl. 17, fig. 9; Hasle, 1960b: 79–82, 86, etc. (refs), text-fig. 1 (Southern Ocean distrib.), tables 1–2, pl. I, figs 1–2 (*Coccolithus*); Black & Barnes, 1961: 141–142, pl. 20, pl. 21, figs 1–6; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Gaarder & Hasle, 1962: 147–148 (symbiosis with diatoms), pl. II, figs 2, 4–5; Fraser, 1962: fig. 11a; Steele *et al.*, 1962: 2646; Berge, 1962: 27–40 (seawater discolouration), text-figs 1–5, pl. 1; Paasche, 1962: 1094–1095 (coccolith formation); Braarud, 1963: 110–116 (reprod.), 2 figs; Riedl, 1963: 31, pl. 5; Paasche, 1963: 186–200, figs (measurement of coccolith production); Wilbur & Watabe, 1963: 227–238 (calcification); Jeffrey & Allen, 1964: 277–288, 7 figs (pigments, growth and photosynthesis); Norris, 1964: 269 (NZOI Stn B199, Wellington Harbour); Paasche, 1964: 1–82, 41 figs (carbon uptake in coccolith formation etc., refs); Bé & McIntyre, 1965: 8 (comments on distrib.); Lecal, 1964: 456-457 (structure and biology), pl. IV, fig. 15; Black, 1965: 135–136, fig. 24; Cohen, 1965: 11–12, pls 8–10, pl. 11, figs c-e, pl. 12, figs a-c; Paasche, 1965: 138–145 (CMU effects on coccolith formation); Loeblich & Tappan, 1966: 111, 145, 158 (listed); Paasche, 1966a: 271–278, text-figs 1–2 (coccolith formation, refs); Paasche, 1966b: 770–779, text-figs 1–4 (coccolith formation, action spectrum, refs); Watabe & Wilbur, 1966: 567–575 (temperature, growth, coccolith formation, etc.); Crenshaw, 1966: 6722; Watabe, 1967: 114–121 (crystallographic analysis); Kamptner, 1967: 125, 169, pl. 3, figs 17–19; Paasche, 1967: 946–956 (light-dark cycles, refs); cf. McIntyre & Bé, 1967: 568–569 (descr., etc.), pl. 5, D, pl. 6, A–B, pl. 12, B; McIntyre *et al.*, 1967: 12; Hay & Mohler *in* Hay *et al.*, 1967: 447, pl. 10, figs 1–2, pl. 11, figs 1–2 (to new genus *Emiliana*); Paasche, 1968a: 178–181, 1 fig. (effects on coccolith formation); Paasche, 1968b: 71–83 *passim* (growth, nutrition etc.); Marshall, 1968: 370–376, 2 figs, 4 tables; Black, 1968: 799–800 (taxonomic problems reviewed, refs), pl. 145, fig. 12; Travers, 1969: 244; Throndsen, 1969: 173; Geitzenauer, 1969a: 172 (palaeoclimatic indicator); Geitzenauer, 1969b: 176, fig. 1b; Geitzenauer, 1969c: 22–24 (ecol., etc.), pl. III, figs 7–10, pl. IV, fig. 1; Farinacci, 1969: II/176 (descr., remarks etc.), figs 1–9 and 69 (cf. Lohmann, 1902) (in *Pontosphaera*); Deflandre & Deflandre-Rigaud, 1969b: Fiche 4956 (from Hay *et al.*, 1967: 447, 480, pls 10–11, fig. 2; see also Fiche 3561); Gartner, 1970: 105–110; Boney, 1970: 294 (action in oilspill emulsifier); Paasche & Klaveness,

* Classification and family sequence used here approximates that of Parke & Green *in* Parke & Dixon (1976); note that Hibbert & Lee (1985: 74) attempted no groupings; see also families in Norris (1982: 88–90).

1970: 143–152, 2 figs (comparison of cells); McIntyre *et al.*, 1970: 721 (paleoclimatic indicator), text-fig. 1 (biogeogr.); Okada & Honjo, 1970: 13, pl. 3, fig. 2; McIntyre & McIntyre, 1971: 259 (concentrations and solution effects), text-figs 16.4, 16.5 (preservation and water depths), pl. 162 (left); Black, 1971: 614 (systematic; in new family Gephyrocapsaceae); Gaarder, 1971: 98, 99 (distrib.); Klaveness & Paasche, 1971: 382–385 (cell types and coccolith formation), figs 1–2; Gaarder & Hasle, 1971: 529 (refs & syn.), figs 6a-c (as *Coccilithus huxleyi*; "Awaiting a revision of the whole group of placolith-bearing coccolithophorids, we hesitate in adopting the generic name *Emiliana* proposed by Hay & Mohler ..."); Clocchiatti, 1971: 318–321; Reinhardt, 1972: 89 (transf. from *Pontosphaera* to *Gephyrocapsa*); Klaveness, 1972a: 335–346 (ultrastructure); Klaveness, 1972b: 309–318 (cell types and life cycle, etc.); Carlucci & Bowes, 1972: 133 *et seq.* (tables 1, 6, 7) (vitamin content); Westbroek *et al.*, 1973: 227–238 (polysaccarides); Okada & Honjo, 1973: 355–374 (distrib. in Pacific); Parsons & Takahashi, 1973: 511–515; Taylor, 1973: 49 (seasonal ecol., Hauraki Gulf); Klaveness, 1973a: 219–224, figs 1–12; Bukry, 1974: 353–363, fig. 3; Sournia 1974: 325–339; Taylor 1974c: 399 (N.Z. records); Travers & Travers, 1975: 261 (comment on new name etc.); Arpin *et al.*, 1976: 529–532 (carotenoids); Klaveness, 1976: 217–224 (mineral deposition, matrix origin), figs 1–12; Honjo, 1976: 65 *et seq.*, pl. I, figs 1, 2 & 4, pl. II, fig. 2; Burns, 1977: 146 (range of phenotypes illustrated from NZOI Stns N113, N433, N452, N473, N474); Okada & McIntyre, 1977: 9 (biogr., refs & syn., incl. new subspecies *corona*, pl. 1, figs 1–4, 6–7; Taylor, 1978: 214 (Goat Is Bay); Taylor & Durbin, 1978 : 220 (Whangateau Harbour records); Dawson, 1979: 15 (figured specimens of Burns (1977) listed); Volkman *et al.*, 1980: 219–227 (netone occurrence); Chen, 1980: 139, pl. 1, figs 1–6; Volkman *et al.*, 1981: 509–527 *passim* (lipid analysis); MacRaild, 1981: 12 (predominant organism of "Nelson slime, September sample; but see under *Phaeocystis pouchetii*, and Hurley, 1982; and Chang 1983a); Heimdal & Gaarder, 1981: 51–52 (remarks, var., etc., refs & syn.), pl. 4, figs 18–19; Taylor, 1981: 391, 402–405, table 6 (ecol., etc./nutrients); Russell, 1982: 20–21 (Nelson slime, popular account but see under *Phaeocystis pouchetii*, and Hurley, 1982); Brand, 1982: 236–245, figs 1–5; Winter, 1982: 319–323, 1 text-fig., 1 pl.; Taylor, 1982: 63 (table I), 64 (symbiosis); Jeffrey *et al.*, 1982: 70, fig. 12; Holligan *et al.*, 1983: 339–342 (satellite studies of production); Burns, 1983: 396 (use of coccolith in lorica formation of tintinnid *Dictyocysta reticulata* Kofoid & Campbell, 1929, *q.v.*); Westbroek *et al.*, 1983: 291–299 (biosynthesis of coccolith, calcification); Hulburt, 1983: 197–212 (equilibrium conditions etc.); Hallegraeff, 1984: 233, figs 8–12; Haxo, 1985: 282–287, figs 1–6 (photosynthetic action of spectrum, refs); Espeland & Throndsen, 1986: 212; Bonin *et al.*, 1986: 23 *et seq.* (physiol./indicator use); Nishida, 1986: 60, 63, pl. 1, fig. 10 (warm-water form), fig. 11 (cold-water form); Holligan & Groom, 1986: 239 *et seq.*; MacKenzie & Gillespie, 1986: 380 (table 3: Tasman Bay); Van Emburg *et al.*, 1986: 246–259 (biochem.); De Vrind-de Jong *et al.*, 1986: 205–217 (calcification/biochem.); Westbroek *et al.*, 1986: 189–203 (calcification/ultrastructure); Borman *et al.*, 1987: 118–123 (biochem.); Kristiansen, 1987: 739 *et seq.*; Jeffrey & Wright, 1987: 180–188 (chlorophyll *c* component); Mitchell-Innes & Winter, 1987: 25–30; Friedinger & Winter, 1987: 49–56; Wright & Jeffrey, 1987: 259–266 (pigment analysis); Paasche & Erga, 1988: 229 *et seq.* (nutrient limits); Hallegraeff, 1988: 10 (SEM photo.); Gartner, 1988: 23 *et seq.* (habitat/palaeoceanogr.); Fincham & Winter, 1989: 325–351 (palaeoceanogr./oxygen isotopes, etc.); Houghton, 1989: 67–74 *passim* (distrib./sediments etc.); Mlot, 1989: 222–224 (irruptions/analysis); Chrétiennot-Dinet, 1990: 95 (generic diag.).

Genus **Gephyrocapsa** Kamptner, 1943

Gephryocapsa oceanica Kamptner, 1943

Kamptner, 1943: 43–49; Lohmann, 1902b: 130, pl. 4, figs 1–9 (as *Pontosphaera huxleyi*, in part); Schiller, 1925: 9, text-figs A–B; Kamptner 1941: 79, 99, pl. 2, fig. 27, pl. 3, figs 29–30 (as *P. huxleyi*, in part); Lecal-Schlauder, 1951: 316 (in key), 326 (internal morphol.), pl. XI, figs 6–7, 14; Deflandre *in* Deflandre & Fert, 1954: 154, pl. III, fig. 7; Halldal & Markali, 1955: 18, figs 1–2, pls 23–24 (*G. oceanica*), 18, pl. 24, fig. 3 (as *G. dentata* Halldal & Markali, *fide* Geitzenauer, 1969c: 24); Kamptner, 1956a: 171–202 (morphol.), pl. 16; Hasle, 1960b: 84 etc.; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Black & Barnes, 1961: 243, pl. 25, figs 1–2; Gaarder & Hasle, 1962: 47 (symbiosis with diatom), pl. II, fig. 6; Cohen, 1964: 240 (remarks etc., distrib., refs & syn.); Loeblich & Tappan, 1966: 142 (listed); Takayama, 1967: 191 (Japanese Cenozoic, remarks, refs & syn.), pl. 1, fig. 8; Boudreaux & Hay *in* Hay *et al.*, 1967: pl. 12, figs 5–6, pl. 13; McIntyre & Bé, 1967: 570 (descr., etc., refs), pl. 9 A–B; McIntyre *et al.*, 1967: 12 (descr., remarks, refs & syn.), pl. 1, figs A–B; Geitzenauer, 1969b: 172 (paleoclimatic indicator); Geitzenauer, 1969c: 24–26 (ecol., etc.), pl. I, fig. 5, pl. IV, figs 4–8; Deflandre & Deflandre-Rigaud, 1969a: Fiche 4416 (from McIntyre & Bé, 1967: 570, pl. 9, figs a-b); Deflandre & Deflan-

dre-Rigaud, 1969b: Fiches 4991, 4992 (from Hay *et al.*, 1967: 480, pls 12–13, figs 5–6), 499 (from McIntyre *et al.*, 1967: 12, pl. 1, figs A–B), 4994 (from Shumenko & Uschakova, 1967: 933, pl. 1, fig. 3), 4995 (from Cohen & Reinhardt, 1968: 293, pl. 20, fig. 10); Grindley & Taylor, 1970: 201 *et seq.* (environmental factors and blooms); McIntyre *et al.*, 1970: 726 (palaeoclimatic indicator), text-figs 5c, 8 (biogeogr.); Okada & Honjo, 1970: 13, pl. 2, fig. 3; Uschakova, 1971: 247, 248, pl. 15.1, figs 4–5; McIntyre & McIntyre, 1971: 259 (concentration and solution effects), text-figs 16.4, 16.5 (preservation and water depths), pl. 16.2 (right); Black, 1971: 614 (systematics), pl. 45.2, fig. 15; Gaarder & Hasle, 1971: 533 (refs), figs 6d-f; Clocchiatti, 1971: 318–321; Farinacci, 1972: V/122 (descr., remarks, etc.), figs 4–5; Okada & McIntyre, 1977: 10 (remarks, biogeogr., refs & syn.), pl. 3, figs 3–9; Winter *et al.*, 1979: 201, pl. 1, figs 7–9; Blackwelder *et al.*, 1979: 417–420 (morphol. and palaeoclimatology); Chen, 1980: 139–140, pls 2 & 7; Hulburt, 1983: 197–212 (equilibrium conditions etc.); Samtleben, 1980: 91–127 *passim* (evol. of species etc.); Hallegraeff, 1984: 233, figs 15–18; Friedinger & Winter, 1987: 49–56; Pujos, 1987: 239 *et seq.* (evol./palaeogeogr., etc.); Sokolov, 1987: 60 (diag., etc.); Ghidalia, 1988: 15 (key to species groups etc.); Gartner, 1988: 23 (environmental indicator); Fincham & Winter, 1989: 325–351 *passim* (palaeoceanogr./oxygen isotopes etc.); Hallegraeff, 1988: 9, 11, 101 (SEM photos); Chrétiennot-Dinet, 1990: 95 (generic diag.).

[PRYMNESIOPHYCEAE: COCCOSPHAERALES]
Family ZYGOSPHAERIDAE/ ZYGOSPHAERACEAE

Genus **Sphaerocalyptra** Deflandre, 1952

Sphaerocalyptra quadridentata (Schiller, 1913)

Schiller, 1913: 607, pl. III, figs 20–21b (*Calyptosphaera*); Schiller, 1930: 103, 104, 108, 127, 224–225 (descr., refs), figs 12, 109; Lecal-Schlauder, 1951: 312 (in key); Deflandre, 1952c: 452, text-fig. 350B (in new genus *Sphaerocalyptra*); Hasle, 1960b: 85, etc; Cassie, 1961: 20, 50 (NZOI Stns Z723–730, Chatham Is). Loeblich & Tappan, 1966: 102, 165 (listed, etc.); Farinacci, 1973: VI/17 (orig. descr., etc. as *C. quatridentat* [*sic*]; Heimdal & Gaarder, 1980: 10 (remarks, refs, in *Sphaerocalyptra*); Chrétiennot-Dinet, 1990: 40 (generic diag.).

Family CALCIOSOLENIIDAE/ CALCIOSOLENIACEAE

Genus **Acanthosolenia** Bernard, 1939

Acanthosolenia mediterranea Bernard, 1939

Bernard, 1939: 41, fig. 2e; Lecal-Schlauder, 1951: 317 (in key); Deflandre, 1952c: 458, figs 356B–C; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 95 (listed); Chrétiennot-Dinet, 1990: 88 (generic diag.).

Genus **Anoplosolenia** Deflandre *in* Grassé, 1952

Anoplosolenia brasiliensis (Lohmann, 1919)

Lohmann, 1919: 187, text-fig. 56 (*Cylindrotheca*); Schiller, 1930: 234–235 (as syn. (?) of *Calciosolenia Granii* Schiller, 1925); Kamptner, 1941: 92, 108, pl. 12, figs 132–133 (as *Calciosolenia grani* Schiller var. *cylindrothecaeformis* Schiller, 1925); Deflandre, 1952c: 458, figs 356D–E (in new genus *Anoplosolenia*); Hasle, 1960b: 86 *et seq.*; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 96, 122 (listed); Travers, 1969: 243 (status); Kamptner, 1967: 120–121, 168 (incl. *C. grani* Schiller var. *cylindrothecaeformis* Schiller, 1925); Deflandre & Deflandre-Rigaud, 1969b: Fiche 4432 (fig. from Kamptner, 1967: 120, pl. 1, fig. 5) — see also Fiche 3437); Gaarder & Hasle, 1971: 523 (refs), figs 3a-c; Winter *et al.*, 1979: 26, pl. III, fig. 3; Heimdal & Gaarder, 1981: 40 (remarks); Hallegraeff, 1984: 239; Chrétiennot-Dinet, 1990: 88–89 (generic diag.).

Family PONTOSPHAERIDAE/PONTOSPHAERACEAE

Genus **Pontosphaera** Lohmann, 1902

Pontosphaera alboranensis Bartolini, 1970

Bartolini, 1970: 148, 150, text-fig. 9, pl. 6, figs 6–7; Burns, 1973a: 149–150, pl. 1, figs 1–3 (NZOI Stn Z1696, 36°38'S, 179°28'E); Dawson, 1979: 15 (figured specimen of Burns listed); Chrétiennot-Dinet, 1990: 100 (generic diag.).

Pontosphaera caelamenisa Lecal-Schlauder, 1951

Lecal-Schlauder, 1951: 266–267, 311 (in key), text-figs 2, 2a-b; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is) (as *P. caelamensis*); Loeblich & Tappan, 1966: 157 (listed).

Pontosphaera grani Gaarder, 1954

Gaarder, 1954b: 9–10, text-figs 7a-c; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 158 (listed).

Pontosphaera japonica (Takayama, 1967)

Takayama, 1967: 189–190, text-fig. 7, pl. 9, pl. 10, figs 1, 2a-d (*Discolithina*); Burns, 1973a: 154, 157 (redescr., discuss., NZOI Stns B74, H142, Z1696), pl. 2, figs 9–13; Okada & McIntyre, 1977: 15, pl. 6, fig. 3; Dawson, 1979: 15 (figured specimen of Burns listed); Heimdal & Gaarder, 1981: 51 (remarks, as "? *Discolithina japonica*"); Hallegraeff, 1984: 236, fig. 23; Hallegraeff, 1988: 14 (SEM photo.).

Pontosphaera messinae Bartolini, 1970

Bartolini, 1970: 150, 152, pl. 7, figs 1–2; Burns, 1973a: 153–154 (discuss., syn., etc. from NZOI Stns B74, B88, Z1696, Z1814), pl. 2, figs 4–7; Dawson, 1979: 15 (figured specimen of Burns listed).

Pontosphaera sp. Burns, 1973

Burns, 1973a: 158, pl. 2, fig. 14 (two specimens from NZOI Stn Z1767, 31°57'S, 177°37'E); Dawson, 1979: 16 (listed).

Genus **Scyphosphaera** Lohmann, 1902

Scyphosphaera apsteinii [forma **apsteinii**] Lohmann, 1902

Lohmann, 1902b: 132, pl. 4, figs 26–30; Lemmermann, 1908: 35, text-fig. 115; Schiller, 1930: 97, 125, 126, 195 (descr., refs, distrib.) figs 36, 75; Lecal-Schlauder, 1951: 277–278, 313 (in key), text-fig. 14; Gaarder, 1954b: 12; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Cohen, 1964: pl. I, fig. 5; Loeblich & Tappan 1966: 164 (listed); Kamptner 1967: 148, pl. 9, figs 64–65, 67; Nival, 1969: 215 (ecol. parameters); Farinacci, 1969: I/207 (descr., etc.), figs 26–36 (from Lohmann, 1902); Gaarder & Hasle, 1971: 536, fig. 12b; Okada & McIntyre, 1977: 15–16 (remarks, biogeogr., refs); Heimdal & Gaarder, 1981: 51; Hallegraeff, 1984: 236, figs 24a-b; Janin, 1987: 105 (ref. to *Pontosphaera*, new comb.); Hallegraeff, 1988: 7 (SEM photo); Chrétiennot-Dinet, 1990: 101 (generic diag.);

Family SYRACOSPHAERIDAE/SYRACOSPHAERACEAE

Genus **Acanthoica** Lohmann, 1902

Acanthoica acanthifera Lohmann, 1913

Lohmann, 1913: 240, 358,359, text-figs 15b-c, pl. 3, fig. 35; Lohmann, 1912b: 219 (*nomen nudum*); Schiller, 1925: 39–36 (descr.); Schiller, 1930: 178–179 (descr., distrib.), fig. 35; Kamptner, 1941: 76 (incl. in *A. quattrospina* Lohmann, 1903; see also Heimdal & Gaarder, 1981: 39); Lecal-Schlauder, 1951: 312 (in key); Norris, 1961: 174 (table 2) (NZOI Stns B65, B67, off Kermadec Is); Lecal, 1964: 453–454 (structure and biol.), pl. II, figs 6–7; Loeblich & Tappan, 1966: 94 (listed); Okada & McIntyre, 1977: 16 (biogr., refs).

Acanthoica quattrospina Lohmann, 1903

Lohmann, 1903: 68, pl. 2, figs 23–24; Schiller, 1930: 178 (descr.), figs 3b, 58a-c; Lecal-Schlauder, 1951: 312 (in key); Hasle, 1960b: 78, 86, etc.; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 94 (listed); Deflandre & Deflandre-Rigaud, 1969a: Fiches 4423 (fig. from Lohmann, 1903), 4424 (fig. from Kamptner, 1967: 119, pl. 1, figs 1–2); Leadbeater, 1972c: 114; Okada & McIntyre, 1977: 16 (biogeogr., refs); Heimdal & Gaarder, 1981: 39 (descr., refs & syn.); Hallegraeff, 1984: 236, fig. 31.

Genus **Anthosphaera** Kamptner, 1937

Anthosphaera robusta (Lohmann, 1902)

Lohmann, 1902b: 133–135, pl. 4, figs 34–35 (*Syracosphaera*); Lemmermann, 1908: 37, text-figs 121–122; Kamptner, 1941: 86; Lecal-Schlauder, 1951: 314 (in key); Halldal & Markali, 1954a: 117–119 (morphol. and microstructure), 2 pls; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 97, 169 (listed); Gaarder & Hasle, 1971: 529 (refs & syn.), figs 4f-g; Heimdal & Gaarder, 1981: 40 (identif. features, etc.); Hallegraeff, 1984: 236 (figs 26a-b.

Genus **Caneosphaera** Gaarder *in* Gaarder & Heimdal, 1977

Caneosphaera molischii (Schiller, 1925)

Schiller, 1925: 21, text-figs Ka-e (*Syracosphaera*); Schiller, 1930: 90, 203–204 (descr., etc.), figs 87a-d; Kamptner, 1941: 84 (figs Kc-e of Schiller = *S. nodosa* Kamptner, 1941); Lecal-Schlauder, 1951: 314 (in key); Halldal & Markali, 1954b: 329–336, figs; Lecal & Bernheim, 1960: 284, pl. 12, photos 19–20 (in new genus *Syracorhabdus* [invalid — see Loeblich & Tappan, 1966: 167]; Norris, 1961: 174 (table 2) (NZOI Stn B68, off Kermadec Is); Lecal, 1965c: 254–255 (phenotypic modifications, as *Syracorhabdus*), pl. III, figs 9–10, pl. IV, figs 11–13; Loeblich & Tappan, 1966: 167, 169 (listed, etc.); Gaarder & Hasle, 1971: 539 (refs); Gaarder & Heimdal, 1977: 66, 68 (descr., remarks, etc. in new genus *Caneosphaera*), pls 7, 8, figs 40–49; Okada & McIntyre, 1977: 24 (descr., biogeogr., refs), pl. 8, figs 4–5 (*Syracosphaera*); Heimdal & Gaarder,

1981: 44–46 (in *Caneosphaera* Gaarder — descr., remarks, refs & syn.), pl. 3, figs 10–16; Hallegraeff, 1984: 242, figs 47a-b; Chrétiennot-Dinet, 1990: 103 (generic diag.).

Genus **Coronosphaera** Gaarder *in* Gaarder & Heimdal, 1977

Coronosphaera binodata Kamptner, 1927

Kamptner, 1927: 178, fig. 3 (as *Syracosphaera mediterranea* Lohmann, 1902b var. *binodata*); Schiller, 1930: 205; Kamptner, 1937: 300 (*S. binodata*); Kamptner, 1941: 82, pl. 5, figs 55–57, pl. 6, fig. 59; Lecal-Schlauder, 1951: 284, 314 (in key) (as *S. mediterranea* var. *binodata*); Gaarder, 1954b: 12; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 167, 169 (listed); Gaarder & Hasle, 1971: 536 *et seq.*; Okada & McIntyre, 1977: 23–24 (biogeogr., remarks, refs, as *Syracosphaera mediterranea* Lohmann var. *binodata*), pl. 10, fig. 6; Gaarder & Heimdal, 1977: 62 (remarks, etc. into new genus *Coronosphaera*), pl. 5, figs 27–32; Chrétiennot-Dinet, 1990: 103 (generic diag.).

Coronosphaera mediterranea (Lohmann, 1902)

Lohmann, 1902b: 133, 134, pl. 4, figs 31–31a, 32 (*Syracosphaera*); Lemmermann, 1908: 36, text-fig. 177; Schiller, 1925: 17, text-fig. G; Schiller, 1930: 93, 120, 121, 124, 139, 204–205 (descr., etc.), figs 88a-b; Lecal-Schlauder, 1951: 314 (in key); Gaarder, 1954b: 12; Trégouboff & Rose, 1957: 72, pl. 17, fig. 12 (key features); not of Halldal & Markali, 1954b: 329–336, figs (see below); Norris 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Lecal, 1964: 452–453 (structure and biology), pl. I, figs 2–5 (in subgenus *Syracolithus* Kamptner); Loeblich & Tappan, 1966: 169 (listed); Travers, 1969: 245 (in subgenus *Eusyracosphaera* Kamptner 1941 or *Syracorhabdus* Lecal & Bernheim, 1960); Gaarder & Hasle, 1971: 536 (refs & syn., etc., incl. *S. pulchroides* Halldal & Markali, 1955 and *S. tuberculata* Kamptner of Halldal & Markali, 1955, but not *S. mediterranea* Lohmann of Halldal & Markali, 1954b = *S. halldalii* Gaarder, nom. nov.); Farinacci, 1972: V/203 (descr., remarks, etc., *S. mediterranea binodata* Kamptner, 1927), fig. 3; Gaarder & Heimdal, 1977: 58 (type of new genus *Coronosphaera*, descr., etc.), 60, 62, pl. 4, figs 21–26; Okada & McIntyre, 1977: 23 (descr., biogeogr., refs & syn., as *Syracosphaera*), pl. 10, figs 4–5; Chen, 1980: 143, pl. 3, fig. 6 (*Syracosphaera*); Hallegraeff, 1984: 242, figs 48a-c.

Genus **Lohmannosphaera** Schiller, 1913

Lohmannosphaera paucoscyphos Schiller, 1914

Schiller, 1914: 10, pl. 2, fig. 31; Schiller, 1925: 13–14, pl. I, figs 8a-b; Schiller, 1930: 193 (descr.), figs 73a-b; Lecal-Schlauder, 1951: 275 (in key), 313 (in key); Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 147 (listed); H.G. Marshall, 1969: 244–248 (as *L. paucoscuphos* [*sic*]; cf. Parke & Green *in* Parke & Dixon, 1976: 554 (note 37 — transfer to *Pterosperma*?).

Genus **Syracosphaera** Lohmann, 1902

Syracosphaera coronata Schiller, 1913

Schiller, 1913: 601, pl. 2, fig. 9; Schiller, 1930: 123, 210–211 (descr., refs), fig. 95; Lecal-Schlauder, 1951: 314 (in key); Deflandre, 1952c: 453 (generic definition); Cassie, 1961: 20,50 (?) (N.Z. record from NZOI Stns Z718–719, Foveaux Strait); Loeblich & Tappan, 1966: 168 (listed); Farinacci, 1973: VI/207 (orig. descr., etc.), 1 fig.; Chrétiennot-Dinet, 1990: 103 (generic diag.).

Syracosphaera dalmatica Kamptner, 1927

Kamptner, 1927: 178, fig. 2; Schiller, 1930: 98, 151, 202–203 (descr., etc.), fig. 86; Kamptner, 1941: 81, 104, pl. 4, figs 46–48; Lecal-Schlauder, 1951: 314 (in key), 324 (internal morphol.), pl. X, figs 3–4; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1963: 193 (in *Syracolithus* Kamptner, 1941); Cohen, 1965: 19–20 (remarks, discuss.), pl. 3, fig. V, pl. 24, figs b-d; Loeblich & Tappan, 1966: 167, 168 (listed, etc.); Farinacci, 1972: V/200 (descr., remarks, etc.), fig. 2; Okada & McIntyre, 1977: 28 (descr., remarks, biogeogr., refs, in *Helladosphaera* Kamptner, 1936), pl. 12, figs 3–6; Heimdal & Gaarder, 1980: 4 (*S. dalmaticus* of Borsetti & Cati, 1972: 399, pl. 43, figs 1a-b (not c) as *Corisphaera wettsteinii* (Kamptner, 1937) new comb., emended diag., etc.).

Syracosphaera histrica Kamptner, 1941

Kamptner, 1941: 84, 101, pl. 16, figs 65–68; Lecal-Schlauder, 1951: 314 (in key); Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Cohen, 1964: 236, pl. 1, figs 2a-g, pl. 2, fig. 1 (remarks, distrib., transferred to *Discolithus*); Cohen, 1965: 13, pl. 24, fig. a; Farinacci, 1972: V/202 (descr., remarks, etc.), figs 65–68 (as *Syracosphaera (Eusyracosphaera)* Kamptner, 1941); Gaarder & Heimdal, 1977: 55–56 (descr., etc.), pl. 2, figs 9–15 (*Syracosphaera*); Okada & McIntyre, 1977: 22 (descr., biogeogr., refs & syn.), pl. 8, fig. 12; Chen, 1980: 142, pl. 7, fig. 17 incl. *S. nodosa* (Kamptner) of Okada & Honjo, 1970: 21, pl. 1, figs 1–2); Heimdal & Gaarder, 1981: 60 (*Syracosphaera*).

Syracosphaera pulchra Lohmann, 1902

Lohmann, 1902b: 133–134, pl. 4, figs 33, 36, 36a-b, 37; Lemmermann, 1908: 36, text-fig. 118; Schiller, 1930: 96, 102, 103, 112, 120, 123, 124, 135, 139, 207–209 (descr., distrib., refs etc.), figs 11, 30, 90a-b; Lecal-Schlauder, 1951: 286 (descr.), 319–321 (internal morphol.) text-fig. 22, pl. IX, figs 1–5, 8–9; Gaarder, 1954b: 12; Halldal & Markali, 1954b: 329–336, figs; Halldal & Markali, 1955: 211, pl. 11; Trégouboff & Rose, 1957: 72, pl. 17, fig. 11 (key features); Lecal & Bernheim, 1960: 283, pl. 11, photos 17–18 (in new genus *Syracorhabdus* [invalid — see Lobelich & Tappan, 1966: 167]); Hasle, 1960b: 78, 86 *et seq.*; Black & Barnes, 1961: 139, pl. 19, figs 1–12; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Gaarder & Hasle, 1962: 147 (symbiosis with diatom), pl. II, fig. 4; Riedl, 1963: 31, pl. 5; Cohen, 1965: 20 (remarks, etc.), pl. 12, fig. d, pl. 14, figs a-b; Lecal, 1965c: 257–258 (structure of discoliths), pl. VIII, figs 24–25, pl. IX, figs 26–27, pl. X, figs 28–29; Loeblich & Tappan, 1966: 167, 169 (listed, etc.); Kamptner, 1967: 154, 176, pl. 10, figs 75–76, pl. 13, fig. 88; Travers, 1969: 245 (in subgenus *Eusyracosphaera* Kamptner, 1941); Deflandre & Deflandre-Rigaud, 1969b: Fiches 5216 (from Kamptner, 1967: 154, pl. 10, figs 75–76, pl. 13, fig. 88), 5217 (from Cohen & Reinhardt, 1968: 292, pl. 20, fig. 3); Gaarder, 1971: 101, text-fig. 5.4 (distrib.); McIntyre & McIntyre, 1971: 260 (solution effects); Gaarder & Hasle, 1971: 539 (refs); Edwards, 1972: 173 (palaeoecol. in early Pliocene, southern Wairarapa), 175, table 1 (ecol. preferences); Burns, 1973: 222, figs 3–4 (latitudinal distrib. and significance); Leadbetter & Morton, 1973: 207, 211–214, figs 13–27, table 2 (ultrastructure); Gaarder & Heimdal, 1977: 55 (descr., etc.), pl. 1, figs 1–8; Okada & McIntyre, 1977: 27 (biogeogr., refs), pl. 10, figs 11–12; Winter *et al.*, 197 : 210, pl. IV, fig. 2; Chen, 1980: 143, pl. 3, fig. 5, pl. 7, fig. 18; Heimdal & Gaarder, 1981: 60; Hallegraeff, 1984: 239, figs 46a-b; Inouye & Pienaar, 1988: 205–217 (cell ultrastructure); Houghton, 1989: 67–74 (abundance/sediments).

Genus **Umbellosphaera** Paasche, 1955

Umbellosphaera irregularis Paasche, 1955

Paasche *in* Markali & Paasche, 1955: 95, 97, pls III–VI; McIntyre & Bé, 1967: 567, pl. 2; McIntyre *et al.*, 1970: 722, 723 (N.Z. records); Okada & Honjo, 1970: 13, 14, pl. 3, fig. 4; Okada, 1970: pl. 1, fig. 8; Gaarder & Hasle, 1971: 539; Okada & McIntyre, 1977: 17 (biogeogr.); Chan, 1980: 142, pl. 5, fig. 2; Winter, 1982: 319–323, 1 pl., 1 text-fig; Hallegraeff, 1984: 236, fig. 29; Chrétiennot-Dinet, 1990: 96 (generic diag.).

Umbellosphaera tenuis (Kamptner, 1937)

Kamptner, 1937: 311, pl. 17, figs 41–42 (*Coccolithus*); Deflandre *in* Deflandre & Fert, 1954: 152, pl. III, figs 1–5, pl. VIII, figs 6–7; Markali & Paasche, 1955: 96, 97, pls I–II (*Umbellosphaera*); Hasle, 1960: pl. 1, fig. 5; Cohen, 1965: 18, pl. 13, figs e-f; Kamptner, 1967: 162 (descr., etc.) 178, pl. 23, fig. 20; McIntyre & Bé 1957: 566, pl. 3; McIntyre *et al.*, 1970: 722, 723 (N.Z. records); Okada & Honjo, 1970: 14, pl. 2, figs 1–2; Gaarder & Hasle, 1971: 539; Okada & McIntyre, 1977: 17 (biogeogr., refs); Winter *et al.*, 1979: 206, pl. III, figs 1–2; Chen, 1980: 142, pl. 5, fig. 1, pl. 7, fig. 14; Heimdal & Gaarder, 1981: 62; Hallegraeff, 1984: 236, fig. 30.

Family HALOPAPPINIDAE/HALOPAPPACEAE
Genus **Halopappus** Lohmann, 1912

Halopappus corii (Schiller, 1925)

Schiller, 1925: 20, pl. 1, fig. 15 (*Syracosphaera*); Schiller, 1930: 103, 201 (descr., distrib.), fig. 85; Lecal-Schlauder, 1951: 321–322 (internal morphol.), pl. IX, figs 6–7, 10–12; Lecal & Bernheim, 1960: 279, pl. 5, photo 8 (*Syracolithus*); Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 167, 168 (listed, etc.); Heimdal & Gaarder, 1981: 52–54, 56 (as *Halopappus adraticus* Schiller, descr., syn., etc.), pl. 6, figs 28–31; Chrétiennot-Dinet, 1990: 97 (generic diag.).

Genus **Michaelsarsia** Gran
in Murray & Hjort, 1912

Michaelsarsia splendens Lohmann, 1912

Lohmann, 1912a: 36, 40, text-fig. 5; Schiller, 1925: 23, 76; Schiller, 1930: 105, 128, 228–229 (descr., refs), Lecal-Schlauder, 1951: 314 (in key); Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Loeblich & Tappan, 1966: 150 (listed); cf. Heimdal & Gaarder, 1981: 56.

Genus **Ophiaster** Gran
in Murray & Hjort, 1912

Ophiaster hydroideus (Lohmann, 1903)

Lohmann, 1903: 69 (*Meringosphaera*); Lohmann, 1913b: 151, fig. 9 (*Ophiaster*); Gran *in* Hjort, 1911: 172 (fig. 14); Schiller, 1930: 105, 106, 128, 233, fig. 18; Lecal-Schlauder, 1951: 292, figs 28–29 (as *Bernardosphaera stellata*); Halldal & Markali, 1955: 13, pl. 13, figs 1–3 (as *Syracosphaera confusa*): Norris, 1961: 174

(table 2) (NZOI Stn B65, B67, off Kermadec Is); Espeland & Throndsen, 1986: 212; Lecal, 1965: 67, fig. G, pl. 2, fig. 5 (as ?*Lachrymasphaera angelieri*); Loeblich & Tappan, 1966: 155 (listed); Gaarder, 1967b: 184–185 (diag.), text-figs 1B (*Meringosphaera hydroidea* after Lohmann, 1913), 1C, pl. 1, figs A–B, pl. 2, fig. A, pl. 3, fig. A, pl. 4; Okada & McIntyre, 1977: 19 (remarks, biogeogr., refs & syn.), pl. 10, figs 13a-b; Winter *et al.*, 1979: 206–207, pl. III, fig. 7; Chrétiennot-Dinet, 1990: 98 (generic diag.);

Family COCCOLITHIDAE/COCCOLITHACEAE
Genus **Calcidiscus** Kamptner, 1950

Calcidiscus leptoporus (Murray & Blackman, 1898)

Murray & Blackman, 1898: 430-435, 439, pl. 15, figs 1–7 (*Coccosphaera*); Lohmann, 1902b: 137–138, pl. 5, figs 52, 61-64 (*Coccolithophora*); Lemmermann, 1908: 38, text-figs 127–128; Lohmann, 1912: 89–97, fig. 20; Schiller, 1930: 90, 245–246 (descr., distrib., refs & syn.), text-figs 9a-b, 10a-b, 121–122 (*Coccolithus*); Kamptner, 1941: 94, pl. 13, figs 137–139; Lecal-Schlauder, 1951: 315 (in key), 329 (internal morphol.), pl. XII, figs 1–3, 6, 8; Déflandre *in* Grassé, 1952: 444, text-fig. 343; Kamptner, 1954: 23–24 (descr., etc.), text-fig. 20 (*Cyclococcolithus*); Déflandre *in* Déflandre & Fert, 1954: 150-151 (discuss., etc.), text-fig. 76, pl. IX, figs 1–3; Gaarder, 1954b: 7; Gardet, 1955: 513, pl. 6, fig. 50 (*Coccolithus*); Hardy, 1956: 45, fig. 15m; Trégouboff & Rose, 1957: 73 (key features); Hasle, 1960b: 78, etc. (Southern Ocean occurrences); Norris, 1961: 174 (table 2) (N.Z. records, as *Cyclococcolithus*); Black & Barnes, 1961: 143, pl. 24, figs 3-4; Bramlette & Martini, 1963: pl. 102, figs 4–5; Cohen, 1964: 237 (remarks, etc., distrib., refs & syn.), pl. 1, figs 6a-e, pl. 2, figs 4a-b; Cohen, 1965: 25–26 (remarks, discuss.), pl. 2, figs h-i, pl. 18, figs a-e, pl. 19, figs a-b, pl. 20, figs a-b; Braarud *et al.*, 1965: 394 (designation of lectotype etc. for *Coccolithus*); Loeblich & Tappan, 1966: 111, 119 (listed); McIntyre & Bé, 1967: 569 (descr., etc.), pl. 7, A-C (*Cyclococcolithus*); Takayama, 1967: 189 (remarks, refs & syn.), pl. 2, figs 1–5; McIntyre *et al.*, 1967: 9–11 (descr., etc., refs & syn.), pl. 4, figs C, D, pl. 5, figs A, C–D; Kamptner, 1967: 129, 170–171, pl. 3, fig. 21 (refs, etc.); Hay, 1967: 240 (conservation of name *Cyclococcolithus*); Black, 1968: 797–799 (taxonomic problems reviewed), pl. 144, figs 3–4, pl. 147, fig. 1; Cohen & Reinhardt, 1968: 296, pl. 19, figs 3, 7, pl. 20, fig. V (*Umbilicosphaera*); Travers, 1969: 244; Geitzenauer, 1969a: 170–172 (palaeoclimatic indicator), text-fig. 2 (*Umbilicosphaera*); Geitzenauer, 1969b: 176, fig. 1a; Geitznauer, 1969c: 30–32 (ecol., etc.), pl. I, figs 3-4, pl. III, figs 1–2, pl. V, fig. 3; Edwards *in* Summerhayes, 1969: 76 (sub-Recent, NZOI Stn D5, S. of Macquarie Is); Déflandre & Déflandre-Rigaud, 1969a: Fiches 4411, 4412 (figs from McIntyre & Bé, 1967: 569, pl. 7, figs A-C), 4584 (from McIntyre *et al.*, 1967: 9, pl. 4, figs C–D), 4585 (from McIntyre *et al.*, 1967: 10, pl. 5, fig. A), 4586 (from McIntyre *et al.*, 1967: 10, pl. 5, figs C–D), 4587 (from Reinhardt, 1967: 210, pl. 6), 4708, 4709 (from Gartner, 1967: 4, pl. 1, figs 1-4a-c), 4710, 4711, 4712 (from Gartner, 1967: 4, pl. 2, figs 1-4), 4713 (from Hay *et al.*, 1967: 480, pls 10–11, fig. 3), 4714 (from Shumenko & Uschakova, 1967: 933, pl. 1, figs d-e (*Cyclococcolithus*); McIntyre *et al.*, 1970: 727 (palaeoclimatic indicator) text-figs 5a-b, 6 (biogeogr.); Wilcoxon, 1970: 82 (*Cyclococcolithina*, new name for *Cyclococcolithus* Kamptner, 1954); Martini, 1971: 541 (Pliocene occurrence, refs), fig. 39.4; Uschakova, 1971: 247, 248, pl. 15.1, figs 1 and 3; McIntyre & McIntyre, 1971: 259 (concentrations and solution effects), text-figs 16.4, 16.5 (preservation and water depth), pl. 16.1, fig. A; Black, 1971: 613 (systematics), pl. 45.1, fig. 7; Gaarder & Hasle, 1971: 529, 532–533 (refs), fig. 7; Edwards, 1972: 173 (palaeoecol., early Pliocene, southern Wairarapa), table 1 (ecol. preferences); Burns, 1973: 222, figs 3-4 (latitudinal distrib. and significance); Jafar & Martin, 1974: 367–368 (retention of *Cyclococcolithus* Kamptner, 1954); Honjo, 1976: 67 *et seq.*, pl. I, figs 2 & 7; Okada & McIntyre, 1977: 8 (remarks, status of name, refs & syn., as *Cyclococcolithus leptopora*); Loeblich & Tappan, 1978: 1391 (*Calcidiscus* and history of nomenclature); Blackwelder *et al.*, 1979: 417–420 (morphol. and palaeoclimatology, formation of coccoliths); Chen, 1980: 138, pl. 4, figs 2–3, pl. 7, fig. 9 (syn.); Heimdal & Gaarder, 1981: 42 (syn. as *Calcidiscus*); Burns, 1983 396–397 (coccolith use in lorica formation by the tintinnid *Dictyocysta reticulata* Kofoid & Campbell, 1929, *q.v.*); Friedinger & Winter, 1987: 49–56; Hallegraeff, 1984: 233, fig. 6; Hallegraeff, 1988: 12 (SEM photo.); Chrétiennot-Dinet, 1990: 94 (generic diag., syn.).

Genus **Helicopontosphaera** Hay & Mohler, 1967

Helicopontosphaera kamptneri Hay & Mohler *in* Hay *et al.*, 1967

Hay & Mohler in Hay *et al.*, 1967: 448, fig. 5, pls 10–11 (new name for *Coccolithus carteri* (Wallich) of Kamptner, 1941: 93, 111, pl. 13, fig. 136, not *Coccosphaera carteri* Wallich, 1877: 348, pl. 17, figs 3-4, 6–7, 17); Ostenfeld, 1899: 436 (as *Coccosphaera pelagica* Wallich var. *carteri* Wallich, 1877); Lohmann, 1902a: 138, pl. 5, figs 58a, c (as *Coccolithophora pelagica* (Wal-

lich, 1877), in part); Lemmermann, 1908: 39, text-fig. 130 (as *C. pelagica* (Wallich); Schiller, 1930: 246–247, figs 123a-d, 124a, 124c (as *C. pelagicus* (Wallich), in part); Kamptner, 1941: 93, 111, pl. 13, fig. 136 (as *Coccolithus carteri* (Wallich); Kamptner, 1944: 141–144; Gardet, 1955: 511, pl. 5, figs 46-47 (as *Coccolithus pelagicus* forma *diademata*); and the following as *Helicosphaera carteri* (Wallich, 1877) — Lecal-Schlauder, 1951: 315 (in key), 330 (internal morphol), pl. XII, figs 4–5, 7–9; Kamptner, 1954: 21–23, 73, text-figs 17–19; Deflandre *in* Deflandre & Fert, 1954: 152–154, text-figs 9–11, 75; Kamptner, 1955: 35, pl. 9 (figs 94–95); Hasle, 1960b: 85, etc.; Parke & Adams, 1960: 263–274 (life-history phases); Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Black & Barnes, 1961: 139–140, pls 22–23; Martini & Bramlette, 1963: 850; Cohen, 1965: 21 (remarks, distrib., refs & syn.), pl. 3, figs o-q, pl. 17, figs 1-d; Loeblich & Tappan, 1966: 143 (listed); Levin & Joerger, 1967: 163–182; Kamptner, 1967: 141–143, 173 (descr., discuss., refs & syn), text-fig. 16, pl. 7, figs 45-46, 48–49; McIntyre & Bé, 1967: 571, pl. 11, A; Takayama, 1967: 172, pl. 1, fig. 5; McIntyre *et al.*, 1967: 12–13 (refs & syn.), pl. 6, figs A–B; Geitzenauer, 1969a: 172 (palaeoclimatic indicator); Deflandre & Deflandre-Rigaud, 1969b: Fiches 5003 (from Cohen & Reinhardt, 1968: 298, pl. 19, figs 17, 21, pl. 20, figs 5, 8), 5004 (from Haq, 1967: 59, pl. 1, fig. 4, pl. 6, fig. 8), 5005 (from Honjo *et al.*, 1967: 139, fig. 1), 5006 (from McIntyre *et al.*, 1967: 12, pl. 6, figs A–B), 5007 (from McIntyre & Bé, 1967: 571, pl. 11, figs 1) — and the following as *H. kamptneri* Hay & Moller, Black, 1968: 801–802 (taxonomic problems review), pl. 147, figs 12; Travers, 1969: 244; Edwards *in* Summerhayes, 1969: 76 (sub-Recent, NZOI Stn D5, S. of Macquarie Is); cf. Manton & Leedale, 1969: 1–16 (micro-anatomy, nature of coccoliths etc.); Geitzenauer, 1969c: 28–29 (ecol., etc.), pl. II, fig. 1, pl. V, fig. 3; Farinacci, 1970: 173 (descr., refs & syn.); see also Gartner *in* Peterson *et al.*, 1970: 106, 115 (*Helicopontosphaera* for *Coccosphaera*, invalid by International Code of Botanical Nomenclature, Art. 33, para. 4, cf. also Loeblich & Tappan, 1970a: 161 (*Coccosphaera*), 164 (*Helicopontosphaera*); Cati & Borsetti, 1970: 129–136 (climatic indicator); McIntyre & McIntyre, 1971: text-figs 16.4, 16.5 (preservation and water depth, as *H. carteri*); Martini, 1971: 541 (Miocene occurrence, refs), figs 39.2 (stratigraphic distrib. in Tertiary); Black, 1971: 615 (systematics), pl. 45.2, fig. 21 (as *H. carteri*); Gaarder & Hasle, 1971: 533 (refs etc.), figs 9a-b, e (as *Helicosphaera carteri* (Wallich)); Farinacci, 1971: IV/149; Edwards, 1972: 173 (palaeoecol., early Pliocene, southern Wairarapa), table 1 (ecol. preferences); Locker, 1972: 767 (*Helicosphaera*); Haq, 1973: 38 (descr., occurrence, etc., evolutionary trends), pl. 7, figs 11–12; Burns, 1973b: 222, figs 3–4 (latitudinal distrib. and significance, as *Coccolithus pelagicus*); cf. Klaveness, 1973b: 72, 151–162 (motile stage); Honjo, 1976: 72, pl. I, fig. 3; Okada & McIntyre, 1977: 14 as *Helicosphaera carteri* following Jafar & Martini, 1975, refs & syn.); cf. Winter *et al.*, 1979: 206, pl. II, fig. 4; Chen, 1980: 141, pl. 4, fig. 4, pl. 7, fig. 13 (as *Helicosphaera carteri*, syn. etc.); Heimdal & Gaarder, 1981: 56 (as *Helicosphaera carteri* (Wallich) following quoted refs); Hallegraeff, 1984: 231, fig. 3 (as *C. pelagicus*) 233, figs 19–20 (*H. carteri*); Gard, 1987: 85–87 (test etc.); Griffis & Chapman, 1988: 305–314 *passim* (darkness effects/palaeoceanogr. implications); Hallegraeff, 1988: 15 (SEM photos as *H. carteri*); Chrétiennot-Dinet, 1990: 98 (generic diag.).

Family RHABDOSPHAERIDAE/ RHABDOSPHAERACEAE

Genus **Aspidorhabdus** Hay & Towe 1962

Aspidorhabdus stylifera (Lohmann, 1902)

Lohmann, 1902b: 142–143, pl. 5, fig. 65 (*Rhabdosphaera*); Lemmermann, 1908: 40, text-fig. 135; Schiller, 1930: 250–251 (distrib. & refs), fig. 129; Gran & Braarud, 1935: 389 (corrected to *stylifer*); Kamptner, 1941: 96, 115, pl. 15, figs 148–149; Lecal-Schlauder, 1951: 316 (in key); Gaarder, 1954b: 11; Halldal & Markali, 1955: 16, pl. 20; Trégouboff & Rose, 1957: 74, pl. 17, fig. 16 (key features); Hasle, 1960: 85, etc; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Black & Barnes, 1961: 144, pl. 26 (as *Discolithus phaseolus*); Cohen, 1964: 242, pl. 6, fig. 2; Cohen, 1965: 22–23 (remarks etc.), pl. 3, figs d-f, pl. 21, figs c-f, pl. 23, figs b-d; Loeblich & Tappan, 1966: 163 (listed); Kamptner, 1967: 145–146, 174, 185, pl. 7, fig. 54, pl. 8, figs 56–58; McIntyre & Bé, 1967: 567 (descr., etc.), pl. 4, A–C; Takayama, 1967: 172–173, pl. 1, fig. 6; Travers, 1969: 245; Deflandre & Deflandre-Rigaud, 1969a: Fiches 4418, 4419 (figs from McIntyre & Bé, 1967: 567, pl. 4, figs a-c); Deflandre & Deflandre-Rigaud, 1969b: Fiche 5188 (from Kamptner, 1967: 145, pl. 7, fig. 54, pl. 8, figs 56–58); Geitzenauer, 1969c: 36–37 (ecol., etc.), pl. I, fig. 1, pl. IV, fig. 2; Boudreaux & Hay, 1969: 269, pl. 4, figs 11–15 (*Aspidorhynchus*); McIntyre *et al.*, 1970: 724 (palaeoclimatic indicator), (probable syn. of *R. clavigera*), text-fig. 7 (biogeogr.); Gaarder, 1971: 99, 100, text-fig. 53 (distrib., as *Rhabdosphaera*); McIntyre & McIntyre, 1971: 259 (concentration and solution effects), text-figs 16.4, 16.5 (preservation and water depth; as *Rhabdosphaera*); Farinacci, 1972: V/180 (descr., etc.), fig. 65 (*Rhabdosphaera*); Burns, 1973b:

222, figs 3–4 (latitudinal distrib. and significance, in *Rhabdosphaera*); Leadbetter & Morton, 1973: 207, 214–216, figs 28–37, table 3 (ultrastructure); Heimdal & Gaarder, 1981: 58 (refs to conspecifity of *R. stylifer* with *R. claviger, q.v.*).

Genus **Discosphaera** Haeckel, 1894

Discophaera tubifer (Murray & Blackman, 1898)

Murray & Blackman, 1898: 438–439, pl. 15, figs 8–10 (*Rhabdosphaera*); Ostenfeld, 1900: 199–200; Lohmann, 1902b: 141, pl. 5, figs 47–48 (*Discosphaera*); Veoltzkow, 1902: 493 (*Rhabdolithes*); Lemmermann, 1908: 49 (refs), text-figs 132, 133a-b; Kamptner, 1927: 175–177, text-fig. 1; Schiller, 1930: 254–255 (descr., distrib., refs & syn.), figs 45a-c; Kamptner, 1944: 139; Lecal-Schlauder, 1951: 136 (in key), 302–303, text-fig. 39; Deflandre *in* Grassé, 1952: 456, text-fig. 354j; Gaarder, 1954b: 8; Halldal & Markali, 1955: 17, pl. 22; Trégouboff & Rose, 1957: 73–74, pl. 17, fig. 17 (key features); Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Cohen, 1964: 242, 244 (remarks, etc., distrib., refs & syn.), pl. 5, figs 3a-c, pl. 6, figs 3a-e); Cohen, 1965: 24 (remarks etc.), pl. 3, figs g-i, pl. 23, fig a; Loeblich & Tappan, 1966: 139, 160, 163 (listed); McIntyre & Bé, 1967: 566 (descr., etc.), pl. 1, A–C; Kamptner, 1967: 138–140, 171–174 (descr., discuss.), pl. 5, figs 36–37, pl. 6, figs 38-40, 42, 44; Deflandre & Deflandre-Rigaud, 1969a: Fiches 4414, 4415 (figs from McIntyre & Bé, 1967: 566, pl. 1, figs 1a-c); McIntyre *et al.*, 1970: 724 (palaeoclimatic indicator), text-fig. 4 (biogeogr.); Okada & Honjo, 1970: pl. 1, fig. 3 (as *D. turbifera* [*sic*]); Gaarder, 1971: 97, 100, text-fig. 5.2 (distrib.); Gaarder & Hasle 1971: 533 (refs), fig. 8; McIntyre & McIntyre, 1971: 259–260, text-fig. 16.5 (preservation and water depth); Farinacci, 1972: V/184 (descr., etc.) figs 8–11 (*Rhabdosphaera*); Burns, 1973b: 222, figs 3–4 (latitudinal distrib. and significance); Okada & McIntyre, 1977: 16 (biogeogr., refs & syn., as *D. tubifera*); Chen, 1980: 142, pl. 7, figs 11–12; Heimdal & Gaarder, 1981: 51 ("the specific epithet *tubifer*, being a noun (Kamptner, 1967, p. 164), should not be changed by the gender of the genus"); Jeffrey *et al.*, 1982: 70, fig. 11; Hallegraeff, 1984: 236, figs 34– 36; Hallegraeff, 1988: 6 (SEM photo.); Chrétiennot-Dinet, 1990: 102 (generic diag.).

Genus **Rhabdosphaera** Haeckel, 1894

Rhabdosphaera claviger Murray & Blackman, 1898

Murray & Blackman 1898: 438, 439, pl. 15, figs 13–15; Lohmann, 1902b: 142, pl. 5, fig. 51; Lemmermann, 1908: 40, text-figs 133, 134a-b; Lohmann, 1912: 228, text-fig. 8b; Schiller, 1930: 252–253 (descr., etc.), text-figs 132a-c; Kamptner, 1944: 140; Lecal-Schlauder, 1951: 316 (in key); Kamptner, 1954: 34, text-figs 38–39; Gaarder, 1954b: 10; Deflandre *in* Deflandre & Fert, 1954: 156, pl. X, figs 14–16; Norris, 1961: 174 (table 2) (NZOI Stn B67, off Kermadec Is); Cohen, 1964: 240, 242 (remarks, distrib., refs), pl. 5, figs 2a-g, pl. 6, fig. 1; Cohen, 1965: 22 (remarks, distrib.), pl. 3, figs a-c, pl. 27, figs a-b, pl. 23, fig. e; Black, 1965: 136, fig. 25; Braarud *et al.*, 1965: 394–400 (validation and description of the species following Hay & Towe, 1962); Loeblich & Tappan, 1966: 160, 162 (listed); Kamptner, 1967: 144–145, 174, 175, pl. 7, figs 51–53, pl. 8, fig. 55; Deflandre & Deflandre-Rigaud, 1969b: Fiches 5182 (from Kamptner, 1967), 5183 (from Cohen & Reinhardt, 1968: 292, pl. 19, figs 18, 22, pl. 20, figs 6–7, pl. 21, fig 4), 5184 (from Hay *et al.*, 1967: 380, pl. 10–11, fig. 4); McIntyre *et al.*, 1970: 721 (footnote: *R. stylifera* "probably synonymous" with *R. clavigera*); Gaarder, 1971: 97, 100, text-fig. 5.3 (distrib.); Uschakova, 1971: 247, pl. 15.2, fig. 10; McIntyre & McIntyre, 1971: 259 (concentration and solution effects); Black, 1971: 615 (systematics), pl. 45.2, figs 19–20; Gaarder & Hasle, 1971: 536 (refs & syn.), fig. 11 (as *R. clavigera*); Burns, 1973b: 222, figs 3–4 (latitudinal distrib. and significance); Okada & Honjo, 1973: 355–374 *passim* (distrib. in Pacific); Okada & McIntyre, 1977: 17 (biogeogr., refs & syn. as *R. clavigera*); Heimdal & Gaarder, 1981: 58 (status of alleged synonymy with *R. stylifer, q.v.*; "The specific epithet *claviger*, being a noun should not be changed by the gender of the genus (Kamptner, 1967, p. 174"); Hallegraeff, 1984: 236, figs 32–33.

Family PRYMNESIIDAE/PRYMNESIACEAE
Genus **Chrysochromulina** Lackey, 1939

Chrysochromulina alifera Parke & Manton, 1956

Parke & Manton *in* Parke *et al.*, 1956: 406–413, text-figs 41–67, pl. VII–IX (figs 68–76); Parke *et al.*, 1958: 209–228; Boney, 1970: 262, figs 4F & 7; Leadbeater, 1972b: 66 (table 1); Leadbeater, 1972c: 114; Manton & Leadbeater, 1974: 22; Leadbeater, 1974: 180; Moestrup, 1979: 65 (N.Z. record).

Chrysochromulina aff. **C. brevifilum** Parke & Manton, 1955

Parke & Manton *in* Parke *et al.*, 1955: 601–606, text-figs 65–72, pls VIII–IX; Parke *et al.*, 1958: 209–228; Boney, 1970: fig. 4E; Leadbeater, 1972b: 66 (table 1); Leadbeater, 1972c: 114; Manton & Leadbeater, 1974:

22; Moestrup, 1979: 65–66, figs 8–9 (N.Z. record).

Chrysochromulina camella Leadbeater & Manton, 1969

Leadbeater & Manton, 1969: 116; Leadbeater, 1972b: 66 (table 1); Moestrup, 1979: 66 (N.Z. record); see also Taylor, 1974c: 398.

Chrysochromulina chiton Parke & Manton, 1958

Parke & Manton *in* Parke *et al.*, 1958: 225–226 (diag.), also pp. 209–228, text-figs 1–7, pls I–X (morphol. etc.); Manton, 1967a: 265–272 (fine structure); Manton, 1967b: 411–418 (scale formation); Boney, 1970: 259, 263, fig. 4c; Leadbeater, 1972b: 66 (table 1); Leadbeater 1972c: 114, 120 (discuss.), pl. 4 (figs 26–29); Manton & Leadbeater, 1974: 22; Leadbeater, 1974: 180; Moestrup, 1979: 68, fig. 10 (N.Z. record); Jeffrey *et al.*, 1982: 70, fig. 14.

Chrysochromulina ephippium Parke & Manton, 1956

Parke & Manton *in* Parke *et al.*, 1956: 398–406, text-figs 20–29, pls V–VII (figs 30–40); cf. Norris, 1964: 268, fig. 6 (Wellington Harbour); Throndsen, 1969: 1972; Boney, 1970: 260–261, fig. 4A; Leadbeater, 1972b: 66 (table 1); Leadbeater, 1972c: 114; Manton & Leadbeater, 1974: 22; Leadbeater, 1974: 180; Thomsen, 1978: 35; Moestrup, 1979: 68 (N.Z. record).

Chrysochromulina ericina Parke & Manton, 1956

Parke & Manton *in* Parke *et al.*, 1956: 389–398, text-figs 1–9, pls I–IV (figs 10–19); Manton & Leedale, 1961a: 145–155, pls I–VII (fine structure); Throndsen, 1969: 172; Boney, 1970: 259, 273, fig. 4D; Throndsen, 1970a: 54; Leadbeater, 1972b: 66 (table 1); Leadbeater, 1972c: 115, 118–120, pl. 3 (figs 19–25); Manton & Leadbeater, 1974: 22; Leadbeater, 1974: 180; Moestrup, 1979: 68–69, figs 20–22 (N.Z. record); Espeland & Throndsen, 1986: 210, fig. 2 (distrib., etc.).

Chrysochromulina "aff. **fragilis** Leadbeater" 1972 *in* Manton & Leadbeater, 1974, Moestrup, 1979

Manton & Leadbeater, 1974: 66 (aff. *C. fragilis* Leadbeater, 1972b: 66, 74–75, pl. 8, figs 45–46; Leadbeater, 1972c: 115); Moestrup, 1979: 66, fig. 11 (N.Z. record).

Chrysochromulina mactra Manton, 1972

Manton, 1972: 21–35; Leadbeater, 1974: 180; Moestrup, 1979: 69 (N.Z. record); Espeland & Throndsen, 1986: 210, fig. 6.

Chrysochromulina novaezelandiae Moestrup, 1979

Moestrup, 1979: 69–70, figs 13–18.

Chrysochromulina parkeae Green & Leadbeater, 1972

Green & Leadbeater, 1972: 469–474, text-fig. 1, pls I–IV; Leadbeater, 1972c: 115–116; Manton & Leadbeater, 1974: 23; Leadbeater, 1974: 180; Moestrup, 1979: 70 (N.Z. record).

Chrysochromulina spinifera (Fournier, 1971)

Fournier, 1971: 89–92, text-fig. 1 (in *Chrysocampanula* new genus); Parke, & Dixon, 1976: 553 (to *Chrysochromulina*), 555; Moestrup, 1979: 70–72, figs 19, 23 & 25 (N.Z. record); Espeland & Throndsen, 1986: 212 (distrib., etc.).

Chrysochromulina sp. "Plymouth 384"

Moestrup, 1979: 72, fig. 26 (Kaikoura, N.Z., cf. Plymouth Culture Collection Serial No. 384).

Chrysochromulina spp. Norris, 1961

Norris, 1961: 172, fig. 10 (from NZOI Stn B69), fig. 11 (from NZOI Stn B65) (discuss. of genus, etc. — see also Hollande, 1952a: 547 (footnote) for generic definition).

Chrysochromulina sp. 1. Norris, 1964

Norris, 1964: 268, fig. 6 (coloured) (Wellington Harbour, as cf. *C. alifera* Parke & Manton, 1956, *q.v.*, and *C. ephippium* Parke & Manton, 1956, *q.v.*); Throndsen, 1969: 172; Leadbeater, 1972c: 114, table 2 (Norris' record given as *C. ephippium*); Taylor, 1974c: 398 (Norris' records as "Resembling *C. ephippium* Manton, *C. kappa* and *C. brevifilum* all of Parke & Manton but identifications provisional, see p. 399)".

Chrysochromulina sp. 2. Norris, 1964

Norris, 1964: 268, fig. 7 (coloured) (Wellington Harbour, as cf. *C. kappa* Parke & Manton, 1955); Throndsen, 1969: 172 ("Possibly also found in Wellington Harbour ...").

Chrysochromulina sp. 3, Norris, 1964

Norris, 1964: 268, fig. 7 (coloured) (Wellington Harbour; cf. *C. brevifilum* Parke & Manton, 1955, *q.v.*).

Chrysochromulina spp. Taylor, 1969

Taylor, 1969: 106 (Goat Is Bay); Taylor, 1978: 214 (three species cultured from Leigh area).

Chrysochromulina sp. Taylor, 1974

Taylor, 1974b: 398 (Jellicoe Channel record as resembling *C. camella* Leadbeater & Manton, 1969, *q.v.*).

Chrysochromulina spp. Taylor, 1978

Taylor, 1978 : 214 (Leigh area : "Three species have been cultured ...").

Chrysochromulina spp. Moestrup, 1979

Moestrup, 1979 : 72, fig. 24 ("At least three more species ..." from N.Z.).

Chrysochromulina sp. Chang *et al.*, 1990

Chang *et al.*, 1990: table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Genus **Phaeocystis** Lagerheim, 1893

Phaeocystis pouchetii (Hariot *in* Pouchet, 1892)

Hariot *in* Pouchet, 1892: 34–36 (*Tetraspora*); Lagerheim, 1893: 32–33 (in new genus); Lagerheim, 1896: 277–288; Savage, 1930: 5–14 (effect on herring migration); Savage, 1932: 326–340 (influence on herring migrations), figs 1–11, pl. XXI; Savage & Wimpenny, 1936: 1–88; Kornmann, 1955: 218–233 (culture); Kashkin, 1963: 697–705 (fine structure, habitat and biogeogr.); Jones & Haq, 1963: 8–20; Boney, 1970: 273, 278, 281–284 (toxigenic properties, refs), 292–294; Parke *et al.*, 1971: 927–941, text-fig. 1 (distrib.), pls I–VI (structure, blooms, refs etc.); Leadbeater, 1972c: 117, pl. 1, figs 17–19; Spencer, 1976: 71–73 (review of current knowledge etc.); Moestrup, 1979: 74, fig. 35 (N.Z., 1st Southern Hemisphere record confirmed by electron microscopy); MacRaild, 1981: 12 (identification of "Nelson Slime" [see Russell, 1982 and Chang, 1983a] as *Emiliana huxleyi*); Bradstock & MacKenzie, 1981: 29–30, 2 figs ("Tasman Bay slime") incl. illus. of *Emiliana huxleyi* as "one of the organisms commonly formed in the Tasman Bay slime"; Hurley, 1982: 1–11 (history of "Nelson Slime", possibly attributable to *Phaeocystis*, refs etc.); Chang, 1983a: 165–168, figs 1–2 (mucilage producer of the "Nelson Slime" in N.Z., refs etc.); Weiss, 1983: 87–94, 7 figs (feeding of copepods on blooms); Chang, 1984: 303–308, figs 1–7 (N.Z. occurrence [see also Hurley, 1982; Bradstock & MacKenzie, 1981; Russell, 1982 re "Tasman Bay Slime"], ultrastructure of vegetative colonies etc.); Lancelot, 1984: 593–600 (metabolic changes); Carreto *et al.*, 1985: 147–152 (toxic blooms/factors); Hibberd & Leedale, 1985: 78, figs 7–10 (descr. etc.); Lancelot & Mathot, 1985: 227–32 (biochemical fractionation/primary production); Veldhuis & Admiraal, 1985: 301–304 (photosynethic product transfer/excretion rate); Grimm & Weisse, 1985: 201–211, 4 figs (temperature/growth, refs); MacKenzie & Gillespie, 1985: 771; Palmisano *et al.*, 1986: 891–906 (photoadaptation); Batje & Michaelis, 1986: 21–27 (blooms); Cadee & Hegeman, 1986: 29–36 (seasonal/annual variation); Admiraal & Venekamp, 1986: 61–66 (tintinnid grazing on blooms); Veldhuis, Colijn & Venekamp, 1986: 37–48 (blooms); Veldhuis, Admiraal & Colijn, 1986: 49–60 (chemical/physiological changes and blooms); Weisse *et al.*, 1986: 171–182 (dynamics of blooms); Lancelot *et al.*, 1986: 193–202 (net protein synthesis); MacKenzie & Gillespie, 1986: 381,388 (table 3: Tasman Bay); Hallegraeff, 1987: 6, fig. 9; Jenkinson, 1987: 47; Lancelot & Mathot, 1987: 239–248 (dynamics of bloom); Billen & Fontigny, 1987: 249–257 (dynamics of bloom); Lancelot *et al.*, 1987: 38–46 (nutrient enrichment and blooms); Admiraal & Veldhuis, 1987: 277–285 (nucleosides/phosphatase activity); Veldhuis & Admiraal, 1987: 47–54 (phosphate depletion); Huntley *et al.*, 1987: 197–212 (grazing of copepods); Veldhuis *et al.*, 1987: 219–229 (phosphorus source); Davidson & Marchant, 1987: 481– 487 (manganese binding/release, bacterial role); Tande & Båmstedt, 1987: 313– 320, 4 figs (copepod feeding rates, refs); Boalch, 1987: 94–97 (blooms); SooHoo *et al.*, 1987: 175–189 (photosynthesis/sea ice); Jahnke & Baumann, 1987: 141–147 (colony organisation/temperature tolerance); Pingree & Harris, 1988: 519–529 (luminescence); Skreslet, 1988: 157166 (buoyancy/ecol.); Verity *et al.*, 1988a: 219– 248 (blooms/metabolism); Verity *et al.*, 1988b: 749–766 (blooms/life-cycles); Verity & Smayda, 1989: 161–171 (nutritional value for copepods); Rick & Aletsee, 1989: 169–176, figs 1–3, tables 1–2; Gibson *et al.*, 1990: 339–346 (sulphur compound/distrib., correlation); Chang *et al.*, 1990: 462, table 1 (record of N.Z. bloom 1981 — see Chang, 1983); Chrétiennot-Dinet, 1990: 83 (key, generic diag.); Marchant *et al.*, 1991: 391–395, figs 1–4.

Phaeocystis scrobiculata Moestrup, 1979

Moestrup, 1979: 74–78, figs 28–34, 36–38.

Genus **Prymnesium** Massart, 1925

Prymnesium calathiferum Chang & Ryan, 1985

Chang & Ryan, 1985: 191–198, figs 1–20; Chang, 1985: 109–112 (toxicity test); Chang, 1987a: 18, fig. 2 (popular account of potential threat to fish); Hallegraeff, 1987: 9, fig. 21; Chang *et al.*, 1990: 467.

Prymnesium parvum Carter, 1937

Carter, 1937: 40–42, pl. 3, figs 5–16, pl. 8, fig. 16; Otterstrøm & Steeman Nielsen, [1939] 1940: 1–24, fig. 6 (mortality effects); Reich & Aschner, 1947: 14–23 (mass development and control); Shelubsky, 1950/

53: 147–150 (relation to fish-farming); Shilo (Shelubsky) & Aschner, 1953: 333–343, 5 figs (factors re toxicity); Shilo (Shelubsky) *et al.*, 1953: 446 (properties of toxin); Shilo (Shelubsky) & Shilo, 1953: 330–333 (control methods); Reich & Kahn, 1954: 144–149 (culture, technique etc.); Shilo & Shilo, 1955: 233–240 (control); Jariv, 1955 : 96 (toxicity); McLaughlin, 1958: 75–81 (nutrition and toxigenesis); Kolarov, 1962: 43–53 (toxic effects); Petrova, 1962: 55–65 (blooming); Manton & Leedale, 1963: 285–303, figs 1–25 (fine structure); Manton, 1964a: 315–330, figs 1–23 (fine structure); Manton, 1964b: 317–325, pls 138–151 (division cycle); Valkanov, 1964: 65–81, pls 1–6 (toxicity, etc., review of effects on various organisms); Manton, 1966: 375–380, figs 1–8 (scale production); Manton, 1968: 35–53 (micro-anatomy); Throndsen, 1969: 182; Pienaar & Kleitzen, 1976: 55–56; Shilo, 1981: 37–47, fig. 1 (toxic principles, refs); Green *et al.*, 1982: 363–382, figs 1–42 (taxon.); Chen & Zeng, 1986: 394–399; Warner *et al.*, 1986: 89-102 (analysis/fluorometry); Wynne & Rhee, 1986: 91–103 (light effects/nutrients etc); Wortley & Phillips, 1987: 152–162 (toxins/fish mortalities); Dickson & Kirst, 1987: 657 *et seq.* (osmotic relationships); Chang, 1987b: 18–19 (first N.Z. record, off Kaikoura, O. Moestrup pers. comm.); Zheng, 1988: 220–223 (antibacterial activity); Bricaud *et al.*, 1988: 851–873 (optical properties); Chang *et al.*, 1990: 467 (N.Z.); Chrétiennot-Dinet, 1990: 83 (key, generic diag.).

Genus **Turrisphaera** Manton, Sutherland & Oates, 1976

Turrisphaera sp. Moestrup, 1979
Moestrup, 1979: 78–79, figs 39–40.

Order VOLVOCIDA/CHLOROPHYCEAE [Suborder POLYBLEPHAERIDINA] Family DUNIALIELLIDAE/DUNIALIELLACEAE

Genus **Collodictyon** Carter, 1865

Collodictyon sphaericum Norris, 1964
Norris, 1964: 267, fig. 39 (Wellington Harbour) (incl. in Chlorophyceae : Polyblepharidaceae, cf. Pascher, 1931 — see Fritsch, 1956: 90); Grassé, 1952: 1008–1011 (generic definition, status etc.); Taylor, 1974c: 396 (listed from Norris, 1964).

Genus **Dunaliella** Téodoresco, 1905

Dunaliella echlora Lerche, 1937
Lerche, 1937: 239, 241, 262 (descr., distrib. etc.), pl. 4, fig. 9, pl. 5, fig. 9; Butcher, 1959: 20 (in key), 22 (descr.); Chang, 1982 : 43 (first N.Z. record); Chang *et al.*, 1986 : 467–478 (growth rates etc.).

Dunaliella salina (Dunal, 1838)
Dunal, 1838: 172, [585] (*Haematococcus*); Téodoresco, 1905: 215–232 (*Dunaliella*), text-figs 1–5, pls 8–9; Hamburger, 1905: 111–125, text-figs 1–17, pl. 6, figs 1–17; Lerche, 1937: 240, 260–261 (development, refs, etc.), pl. 4, figs 2–3, pl. 5, figs 2–3; Pavillard, 1952: 181, 188–190, 200, 201, figs 110–111; Butcher, 1959: 21 (in key, descr., distrib., refs & syn. etc.), 21–22, pl. 1, fig. 1, pl. VII, fig. 5; Trezzi *et al*, 1964: 203 *et seq.* (ultrastructure); Trezzi *et al.*, 1965 : 255–263; Pfeihofer & Belton, 1975: 287–299; Wickramasinghe & Le Gal, 1973: 39–41 (amino acid metabolism); Taylor, 1974c: 396 (first N.Z. record from Grassmere salt ponds); cf. Hoshaw & Maluf, 1981: 199 *et seq.*; Chang, 1982 : 43; Chang & Wear, 1983: 57; Kosmakova & Prozumenshchikova, 1983: 42–46 (growth/biochem.); Stom *et al.*, 1984: 46–49; Leedale & Hibberd, 1985: 89, fig. 1 (descr.); Khanajchenko, 1985: 1–223 *passim* (predation/rotifers); Nosova, 1985: 130–135 (predation/rotifers); Chang *et al.*, 1986: 467–478 (growth rates etc.); Falkowski *et al.*, 1986: 183–192 (photosynthesis); Burns & Beardall, 1987: 75–86 (photosynthesis); Cho & Thompson, 1987: 75–93 (biochem.); Goldman *et al.*, 1987: 75–87 (predators); Jones *et al.*, 1987: 237–244 (mineral metabolism); Lenova *et al.*, 1987: 54–57 (lab. culture/growth analysis); Morissette & Popovic, 1987: 385–390 (pigments); Pick *et al.*, 1987: 194–198 (pigments/light intensity); Bental *et al.*, 1988a: 813–817 (ionic regulation); Bental *et al.*, 1988b: 320–324 (chem. composition); Bruce & Malkin, 1988: 1201–1206 (photosystem); Einspahr *et al.*, 1988a: 529–538 (osmoregulation etc.); Einspahr *et al.*, 1988b: 5775–5779 (metabolism/hypoosmosis); Karni & Avron, 1988: 1311–1314 (ionic content); Klut *et al.*, 1988: 35–40 (cytochemistry); Lukavsky, 1988: 65–68 (strain preservation technique); Moulton *et al.*, 1988: 1908–1911 (ecol., population growth etc.); Omarov & Mamedov, 1988: 21–25 (ion transport); Peeler et al., 1989: 970-976, figs; Oren-Schamir *et al.*, 1988: 124–128 (osmotic relationships); Pesheva, 1988: 105–108 (growth); Post & Stube, 1988: 89–100 (nitrogen use/growth); Posudin *et al.*, 1988: 1001–1006 (light/temperature effects); Selman-Reimer & Selman, 1988a: 17–20 (enzymes); Selman-Reimer & Selman, 1988b: 21–24 (enzymes); Wynne & Rhee, 1988: 173–178 (light/biochem.); Chitlaru & Pick, 1989: 788–794 (mutants/halo-adaptation); Einspahr *et al.*, 1989: 1115–1120 (biochem.); Katz *et al.*, 1989: 9–14 (biochem.); Oren-Schamir *et al.*, 1989: 1258–

1263 (osmoregulation); Pesheva & Toncheva-Panova, 1989: 91–93 (salt effect/growth, pigment); Sadka *et al.*, 1989: 93–98 (osmotic relationships); Stephenson *et al.*, 1989: 549–552 (proteins); Sung & Thompson, 1989: 610–616 (protein chem.); Zachleder *et al.*, 1989: 160–167 (cell cycle/ light effects); Bental *et al.*, 1990: 111–116 (metabolism).

Dunaliella sp. Taylor, 1969

Taylor, 1969: 106 (Goat Is Bay, Leigh, April-May, 1966).

* Order PRASINOMONADIDA/ PRASINOPHYCEAE

Genus **Nephroselmis** Stein, 1878

Nephroselmis gilva Parke & Rayns, 1964

Parke & Rayns, 1964: 209–213, text-figs 1–5, pls I–II (figs 6–25); Throndsen, 1969: 184; Boney, 1970: 266, 274, 276, table II (p. 275), fig. 11C; Leadbeater, 1972c: 117, pl. 2, figs 16–17; Leadbeater, 1974: 191; Manton & Leadbeater, 1974: 23; Moestrup, 1979: 79 (N.Z. occurrence); Chrétiennot-Dinet, 1990: 71 (key, generic diag.).

Nephroselmis rotundata (Carter, 1937)

Carter, 1937: 13–14, pl. I, figs 17–18 (*Bipedinomonas*); Butcher, 1959: 38 (descr.), pl. II, fig. 7, pl. VI, fig. 8, pl. VIII, fig. 4; Norris, 1964: 263–265, figs 10 (coloured), 24–28; Manton *et al.*, 1965: 243 (*Heteromastix*), 245–249, text-figs 1–6, pls I–X; Taylor, 1974c: 397 (N.Z. record listed); cf. Throndsen, 1976: 269–293 *passim* (productivity of *H. pyriformis* (Carter)); Leedale, 1985: 99–100, figs 3–4 (transf. to *Nephroselmis*, comb. nov.).

Genus **Micromonas** Manton & Parke, 1960

Micromonas pusilla (Butcher, 1952)

Butcher, 1952: 182–183, pl. II, fig. 42 (*Chromulina*); Knight-Jones, 1951: 145–146 (culture); Knight-Jones & Walner, 1951: 445–447 (as component of ultraplankton); Manton & Parke, 1960: 292–293, 298 (diag., in *Micromonas* new genus); Throndsen, 1969: 184; Throndsen, 1970a: 55; Throndsen, 1976: 269–293, figs *passim* (productivity); Moestrup, 1979: 79 (N.Z. occurrence); Stewart & Mattox, 1980: 433–462; Norris, 1980: 85–145; Leedale, 1985: 102 (incl. generic descr.); Espeland & Throndsen, 1986: 214 (distrib., etc.); Chrétiennot-Dinet, 1990: 73–74 (key, generic diag.).

(?) Micromonas sp. Norris, 1964

Norris, 1964: 265 (Wellington Harbour), fig. 9 (coloured); Taylor, 1974c: 397 (listed); cf. Throndsen, 1976: 269–293 *passim* (productivity of *M. pusilla* (Butcher)).

Genus **Pachysphaera** Ostenfeld, 1899/ Genus **Pterosperma** Pouchet, 1893

Pachysphaera or **Pterosperma sp.** Moestrup, 1979

Moestrup, 1979: 79 (N.Z., Leigh); cf. Park, 1966: 555–563; Leadbeater, 1974: 191; Chrétiennot-Dinet, 1990: 70 (diag., etc.).

Genus **Pyramimonas** Schmarda, 1850

Pyramimonas disomata Butcher, 1959

Butcher, 1959: 26 (in key), 27, pl. II, fig. 2, pl. VIII, figs 7, 11; Kudo, 1954: 282 (generic definition); Norris, 1964: 266, figs 2, 2A, 29a-d, 30a-g (Wellington Harbour); Parke & Dixon, 1964: 528 (listed as "*P. distomata* [*sic*] Butch."); Throndsen, 1969: 186 (distrib.), 191–195, 208; Taylor, 1974c: 397 (N.Z. record listed as *P. distomata* [*sic*]; Adachi, 1972: 17 (table 5); Belcher, 1974: 106 (synonymy); Throndsen, 1976: 269–293 *passim* (productivity); Norris & Pienaar, 1978: 47–48, figs 15–19 (fine structure); Pennick, 1984: 4, 7, figs 23 & 27, table (p. 10) (ultrastructure, scales etc., refs); Espeland & Throndsen, 1986: 216 (distrib., etc.); Chrétiennot-Dinet, 1990: 71 (key, generic diag.).

Pyramimonas grossii Parke, 1949

Parke, 1949: 256–261, text-figs 1–12, pl. II, figs 17–18; Knight-Jones, 1951: 145 (culture); Hardy, 1956: fig. 15Q; Butcher, 1959: 26 (in key), 30, pl. II, fig. 1, pl. VIII, figs 1–2; Fraser, 1962: text-fig. 7 : 8; Manton *et al.*, 1963: 235 (structure), pl. XI, figs 29–34; Norris, 1964: 266, figs 4–5, 29a-c (Wellington Harbour); Manton, 1969: 378–392 (trichocysts); Throndsen, 1969: 186 (distrib.), 191, 193, 194, 208; Boney, 197: 286; Throndsen, 1970a: 55; Leadbeater, 1972c: 118, pl. 2, figs 12–13; Manton & Leadbeater, 1974: 23; Leadbeater, 1974: 181; Taylor, 1974c: 397 (listed from Norris, 1964); Moestrup, 1979: 80 (N.Z.); Chang, 1983b: 288, table 1 (West Coast productivity);

* "Christiansen (1962, 1966) names orders and families for the Prasinophyceae but relationships are uncertain and no groupings are attempted for the genera selected for inclusion here." (Leedale *in* Lee *et al.*, 1985: 97)

Pennick, 1984: 4, 9, figs 5, 31, 44, table (p. 10) (ultrastructure, scales etc.); Espeland & Throndsen, 1986: 216 (distrib., etc.), fig. 19; Bradford *et al.*, 1987: 228, table 2 (NZOI Stn T140, Pelorus Sound, as *P. grosii* [*sic*].

Pyramimonas janetae Norris, 1964

Norris, 1964: 226–267, fig. 3 (Wellington Harbour); Taylor, 1974c: 397 (listed); Chang, 1983: 288, table 1 (West Coast productivity).

Pyramimonas orientalis Butcher, 1959

Butcher, 1959: 26 (in key), p. 31, pl. I, fig. 7, pl. VII, Throndsen, 1970a: 55; Leadbeater, 1972c: 118, pl. 2, figs 10–11; Moestrup & Thomsen, 1974: 247–269 (ultrastructure); Belcher *et al.*, 1974: 101–106; Manton & Leadbeater, 1974: 23; Leadbeater, 1974: 181; Norris & Pienaar, 1978: 48–50, figs 20–22; Pennick & Belcher, 1978: 304–311 (morphol.); Moestrup, 1979: 80 (N.Z.); Pennick, 1984: 4, 7, 9, figs 11, 19, 21, 22, 35, 36, 45, table (p. 10); Espeland & Throndsen, 1986: 216 (distrib., etc.).

Pyramimonas sp. MacKenzie & Gillespie, 1986

MacKenzie & Gillespie, 1986: 381 (table 3 : Tasman Bay).

Pyramimonas sp. Bradford *et al.*, 1987

Bradford *et al.*, 1987: 228 (table 2, NZOI Stn T140, Pelorus Sound).

Pyramimonas sp. Chang *et al.*, 1990

Chang *et al.*, 1990: 463, table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Genus **Tetraselmis** Stein, 1878
[= **Prasinocladus** Kuckuck, 1894]

Tetraselmis marinus (Cienkowski, 1881)

Cienkowski, 1881: 152, pl. I, figs 7–11 (*Chlorangium*); Waern, 1952: 85 (*Prasinocladus* cf. also Proskauer, 1950); Parke, 1953: 498 (as *P. lubricus* Kuckuck, see Parke & Dixon, 1964: 529, note 10); Chihara, 1963: 19 (systematic position); Parke & Manton, 1965: 525–536, pls I–XII (fine structure); Taylor, 1969: 106–109 (first N.Z. and Southern Hemisphere record from Goat Is Bay, Leigh); Taylor, 1974c: 397 (listed); Hori & Chihara, 1974: 265–271 (develop.); Norris *et al.*, 1980: 337 (to *Tetraselmis*); Leedale, 1985: 100–101, figs 6–7.

[Chromophycota]
* Order SILICOFLAGELLIDA/
DICTYOCHOPHYCEAE [Dictyophycidae]
[Dictyochales]
Family DICTYOCHIDAE/DICTYOCHACEAE

Genus **Dictyocha** Ehrenberg, 1838

Dictyocha fibula Ehrenberg, 1838

Ehrenberg 1837: 61 (*nomen nudum*); Ehrenberg, 1838 [1840a]: 129, pl. 4, fig. 16; Ehrenberg 1854b: pl. XVIII, figs 54–55; Haeckel, 1887: 1561; Lemmermann, 1901: 260, pl. X, fig. 24; Lemmermann, 1908: 27–28 (descr., refs), text-fig. 92; Gemeinhardt, 1930: 47–55 (descr., distrib., forms, varieties, etc.), figs 8, 39–45; S. M. Marshall, 1934 : 629–630 (varieties), text-figs 1, 3–5; Deflandre, 1952b: 437 (generic definition); Gaarder, 1954b: 13; Trégouboff & Rose, 1957: 78 (key features, forms and varieties), pl. 18; Yamaji, 1959: fig. 4 (on p. 91); Frenguelli, 1959: 56–57 (refs); Norris, 1961: 173 (NZOI Stn B65, off Kermadec Is); Fraser, 1962: 44, text-fig. 12 : 23; Tsumara, 1963: 51 (descr., refs, distrib.), pl. IX, fig. 7, pl. XXII, figs 9–10, pl. XXVII, fig. 1; Riedl, 1963: 31, pl. 5; Nival, 1965: 67–82, figs (annual cycle); Cassie, 1966: 584 (Hauraki Gulf); Gleser, 1966: 224, 226 (in key), 240, 241, 246–249 (descr., distrib., refs & syn.), 250, text-figs 1(2, 10), 8(9), 9(4), 10(13), 12(1), 15(1), 19(3), 22 (map), pl. XIII, figs 6–9, pl. XIV, figs 1–9; Loeblich *et al.*, 1968: 35 (listed), 90 (original descr.), pl. 9, figs 7–12; Travers & Travers, 1968: 285–288, text-fig. 1; Wood, 1968: 131 (descr., etc.), fig. A; Van Valkenburg, 1970: 6–7 (ultrastructure); Ling, 1970: 90–91 (taxon. notes), pl. 18, figs 4–10; Jerkovic & Kovacic, 1970: 19 (variation); Van Valkenburg & Norris, 1970: 48–54, 2 figs, 21 pls (growth and morphol.); Mandra & Mandra, 1969: 172–174; Van Valkenburg, 1971: 113–132 (fine structure); Mandra & Mandra, 1972: 17–18 (diag. features); Mandra *et al.*, 1973: 4 (occurrence in Oamaru diatomite, N.Z. Eocene); cf. Ciesielski & Weaver, 1973: 295–297 (Southern Ocean palaeotemperatures); Taylor, 1974c: 398 (NZ records listed), 399 (note 13 on nomenclature); Leadbeater, 1974: 188, pl. Vc; Travers, 1975: 51–75; Taylor, 1978: 214 (Leigh area), Van Valkenberg, 1980: 335–350; Leedale, 1985: 104–105 (descr., etc.), figs 1–2; Perch-Nielsen, 1985: 831, 842, figs 15–17; Sournia, 1986: 24 (generic diag.); Van der Spoel, 1987: 439 *et seq.* (temperature/genera ratios etc.); Bradford *et al.*, 1987: table 2 (NZOI Stn T140, Pelorus Sound); Nelissen, 1988: 3–16 *passim* (variation/taxon.).

* Note annotated index of fossil and recent silicoflagellates by Loeblich *et al.*, 1968, and review of ecology and biogeography in the South Pacific by Funnell, 1970.

Dictyocha fibula (Ehrenberg, 1838) var. **aculeata** Lemmermann, 1901

Lemmermann, 1901: 261, pl. XI, figs 1–2; Gemeinhardt, 1930: 55 (descr., distrib.), figs 43a-b; Gaarder, 1954b: 13; Trégouboff & Rose, 1957: 58, pl. 18, fig. 4 (key features); Cassie, 1961: 20, 39, 50, pl. VIII, fig. 1 (Cook Strait); Tsumara, 1963: 54–55 (descr., refs), pl. X, fig. 9, pl. XXIII, fig. 6; Gleser, 1966: 250 (descr., refs), text-figs 1(4), 23 (map), pl. XV, fig. 10; Loeblich *et al.*, 1968: 35 (listed), 90 (orig. descr.), pl. 9, figs 1–2; Ling, 1970: 91–92 (taxon. notes, refs & syn.), pl. 18, figs 11–13; Ling, 1972: 161, pl. 15, figs 16–17; Taylor, 1974c: 398 (listed); Huang, 1979: 122 (descr.), pl. 1, figs 4–5; Perch-Nielsen, 1985: 843 (listed), fig. 17.14.

Dictyocha fibula (Ehrenberg, 1838) "forma" **rhombica** Schulz, 1928

Schulz, 1928: 253, fig. 37 (as *D. fibula* var. *aculeata* forma *rhombica*); Gemeinhardt, 1930: 50–51 (descr., distrib.), figs 40a-c; Cassie, 1961: 20 (N.Z. records), pl. VIII, fig. 4; Norris, 1961: 173 (NZOI Stn B65, off Kermadec Is); Fraser, 1962: 44, text-fig. 12: 23; Tsumara, 1963: 51–52 (descr., distrib., refs & syn.), pl. IX, figs 7–12, pl. XXII, figs 9–10, pl. XXIII, figs 11–13, pl. XXVII, fig. 1; Riedl, 1963: 31, pl. 5; Nival, 1965: 67–82, figs (annual cycle); Cassie, 1966: 584 (Hauraki Gulf); Gleser, 1966: 224, 226 (in key), 240, 241, 245–249 (descr., distrib., refs & syn.), 250, text-figs 1 (2, 10), 8(9), 9(4), 10(13), 12(1), 15(1), 19(3), 22 (map), pl. XIII, figs 6–9, pl. XIV, figs 1–9, pl. XV, figs 4–5, 7, 9; Wood, 1968: 131 (descr., etc.), fig. A; Loeblich *et al.*, 1968: 35–36 (listed), 90–91 (original descr.), pl. 9, figs 7–12, pl. 10, fig. 4; Ling, 1970: 90–91, 93–95 (taxon. notes, refs & syn.), pl. 18, figs 4–10, 15; Bachmann, 1970: 1 *et seq.*; Van Valkenburg, 1970: 6–7 (ultrastructure); Jerkovic & Kovacic, 1970: 19 (variation); Van Valkenburg & Norris, 1970: 48–54, 2 figs, 21 pls (growth and morphol.); Van Valkenburg, 1971: 113–132 (fine structure); Mandra & Mandra, 1972: 17–20 (diag. features, refs & syn.), figs 17–25, 28–33; Mandra *et al.*, 1973: 4 (occurrence in Oamaru diatomite, N.Z. Eocene); Ciesielski & Weaver, 1973: 295–297 (Southern Ocean palaeotemperatures); Ciesielski & Weaver, 1974: 511– 515 (palaeotemperatures); Taylor, 1974c: 398 (N.Z. records listed), 399 (note 13 on nomenclature); Taylor, 1978: 214 (Leigh area, records from Goat Is Bay); Taylor & Durbin, 1978: 220 (Dec. 1967 record from Whangateau Harbour); Huang, 1979: 122 (descr.), pl. 1, figs 1–2; Perch-Nielsen, 1985: 843 (listed), fig. 17.14.

Genus **Distephanus** Stohr, 1880
[? = *Dictyocha*; cf. Leedale, 1985: 103]

Distephanus crux [var. **crux**] (Ehrenberg, 1840)

Ehrenberg, 1840b: 207 (*Dictyocha*); Ehrenberg, 1854b: pl. XVIII, fig. 56, pl. XX, fig. 46, pl. XXXIII, Nr. XV, fig. 9; Haeckel, 1887: 1563 (*Distephanus*); Lemmermann, 1901: 262, pl. XI, figs 6–7; Lemmermann, 1908: 29 (descr., refs), text-fig. 98; Gemeinhardt, 1930: 58–60 (descr., distrib., varieties, etc.), figs 49–52; Gaarder, 1954b: 13, text-fig. 14; Cassie, 1961: 20 (Hauraki Gulf and Kaikoura); Tsumara, 1963: 60-61 (descr., refs & syn.), pl. XI, figs 8–9, pl. XXIV, fig. 43; Gleser, 1966: 224, 225, 259, 260–262 (in key, descr., distrib., refs & syn.), 273, 275, 279, 282, text-figs 9(2–3), 12(9), 13(2), 14(4–6), 24 (map), pl. XVIII, figs 1–11, pl. XIX, figs 1–6; Loeblich *et al.*, 1968: 34 (listed under *Dictyocha*), 85 (orig. descr.), pl. 8, figs 29–32; Wood, 1968: 132 (descr.), fig. C; Mandra & Mandra, 1972: 26–28 (diag. features, refs & syn.), fig 41; Ling, 1970: 96 (taxon. notes; note refs to syn. in Bachmann, 1967 and in Mandra, 1968), pl. 19, figs 5–6; Mandra *et al.*, 1973: 4 (occurrence in Oamaru diatomite, N.Z. Eocene); Taylor 1974c: 398 (Cassie records listed under *Dictyocha*); Travers & Travers, 1975: 261 (varieties, etc.); Perch-Nielsen, 1985: 833, 843, figs 18.7–11; Van der Spoel, 1987: 439 *et seq.* (temperature/genera ratios); Nelissen, 1988: 3–16 (taxon./var.).

Distephanus speculum ["var". **speculum**] (Ehrenberg, 1837)

Ehrenberg, 1837: pl. 18, figs 5–7, 19(41), 21(44b), 22(48), 25(49); Ehrenberg, 1839: 129, table, pl. 14, fig. XVI (*Dictyocha*); Ehrenberg, 1854b: pl. XVIII, figs 5–7, pl. XIX, fig. 41, pl. XXI, figs 44b, 47, pl. XXII, fig. 48, pl. XXV, fig. 47; Haeckel, 1887: 1565 (*Distephanus*); Lemmermann, 1899: 375 (syn.); Lemmermann, 1901: 263, pl. XI, fig. 11; Lemmermann, 1908: 29–31 (descr., varieties, refs), text-fig. 99; Gemeinhardt, 1930: 61–72 (descr., distrib., syn., varieties, etc.), figs 53–60; S. M. Marshall, 1934: 625, text-figs 1–2; Margaleff & Duran, 1953: 20, figs 2c-e; Gaarder, 1954b: 14; Kudo, 1954: 267, fig. 109c; Hardy, 1956: figs 15i-j; Trégouboff & Rose, 1957: 78 (key features), pl. 18, figs 6–8; Frenguelli, 1959: 57–59 (refs), text-figs 1a-c; Fraser, 1962: text-fig. 12: 26; Tsumara, 1963: 61–63 (descr., detailed refs & syn.), pl. XII, fig. 4, pl. XXIV, fig. 8; Riedl, 1963: 31, pl. 5; Norris, 1964: 270 (Wellington Harbour), fig. 12 (coloured); Balech & El-Sayed, 1965: 108–112; Gleser, 1966: 260 (in key), 263–271 (descr., distrib., varieties, refs & syn.) 273–276, 281, 282, text-figs 1(7), 13(3–4), 21(1), 25 (map), pl. XIX, figs 7–9, pl. XX, figs. 1–11; Loeblich *et al.*,

1968: 42 (listed under *Dictyocha*), 114–115 (orig. descr.), pl. 24, figs 1–10; Wood, 1968: 132 (descr., etc.), fig. D; Mandra & Mandra, 1969: 172–174; Balech, 1970: 143 (Antarctic); Hada, 1970: 9–10 (descr., refs) text-fig. 1; Ling, 1970: 98 (taxon. notes), pl. 19, figs 11–20; Mandra & Mandra, 1972: 28–29 (diag. features, refs & syn.), figs 38–39; Boney, 1973: 263–268; Mandra *et al.*, 1973: 4 (occurrence in Oamaru diatomite, N.Z. Eocene); Ciesielski & Weaver, 1973: 295–297 (palaeotemperatures); Ciesielski & Weaver, 1974: 511–515 (palaeotemperatures); Leadbeater, 1974: 188; Taylor, 1974c: 398 (N.Z. records listed under *Dictyocha*); Travers & Travers, 1975: 261 (syn. etc.); Boney, 1976: 263–266 (double skeletons); Boney, 1981: 1027–1029, fig. 1 (double skeletons); Thomsen & Moestrup, 1985: 778; Perch-Nielsen, 1985: 833, 843, figs 2.0–8.9; MacKenzie & Gillespie, 1986: 377 (table 3: Tasman Bay); Boden, 1988: 61–68 (blooms etc.); Nelissen, 1988: 3–16 (var., taxon.); Subba Rao & Sameoto, 1988: 85 etc. (predators); Fanuko, 1989: 75– 84 (blooms/anoxia relationship); Hallegraeff, 1988: 99 (SEM photo); Chang *et al.*, 1990: 443, table 3 (record from salmon farm, Big Glory Bay, Stewart Is, Jan. 1989).

Distephanus speculum (Ehrenberg, 1839) var. **octonarium** (Ehrenberg, 1844)

Ehrenberg, 1844a: 186, 201 (*Dictyocha*); Haeckel, 1887: 1566; Jorgensen, 1899: 50 (*Distephanus*); Lemmermann, 1901: 265, pl. XI, fig. 18; Lemmermann, 1908: 31 (refs), text-fig. 105; Gemeinhardt, 1930: 69–71 (descr., distrib., refs & syn); S. M. Marshall, 1934: 632 ("The variety *octonarius* does not ... differ at all from the typical form..."); Trégouboff & Rose, 1957: 79, pl. 18, figs 9–11 (key features); Cassie, 1961: 20, 50 (N.Z. records), pl. VIII, fig. 2; Norris, 1961: 173 (NZOI Stn B67, off Kermadec Is as *D. octonaria* Ehrenberg); Tsumara, 1963: 65 (descr., distrib., refs & syn.), pl. XII, figs 5–9, pl. XXIV, fig. 10, pl. XXVIII, fig. 1; Gleser, 1966: 260 (in key), 271–273 (descr., distrib., refs & syn.), 274, 275, 280, text-fig. 28 (map); Loeblich *et al.*, 1968: 40 (listed under *Dictyocha*), 48 (*Distephanus*), 107 (orig. descr.), pl. 19, fig. 13; Mandra *et al.*, 1973: 4 (occurrence in Oamaru diatomite, N.Z. Eocene); Ling, 1973: 759, figs 5–6; Leadbeater, 1974: 188 (descr., etc. incl. *Octatis pulchra* Schiller, 1925), pl. V, figs A–B, D–F; Taylor, 1974c: 398 (N.Z. records), 399 (new comb. to *Dictyocha*), 400 (syn.); Travers & Travers, 1975: 261; Taylor, 1978: 214 (Leigh area); (?)Huang, 1979: 124 (descr. as *D. octonarius* var. *octonarius* Glezer, 1966), pl. 1, figs 9–10; Perch-Nielsen, 1985: 843 (listed), fig. 19.5; Locker & Martini, 1986: 887–924, figs; Van der Spoel, 1987: 439 *et seq.* (temperature/genera ratios etc.); Okolodkov, 1987: 61; Takahashi, 1987: 397–425; Nelissen, 1988: 3–16 (*Octatis* var. etc.).

Class ZOOMASTIGOPHORA
Order CHOANOFLAGELLIDA/ CRASPEDOPHYCEAE
[Craspedomonadina/Craspedomonadales]
Family ACANTHOECIDAE

Genus **Acanthoecopsis** Norris, 1965

Acanthoecopsis apoda Leadbeater, 1972

Leadbeater, 1972a: 71–72, text-fig. 1, pl. III, table 1; Leadbeater, 1972b: 112 (listed); Thomsen, 1973: 247, table 5; Leadbeater, 1973: 247; Leadbeater, 1974: 180; Throndsen, 1974: 108 (generic diag., characters, distrib.), figs 27–28; Thomsen, 1977: 91, figs 5–7; Parke & Leadbeater, 1977: 2, 4 (generic status); Moestrup, 1979: 82 (N.Z. occurrence); Leadbeater, 1985: 113 (generic descr.); Espeland & Throndsen, 1986: 217, fig. 24 (descr., distrib., etc.).

Genus **Bicosta** Leadbeater, 1978

Bicosta antennigera Moestrup, 1979

Moestrup, 1979: 82, figs 41–44; Leadbeater, 1985: 111 (generic descr.).

Bicosta minor Reynolds, 1976

Reynolds, 1976: 13 (*Salpingoeca*); Leadbeater, 1972a: 70 (as *S.* sp.), pl. II B; Thomsen, 1973: 18 (as *S.* sp.), fig. 37; Parke & Leadbeater, 1977: 2 (as *Salpingoeca virgata*, new name for *S. minor* Reynolds preocc. by *S. minor* Dangeard, 1910); Leadbeater, 1978 : 511, 514 (*S. virgata* transf. to new genus *Bicosta* as new comb. *B. minor* (Reynolds)); Moestrup, 1979: 83, fig. 47 (N.Z. occurrence); Espeland & Throndsen, 1986: 219 (distrib., etc.).

Genus **Calliacantha** Leadbeater, 1978

Calliacantha aff. **natans** (Grøntved, 1956) Leadbeater, 1972

Leadbeater, 1972e: 195–211 (as *C.* aff. *natans* Grøntved, 1956: 9 (*Salpingoeca*); cf. Throndsen, 1970b: 87–89; Leadbeater, 1973: 235–236 (descr., etc.), *Salpingoeca* sp.), figs 3c, d, pl. 13; Thomsen, 1973: 20, fig. 4; Thomsen, 1977: 20; Parke & Leadbeater, 1977: 2, 3 (note 17), 4; Leadbeater, 1978: 511, 513, 514 (to new genus *Calliacantha*), figs 1a-f (Grøntved's fig. 6; f as lectotype), g (after Leadbeater,

1972e: fig. 1a); Moestrup, 1979: 83, fig. 47 (N.Z. occurrence); cf. Leadbeater, 1985: 112 (descr.), fig. 16.

Genus **Calotheca** Thomsen & Moestrup, 1983

Calotheca alata Thomsen & Moestrup, 1983

Thomsen & Moestrup, 1983: 41, 43-46, pls 1–3 (descr. from Gulf of Elat (see Thomsen, 1978), the Andaman Sea and 3 localities in N.Z.).

Genus **Cosmoeca** Thomsen, 1984

Cosmoeca norvegica Thomsen, 1984

Thomsen *in* Thomsen & Boonruang, 1984: 168, figs 3–13, table 1; Moestrup, 1979: 86, fig. 54 (Kaikoura record as "Choanoflagellate sp. "N." [Norway]; Espeland & Throndsen, 1986 : 222, fig. 35.

Genus **Crinolina** Thomsen, 1976

Crinolina isefiordensis Thomsen, 1976

Thomsen, 1976: 39, 41 (Isefjorden, Denmark, and Kaikoura, N.Z.), figs 11–21; Parke & Leadbeater, 1977: 2, 4; Moestrup, 1979: 83–84, figs 56-57 (N.Z. occurrence); Leadbeater, 1985: 112 (descr.), fig. 18; Espeland & Throndsen, 1986: 219, fig. 37 (descr., distrib., etc.).

Genus **Parvicorbicula** Deflandre, 1960

Parvicorbicula n.sp. Moestrup, 1979

Moestrup, 1979: 84, fig. 46 (N.Z. record, also known from Denmark and Gulf of Elat); Throndsen, 1974: 113 (generic diag., etc.); Manton *et al.*, 1976: 1932 *et seq.*; Leadbeater, 1985: 114 (generic descr.); Espeland & Throndsen, 1986: 219 (as *P.* aff. *socialis* (Meunier) *fide* Moestrup, 1979) but Moestrup commented : "... the specimen belongs to an undescribed species of *Parvicorbicula*, of which numerous cells were recently found in Danish waters by Thomsen (pers. comm.), who will describe this new species shortly."; cf. Hara & Tanoue, 1984: 1 *et seq.*

Genus **Pleurasiga** Schiller, 1925

Pleurasiga reynoldsii Throndsen, 1970

Throndsen, 1970c: 106-109, figs 11–20; Thomsen, 1973b: 18, figs 31–32; Leadbeater, 1973: 240-241, text-figs 2d-e, pl. 16, figs a-g, table 4; Throndsen, 1974: 114, 116 (generic diag.), 117 (records), fig. 37; Thomsen 1976: 45, figs 38-41; Manton *et al.*, 1976: 1932 *et seq.*; Parke & Leadbeater, 1977: 3, 4 (refs); Moestrup, 1979: 84, fig. 53 (N.Z. occurrence); Leadbeater, 1985: 114 (generic descr.).

Genus **Polyfibula** Manton & Bremer, 1981

Polyfibula sphyrelata Thomsen, 1973

Thomsen, 1973b: 14, 24–25, figs 22–26 (*Pleurasiga*); Manton *et al.*, 1976: 1932 *et seq.*; Parke & Leadbeater, 1977: 3, 4 (refs : "Requires taxonomic re-investigation" — see Note 33, p. 4); Thomsen, 1978: 36, 38 (N.Z. record *fide* Moestrup); Moestrup, 1979: 86, fig. 50 (N.Z. occurrence); Manton & Bremer, 1981: 273–281 *passim* (lorica structure and replication), figs 1–5 & p. 291 (descr. in new genus *Polyfibula* Manton), table II (distrib.)).

Family SALPINGOECIDAE

Genus **Crucispina** Espeland & Throndsen, 1986

Crucispina cruciformis (Leadbeater, 1974)

Leadbeater, 1974: 186–186 (*Salpingoeca*), text-fig. 1A, pl. I, figs C–D; Thomsen, 1978: 41 (incl. N.Z. record *fide* Moestrup), fig. 6; Moestrup, 1979: 86 (Kaikoura specimens), fig. 55; Leadbeater, 1985: 110 (generic descr.); Espeland & Throndsen, 1986: 222–223 (descr., distrib., etc. in new genus).

Genus **Syndetophyllum** Thomsen & Moestrup, 1983

Syndetophyllum pulchella (Leadbeater, 1974)

Leadbeater, 1974: 182–183, text-fig. 1D, pl. I, figs A–B (*Parvicorbula*); Thomsen, 1978: 40 (incl. N.Z. record *fide* Moestrup), fig. 8; Moestrup, 1979: 84 (descr. of specimens from Leigh), figs 48–49, 51–52; Thomsen & Moestrup, 1983: 47–50 (to new genus *Syndetophyllum*), pls 4–5.

INCERTAE SEDIS

Genus **Petasaria** Moestrup, 1979

Petasaria heterolepis Moestrup, 1979

Moestrup, 1979: 86, 88–89, figs 58–59, 61–66.

Order KINETOPLASTIDA
Suborder TRYPANOSOMATIDAE
Family TRYPANOSOMA Gruby, 1843

Genus **Trypanosoma** Gruby, 1843

Trypanosoma caulopsettae Laird, 1951
Laird, 1951: 299–301, pl. IV, pl. V, fig. 1; Hewitt & Hine, 1972: 7, 95, 102 (listed).
Hosts: Megrim or Witch, *Arnoglossus scapha* (Bloch & Schneider, 1801), Sand Flounder, *Rhombosolea plebeia* (Richardson, 1842).

Trypanosoma coelorhynchi Laird, 1951
Laird, 1951: 297–299, pl. III; Hewitt & Hine, 1972: 81, 92, 102 (listed).
Hosts: Javelin Fish, *Lepidorhynchus denticulatus* (Richardson, 1846), Red Cod, *Pseudophycis bachus* (Bloch & Schneider, 1801).

Trypanosoma congipodi Laird, 1951
Laird, 1951: 303–304, text-fig. 2(1–3); Hewitt & Hine, 1972: 82, 102 (listed).
Host: Pigfish, *Congiopodus leucopaecilus* (Richardson, 1846).

Trypanosoma gargantua Laird, 1951
Laird, 1951: 293–297, text-fig. 1, pl. II; Hewitt & Hine, 1972: 74, 102 (listed).
Host: Skate, *Raja nasuta* Müller & Henle, 1841.

Trypanosoma heptatreti Laird, 1948
Laird, 1948: 440–441; Laird, 1951: 289–292, pl. I; Hewitt & Hine, 1972: 71, 102 (listed).
Host: Hagfish, *Eptatretus cirrhatus* (Bloch & Schneider, 1801).

Trypanosoma parapercis Laird, 1951
Laird, 1951: 305, text-fig. 2 (5–6): Hewitt & Hine, 1972: 91, 102 (listed).
Host: Blue Cod, *Parapercis colias* (Bloch & Schneider, 1801).

Trypanosoma tripterygium Laird, 1951
Laird, 1951: 301–303, pl. V, figs 2–4, 6-7; Laird, 1953: 86–87 (morphol.); Hewitt & Hine, 1972: 84, 86, 102 (Listed).
Hosts: Blenny, *Ericentrus rubrus* (Hutton, 1872), Twister, *Bellapiscis medius* (Günther, 1861), Blenny, *Forsterygion varium* (Bloch & Schneider, 1801).

Subphylum Sarcodina
Superclass RHIZOPODA [Rhizopodea]
Class LOBOSA [Lobosea]
Subclass GYMNAMOEBA [Gymnamoebia]

Order AMOEBIDA
Suborder TUBILINA
Family AMOEBIDAE

* Genus **Amoeba** (Bory de St Vincent, 1822) emend.

Amoeba agilis Kirk, 1907
Kirk, 1907: 521–522, pl. XXV; Kirk, 1913: 9 (Island Bay); Kirk, 1922: 14 (Island Bay); cf. Bovee & Sawyer (1979) and Page (1983) for introduction to marine amoebae, also taxonomy in Bovee & Jahn (1973), biology in Jeon (1973) and general review of amoebae, references etc. in Bovee (1985).

Subclass TESTACEALOBOSA
Order ARCELLINIDA

** Genus **Cenchridium** Ehrenberg, 1845

Cenchridium armatum Thompson, 1956
Thompson, 1956: 640 (in sand, Takapuna Beach, Auckland), text-fig. 2 (fig. 11).

Cenchridium novaezelandiae Thompson, 1956
Thompson, 1956: 642 (in sand, Takapuna Beach, Auckland), text-fig. 2 (figs 15–17).

Cenchridium pyrum Thompson, 1956
Thompson, 1956: 642 (in sand, Takapuna Beach, Auckland), text-fig. 2 (figs 13–14).

Cenchridium spectabile Thompson, 1956
Thompson, 1956: 640 (in sand, Takapuna Beach, Auckland), text-fig. 1 (figs 8–10).

Cenchridium takapuniense Thompson, 1956
Thompson, 1956: 640-642 (in sand, Takapuna Beach, Auckland), text-fig. 2 (fig. 12).

Cenchridium varum Thompson, 1956
Thompson, 1956: 640 (in sand, Takapuna Beach, Auckland), text-fig. 1 (figs 5–7).

* Hutton (1904: 340) noted "Several undetermined species" of *Amoeba*. cf. Dangeard (1900): "Rien n'est plus difficile, en effet, que de déterminer une amibe". (also discussed by Bovee & Jahn, 1973: 38–39).

** cf. Travers & Travers, 1975: 263 (position).

Class FILOSA
Order TESTACEAFILOSIDA
Suborder GROMIINA
Family GROMIIDAE

Genus **Gromia** Dujardin, 1835

Gromia oviformis (Dujardin, 1835)

Dujardin, 1835: 343, pl. IX, figs 1–2; Carpenter, Parker & Jones, 1862: 64, pl. III, fig. 2; Heron-Allen & Earland, 1922: 59 (Antarctic); Heron-Allen & Earland, 1930a: 49 (refs etc.); Hedley, 1958: 1391–1392 (confusion of identity, names etc. with *Allogromia ovoidea*); Hedley, 1960: 279–293, figs 1–6 (fig. 2, pl.) (shell growth and structure); Hedley, 1962a: 121–136 (N.Z. material); Hedley & Bertaud, 1962 : 79–87 (electron-microscope obs.); Arnold, 1966: 23–27; Hedley *et al.*, 1967: 16, pl. 2, figs 1–2; Hedley & Wakefield, 1969: 69–89 (fine structure); Gordon, 1972: 510–511 (fig. 3F) (as member of epifauna on the bryozoan *Crassimarginatella papulifera*, Goat Is Bay, Leigh); Arnold, 1972: 1–168 (develop., genetics, ecol., distrib. (see text-fig. 5, world distrib., pp. 137–138, distrib. records incl. N.Z.), refs, etc.) text-figs 1–5, pls 1–6; Boltovskoy & Wright, 1976: 218; Gordon & Ballantine, 1977: 95 (listed from Leigh region).

* Class XENOPHYOPHOREA
Order PSAMMINIDA
Family PSAMMINIDAE

Genus **Reticulammina** Tendal, 1972

Reticulammina labyrinthica Tendal, 1972

Tendal, 1972: 17, 30–31, table 3, pls 3H, 4A; Tendal, 1975: 94 (descr., localities), fig. 1 (upper right); Tendal & Lewis, 1978: 198 (table 1), 199 (cfn with *R. maini*), 202 (in key); Tendal, 1981: 285 (range extension), fig. 1 (distrib. map); Tendal & Gooday, 1981: 417–421 (identif. in bottom photographs), figs 5, 7 (distrib. map); Gooday & Tendal, 1988: 424 *et seq.*, (diag., etc.), fig. 5.

Reticulammina lamellata Tendal, 1972

Tendal, 1972: 17, 31, table 3, pl. 4B–C; Tendal, 1975: 96 (descr., locality), fig. 1 (upper left); Tendal & Lewis, 1978: 200, 202 (in key), figs 4 & 6, table 1; Tendal, 1981: fig. 1 (distrib. map).

* cf. Tendal, 1979: 13–17, aspects of the biology and ecological role of the Xenophyophorea in deep-sea communities.

Reticulammina maini Tendal & Lewis, 1978

Tendal & Lewis, 1978: 198–200, 202 (in key), text-fig. 2, table 1; Tendal, 1981: fig. 1 (distrib.).

Reticulammina novaezealandica Tendal, 1972

Tendal, 1972: 17, 39–40, table 3, pl. 3E–G; Tendal, 1975: 94 (descr., localities), fig. 1 (middle left, middle right); Tendal, 1981: fig. 1 (distrib. map).

Family SYRINGAMMIDAE

Genus **Syringammina** Brady, 1883

Syringammina fragilissima Brady, 1883

Brady, 1883: 158, pl. 2, figs 1–5, pl. 3, figs 6–8; Brady, 1884: 242, text-fig. 9; Tendal, 1972: 17, 36–37 (in key, descr., etc.), table 4, pl. 6A–E; Tendal, 1975: 96 (descr., localities.), fig. 1 (lower right); Tendal & Lewis, 1978: 202 (in key); Adams *et al.*, 1980: 11 type); Loeblich & Tappan, 1987: 729 (listed under "Generic taxa erroneously regarded as foraminifers", now in the Xenophyophorea.

Syringammina tasmanensis Lewis, 1966

Lewis, 1966: 114–123, text-figs 1–8; Hedley *in* Lewis, 1966: 123–124 (cytology), text-fig. 1; Eade, 1967a: 15 (listed); Lewis, 1970: 10 (in generic key), 67 (fig. 2); Tendal, 1972: 16, 38, text-fig. 3, table 4, pls 5D–E, 16F; Tendal, 1975: 96–97 (descr., localities), fig. 1 (lower right); Tendal & Lewis, 1978: 200, 202 (in key), figs 3 & 5, table 1; Tendal, 1981: 285 (range extension), fig. 1 (distrib. map); Tendal & Gooday, 1981: 421.

Family ASCHEMONELLIDAE

Genus **Aschemonella** Brady, 1879

Aschemonella scabra Brady, 1884

Brady, 1884: 271 (as *A. catenata* Norman, 1876, pl. 27, figs 1, 2, 4, 5 & 7); Barker, 1960: 54, pl. 27 (XXVII), figs 1, 2, 4–11 (syst. placing etc.); Lewis, 1979: 19 (off Southern Hawkes Bay : "Rare, at two deepest stations only."); Loeblich & Tappan, 1987: 726 (listed under "Generic taxa erroneously regarded as foraminifers"), now in the Xenophyophorea.

Class GRANULORETICULOSA
* Order FORAMINIFERIDA

* Detailed references to, and facsimiles of, the original descriptions of most of the species listed here may be found in the loose-leaf catalogue of foraminiferids appearing under the authorship of Ellis & Messina (1940-). Commensurate with modern methods of bibliographic retrieval, keys to this catalogue are available as computerized directories on 9-track magnetic tape with an "update" service available (refer to Micropaleontology Press, American Museum of Natural History, New York).

Reference should be made to the "Catalogues of Index Smaller [and Larger] Foraminifera", published also by the American Museum of Natural History, as well as the "Catalogue of Planktonic Foraminifera". Several important texts on distribution and ecology have appeared, notably by Phleger (1960), Hedley & Adams (1974, 1976, 1978), Murray (1973), Haynes (1981) and, especially, the comprehensive review by Boltovskoy & Wright (1976) which contains an extensive bibliography especially of palaeoclimatic interpretations based on species distributions in time and space as well as a guide to collecting, curating, and studying this group. Some other significant papers include the well-illustrated ecological, zoogeographic and taxonomic review of Recent planktonic Foraminifera by Bé *in* Ramsay (1977) and those in Funnell & Riedel (1971), notably Bé & Tolderlund (pp 104–149), Boltovskoy (pp 277–288), Parker (pp 289–307), Barash (pp 433–442), Reiss (pp 633-638), and Bolli (pp 639-648). Kennett's extensive contributions are summarised in Kennett (1982). Note also the monumental work by Blow (1979) on the Cenozoic Globigerinida; and modern treatment of planktonic species by Hemleben *et al.*, 1989.

Several atlases of foraminiferids are also most helpful for identification purposes, notably Murray (1971), Boltovskoy *et al.*, (1980), and Poag (1981).

The indexes to foraminiferal names by Sherborn (1893, 1955 reprint) to 1889 and Thalman (1960) for the years 1890–1950 still have a usefulness.

The checklist of New Zealand species compiled by Eade (1967a), in which only references to records from New Zealand are given, has been extended considerably herein by incorporating subsequent lists by Hayward (*q.v.*) and by the inclusion of fairly detailed references to planktonic species significant in palaeoenvironmental reconstruction. Foraminiferids (including some new species) collected on Soviet expeditions in New Zealand waters have been described and illustrated by Saidova (1975); see locations of station positions in her Fig. 1. A highly useful manual of New Zealand fossil Foraminifera which includes living species known from the Pleistocene has recently been produced by Hornibrook and his co-workers (Hornibrook *et al.*, 1989).

Synopses of the families of the Foraminiferida with key references are also now available in the recent comprehensive classification treatise edited by Parker (1982). The sequence in the present list is based on Loeblich & Tappan in their 2-volume work "Foraminifera Genera and their Classification", 1987 ["1988"].

Suborder ALLOGROMIINA
Family ALLOGROMIIDAE

Genus **Shepheardella** Siddall, 1880

Shepheardella taeniformis Siddall, 1880

Siddall, 1880: 131, pl. 15, figs 1–19, pl. 16, figs 1–7; Ellis & Messina, 1940: refs 1886–1933; Cushman, 1955: 68 (type species, generic descr.), text-plate 8, fig. 9; Hedley *et al.*, 1967: 445–456, pl. 3; Eade, 1967a: 14; Gordon, 1972: 510–511 (fig. 3H), (? as member of epifauna on bryozoan *Crassimarginatella papulifera*, Goat Is Bay, Leigh); Boltovskoy & Wright, 1976: 9; Loeblich & Tappan, 1987: 15 (syst. descr.), pl. 8, figs 1–2.

Suborder TEXTULARIINA
Superfamily ASTRORHIZACEA
Family ASTRORHIZIDAE

Genus **Astrorhiza** Sandahl, 1857

Astrorhiza arenaria Carpenter, 1877

Carpenter *in* Norman, 1877: 213 (type figure is pl. 19, figs 1–13 in Carpenter, 1876); Brady, 1884: 232, pl. XIX, figs 5–10; Heron-Allen & Earland, 1922: 75; Ellis & Messina, 1940: refs 1880–1935; Cushman, 1955: 70–71 (generic descr.); Barker, 1960: 38, pl. 19, figs 5–10; Eade, 1967a: 14; Hofker, 1972: 21–22 (descr., distrib., refs & syn.), pl. I, figs 1–5; Colom, 1974: 69, fig. 1c; Adams *et al.*, 1980: 3 (type details); Loeblich & Tappan, 1987: 19 (generic syst. descr.)

Genus **Pelosina** Brady, 1879

Pelosina aff. bicaudata (Parr, 1950). Lewis, 1979

Lewis, 1979: 18 (off Southern Hawke's Bay: "Common at one station on lower slope."); cf. Parr, 1950: 261, pl. IV, figs 1–2 (BANZARE Stn 53, Kerguelen); see also Loeblich & Tappan, 1964: fig. 112, no. 8.

Pelosina cylindrica Brady, 1884

Brady, 1884: 236–237, pl. XXVI, figs 1–6; Wiesner, 1931: 83, pl. VI, figs 66–67; Eade, 1967a: 15 (N.Z. refs); Todd & Low, 1981: 9 (in key), 1 fig.

Pelosina didera (Loeblich & Tappan, 1953)

Loeblich & Tappan, 1953: 16 (*Pelosinella*); Lewis, 1979: 18 (off Southern Hawke's Bay: "Single specimens at two stations on mid and lower slope.").

Pelosina rotundata Brady, 1879

Brady, 1879a: 31, pl. III, figs 4–5; Brady, 1884:

236, pl. XXV, figs 18–20; Eade, 1967a: 15 (N.Z. refs); Hofker, 1972: 43 (descr., distrib., etc.), pl. XI, figs 1–6; Adams *et al.*, 1980: 9 (types).

Pelosina variabilis Brady, 1879

Brady, 1879a: 301, pl. III, figs 1–3; Brady, 1884: 235, pl. XXVI, figs 7–9; Nuttall, 1927: 217 (locality details, "Challenger" figured material, Brady, pl. XXVI), figs 7–9; Cushman, 1955: 81 (type species, generic descr.), 452 (in key), key pl. 2, fig. 18; Barker, 1960: 52, pl. 26, figs 7–9; Eade, 1967a: 15 (N.Z. refs); Hofker, 1972: 42 (descr., distrib., etc.), pl. X, figs 7–9a; Adams *et al.*, 1980: 9 (types); Loeblich & Tappan, 1987: 20 (syst. descr.), pl. 11, figs 3–8.

Family BATHYSIPHONIDAE

Genus **Bathysiphon** M. Sars *in* G.O. Sars, 1872

Bathysiphon argenteus Heron-Allen & Earland, 1913

Heron-Allen & Earland, 1913a: 38, pl. III, figs 1–3; Cushman, 1918: 30, pl. 12, figs 1–3; Heron-Allen & Earland, 1922: 82 (N.Z.); Eade, 1967a: 14; Boltovskoy & Wright, 1976: 111; Adams *et al.*, 1980: 3 (types).

Bathysiphon aff. **argenteus** Heron-Allen & Earland, 1913. Lewis, 1979

Lewis, 1979: 17 (Southern Hawkes Bay: "Rare, on mid and lower slope.").

Bathysiphon discreta (Brady, 1881)

Brady, 1881: 48 (*Rhabdammina*); Brady, 1884: 268, pl. XXII, figs 11–13; Cushman, 1918: 21, pl. 11, fig. 1; Cushman, 1921: 39 (refs & syn.); Barker, 1960: 44, pl. 22, figs 7–10; Eade, 1967a: 14 (N.Z. refs).

Bathysiphon filiformis M, Sars, 1872

M. Sars *in* G. O. Sars, 1872: 251; G. O. Sars, 1879: 251; Brady, 1884: 248, pl. XXVI, figs 15–20; Murray, 1895: 604, 610; Cushman, 1921: 41–42 (descr., refs), pl, 2, fig. 1; Heron-Allen & Earland, 1922: 82; Ellis & Messina, 1940: refs 1883–1934; Cushman, 1955: 73–74 (type species, generic descr.), 451 (in key), key plate 1, figs 15–17; Eade, 1967a: 14; Hofker, 1972: 75–76 (descr., distrib., etc.), pl. XXIII, figs 14–15; Boltovskoy & Wright, 1976: 238; Loeblich & Tappan, 1987: 22 (syst. descr.), pl. 13, figs 1, 2, 5–7, 9, 10, 12–14, pl. 14, fig. 1.

Bathysiphon globigeriniformis Hofker, 1972

Hofker, 1972: 80; Lewis, 1979: 17 (off Southern Hawke's Bay: "Common on mid and lower slope, rare elsewhere.").

Bathysiphon spp. Lewis, 1979

Lewis, 1979: 17 (off Southern Hawke's Bay: "Several large diameter forms ... Common on lower slope, rare on mid slope.").

Genus **Rhabdamminella** de Folin, 1881

Rhabdamminella cyclindrica (Brady, 1882)

Brady, 1882: 714 (*Marsipella*); Brady, 1884: 265, pl. XXIV, figs 20–22; Cushman, 1921: 41 (refs); Heron-Allen & Earland, 1922: 90; Ellis & Messina, 1940: refs 1884–1937; Barker, 1960: 48, pl. 24, figs 20–22; Eade, 1967a: 14; Hofker, 1972: 81 (descr., distrib., etc.), pl. XXV, figs 2–8; Saidova, 1975: 23 (as type species of new genus *Pseudomarsipella*); Loeblich & Tappan, 1987: 23 (transf. to *Rhabdamminella;* generic syst. descr.), pl. 14, figs 2–3.

Family RHABDAMMINIDAE
Subfamily RHABDAMMININAE

Genus **Marsipella** Norman, 1878

Marsipella chapmani Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 90–91, pl. III, figs 8–9; Chapman, 1924: 7–8; Eade, 1967a: 14 (listed).

Marsipella elongata Norman, 1878

Norman, 1878: 281, pl. 61, fig. 7; Brady, 1884: 265, pl. XXIV figs 10–19; Heron-Allen & Earland, 1922: 90, pl. 3, figs 10–12; Ellis & Messina, 1940: refs 1881–1934; Cushman, 1955: 73 (type species, generic descr.), 451 (in key), key pl. 1, fig. 22; Barker, 1960: 48, pl. 24, figs 10–19; Eade, 1967a: 14; Hofker, 1972: 80–81 (descr., distrib., etc.), pl. XXIV, figs 13–21, pl. XXV, fig. 1; Lewis, 1979: 17 (off Southern Hawke's Bay: "Rare on lower slope only."); Adams *et al.*, 1980: 8 (types); Loeblich & Tappan, 1987: 23 (generic syst. descr.), pl. 15, fig. 2.

Genus **Rhabdammina** M. Sars, 1869

Rhabdammina abyssorum M. Sars, 1869

Sars, 1869: 248; Brady, 1884: pl. XXI, figs 1–13; Cushman, 1921: 36–37 (refs etc.), pl. 1, fig. 2; Ellis & Messina, 1940: refs 1879–1937 (note re. *nomen nudum* of Sars, 1869); Cushman, 1955: 71 (type species, generic descr.), 450 (in key), key pl. 1, figs 9–12; Bar-

ker, 1960: 42, pl. 21, figs 1–13; Eade, 1967a: 14 (N.Z. refs); Kameswara Rao, 1969: 585 (descr., distrib., refs), pl. I, fig. 1; Hofker, 1972: 27–28 (descr., distrib., refs & syn. as *R. abyssorum* Carpenter, 1881: 562, 563, text-figs 321-d; Brady, 1884: 266, pl. XXI, figs 1–3), pl. V, figs 1–6; Boltovskoy & Wright, 1976: 59; Loeblich & Tappan, 1987: 24 (generic syst. descr.), pl. 15, fig. 3

Rhabdammina **cornuta** (Brady, 1879)

Brady, 1879a: 43, pl. IV, figs 14–15 (*Astrorhiza*); Brady, 1884: 270, pl. XXII, figs 11–13 (*Rhabdammina*); Barker, 1960: 44, pl. 22, figs 11–13; Eade, 1967a: 14 (N.Z. refs); Adams *et al.*, 1980: 3 (type details).

Rhabdammina **linearis** Brady, 1879

Brady, 1879a: 37–39, pl. III, figs 10–11; Brady 1884: 269, pl. XXII, figs 1–6; Cushman, 1921: 40 (refs etc.), pl. 1, fig. 4; Ellis & Messina, 1940: refs 1880–1937; Barker, 1960: 44, pl. 22, figs 1–6; Eade, 1967a: 14 (N.Z. refs); Hofker, 1972: 29 (descr., distrib., etc.), pl. VI, figs 2–5; Colom, 1974: 69, fig. 1e; Adams *et al.*, 1980: 10 (type); Larsen, 1982: pl. 1, fig. 1.

Genus **Rhizammina** Brady, 1879

Rhizammina algaeformis Brady, 1879

Brady, 1879a: 39–41, pl. IV, figs 16–17; Brady, 1884: 274, pl. XXVIII, figs 1–11; Cushman, 1921: 46 (refs); Heron-Allen & Earland, 1922: 92 (N.Z.); Wiesner, 1931: 79, pl. III, fig. 29, pl. IV, fig. 30; Ellis & Messina, 1940: refs 1884–1937; Cushman, 1955: 73 (type species, generic descr.), 451 (in key), key pl. 1, figs 18–19; Barker, 1960: 58, pl. 28, figs 1–11; Eade, 1967a: 14; Boltovskoy & Wright, 1976: 111; Lewis, 1979: 17 (off Southern Hawke's Bay: "Common on mid and lower slope."); Loeblich & Tappan, 1987: 24 (generic descr.), pl. 15, figs 6–8.

Rhizammina **indivisa** Brady, 1884

Brady, 1884 : 277–281, pl. XXIX, figs 5–7; Chapman, 1909: 325; Cushman, 1921 : 45–46 (refs etc.), pl. 2, fig. 6; Wiesner, 1931: 79, pl. IV, fig. 31; Ellis & Messina, 1940: refs 1893–1937; Barker, 1960: 65, pl. 29, figs 5–7 (generic placing); Eade, 1967a: 14; Colom, 1974: 69–70, figs 1 g-h.

Rhizammina sp. Lewis, 1979

Lewis, 1979: 17 (off Southern Hawke's Bay: "Similar to *R. algaeformis*, but tubes relatively narrow and wall composed of relatively fine grains... Abundant on mid and lower slope, many specimens living.").

Subfamily DENDROPHRYINAE
Genus **Dendronina** Heron-Allen & Earland, 1922

Dendronina arborescens Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 78–80, pl. II, figs 10–12; Cushman, 1955: 87 (genotype, generic descr.), 453 (in key), key pl. 3, fig. 10; Eade, 1967a: 15 (listed); Gordon, 1972: 510–511 (fig. 3E) (as member of epifauna on the bryozoan *Crassimarginatella papulifera*, Goat Island Bay, Leigh); Gordon & Ballantine, 1977: 95 (Leigh); Todd & Low, 1981: 7 (in key, as *Dendrophyra*), 1 fig.

Dendronina limosa Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 81, pl. II, figs 1–6; Eade, 1967a: 15 (listed).

Genus **Dendrophyra** Wright, 1861

Dendrophyra kermadecensis Saidova, 1975

Saidova, 1975: 29–30, pl. V, fig. 5 ("Vityaz" Stn 3827, Kermadec Trench, 8520–9120 m); Cushman, 1955: 87 (generic descr.); Loeblich & Tappan, 1987: 25 (syst. descr., pl. 16, figs 1–2).

Family SCHIZAMMINIDAE
Genus **Jullienella** Schlumberger, 1890

Jullienella zealandica Hayward & Gordon, 1984

Hayward & Gordon, 1984: 111–114, text-figs 1–2, pls 1–2; Cushman, 1955: 171 (generic descr.); Loeblich & Tappan, 1987: 27 (syst. descr.).

Family PSAMMOSPHAERIDAE
Genus **Psammosphaera** Schulze, 1875

Psammosphaera bowmanni Heron-Allen & Earland, 1912

Heron-Allen & Earland, 1912: 385, pl. 5, figs 5–6, pl. 6, fig. 5; Eade, 1967a: 15 (N.Z. refs); Boltovskoy & Wright, 1976: 60; Adams *et al.*, 1980: 10 (types).

Psammosphaera fusca Schulze, 1875

Schulze, 1875: 113, pl. II, figs 8a-f; Brady, 1884: 249, pl. XVIII, figs 1, 5, 6; Cushman, 1921: 461 (refs); Wiesner, 1931: 79, pl. IV, figs 32–33 (*P. fusca*), 80, pl. IV, fig. 34 (as *P. irregularis* n.sp.), 80, pl. IV, figs 35–37 (as *P. testudinaria* Rhumbler); Heron-Allen & Earland, 1932: 327, pl. VIII, figs 1–4, pl. XVII, figs 4–6; Parr, 1950: 256; Cushman, 1955: 75 (type species,

generic descr.), 451 (in key), key pl. 2, fig. 5; Eade, 1967a: 15 (N.Z. refs); Hofker, 1972: 32 (descr., distrib. etc.), pl. VII, figs 1–3; Boltovskoy & Wright, 1976: 60, 111; Lewis, 1979: 17 (off Southern Hawke's Bay : "A few specimens at most stations."); Boltovskoy *et al.*, 1980: 43 (descr. etc.), pl. 25, fig. 8; Todd & Low, 1981: 8 (in key), 2 figs; Larsen, 1982: pl. 1, fig. 8; Loeblich & Tappan, 1987: 28, pl. 19, figs 2–3.

Psammosphaera parva Flint, 1899

Flint, 1899: 268, pl. 9, fig. 1; Brady, 1884: 250 (in part), pl. XVIII, fig. 4; Heron-Allen & Earland, 1913a: 1–26, pl. II, figs 3–6, 10–16; Cushman, 1921: 47 (refs), pl. 2, fig. 7; Eade, 1967a: 15 (N.Z. refs); Haynes, 1973: 18–19 (diag., descr., distrib., remarks), pl. 2, fig. 13; Hofker, 1972: 32 (descr., distrib. etc.), pl. VII, figs 4–5; Boltovskoy & Wright, 1976: 60; Lewis, 1979: 17 (off Southern Hawke's Bay: "Single specimens at two stations on mid and lower slope.").

Psammosphaera rustica Heron-Allen & Earland, 1912

Heron-Allen & Earland, 1912: 383, pl. 5, figs 3–4, pl. 6, figs 2–4; Heron-Allen & Earland, 1922: 84 (refs); Eade, 1967a: 15; Boltovskoy & Wright, 1976: 60; Adams *et al.*, 1980: 10 (types).

Psammosphaera testacea Flint, 1899

Flint, 1899: 268, pl. 8, fig. 2 (*P. fusca* var. *testacea*); Heron-Allen & Earland, 1922: 83 (refs); Eade, 1967a: 15; Hofker, 1972: 33 (descr., distrib. etc.), pl. VII, figs 6–7; Colom, 1974: 70, figs 1n-o; Boltovskoy & Wright, 1976: 60.

Genus **Storthosphaera** Schulze, 1875

Storthosphaera albida Schulze, 1875

Schulze, 1875: 113, pl. II, figs 9a-d; Brady, 1884: 241, pl. XXV, figs 15-17; Heron-Allen & Earland, 1922: 77; Eade, 1967a: 15; Loeblich & Tappan, 1987: 29 (syst. descr.), pl. 18, figs 5–7.

Family SACCAMMINIDAE
Subfamily SACCAMMININAE

Genus **Brachysiphon** Chapman, 1906

Brachysiphon corbuliniformis Chapman, 1906

Chapman, 1906: 84, pl. 3, figs 2–3; Cushman, 1955: 78 (included "possibly" in *Saccammina* M. Sars, 1869); Eade, 1967a: 15 (listed); Lewis, 1970: frontispiece fig. from NZOI Stn C488; Dawson, 1979: 17; Lewis, 1979: 18 (off Southern Hawkes Bay: "Rare, only at two deepest stations."); Loeblich & Tappan, 1987: 30–31 (generic descr., etc.), pl. 23, figs 1–2.

Genus **Lagenammina** Rhumbler, 1911

Lagenammina bulbosa (Chapman & Parr, 1937)

Chapman & Parr, 1937: 150, pl. X, fig. 42 (*Proteonina*); Lewis, 1979: 18, table 5 (off Southern Hawke's Bay: "Originally described as *Proteonina*; tiny with fine grained neck; large specimens of similar shape but with coarse grained neck are referred to *Hormosina globulifera*... Rare, on lower slope only."). (see also Barker, 1960: pl. XXX, fig. 3).

Lagenammina sp. Lewis, 1979

Lewis, 1979: 18, table 5 (off Southern Hawke's Bay).

Genus **Saccammina** M. Sars, 1869

Saccammina alba Hedley, 1962

Hedley, 1962b: 387–388, text-figs 1-6; Hedley *et al.*, 1967: 16, text-figs 2–3, pl. 4; Eade, 1967a: 15; Ellis & Messina, 1940-[1977 suppl.] : 1–12 (descr., figs, from Hedley, 1962); Dawson, 1979: 22 (type data).

Saccammina cushmani Collins, 1958

Collins, 1958: 345 (*Proteonina*); Lewis, 1979: 18 (off Southern Hawke's Bay: "Common at most places ...").

Saccammina difflugiformis Brady, 1879

Brady, 1879a: 51–52, pl. IV, figs 3a-b (*Reophax*); Todd & Bronnimann, 1957: pl. 1, fig. 15; Eade, 1967a: 15 (N.Z. refs); Boltovskoy & Wright, 1976: 120; Lewis, 1979: 18, table 5 (off Southern Hawke's Bay in *Lagenammina;* "Abundant on lower slope, common on mid slope.", referred to Brady, 1884: pl. XXX, fig. 3); Adams *et al.*, 1980: 10 (types); Todd & Low, 1981: 9 (in key), 1 fig.

Saccammina cf. **difflugiformis** (Brady, 1879). Kustanowich, 1965

Kustanowich, 1965: 52 (as *Proteonina* cf. *difflugiformis* (Brady, 1879), *q.v.*); Eade, 1967a: 15 (listed).

Saccammina sphaerica M. Sars, 1872

M. Sars *in* G. O. Sars, 1872: 250; Brady, 1884: 253, pl. XVIII, figs 11–17; Cushman, 1921: 48 (refs); Heron-Allen & Earland, 1922: 85, pl. I, fig. 16; Wies-

ner, 1931: 81, pl. V, figs 48–52; Ellis & Messina, 1940: refs 1869–1937 incl. *S. sphaerica* M. Sars, 1869: 248 as *nomen nudum*); Cushman, 1955: 78 (genotype, generic descr.), 45 (in key), key pl. 2, fig. 8; Todd & Bronniman, 1957: pl. 1, fig. 16; Hedley, 1963: 433–441 *passim* (organic cement analysis); Eade, 1967a: 15; Hofker, 1972: 44-45 (descr., distrib., etc.), pl. XII, figs 1–3; Colom, 1974: 70–71, figs 1i-j, p; Boltovskoy & Wright, 1976: 21, 59, 80; Lewis, 1979: 18 (off Southern Hawke's Bay: "A few specimens at most stations on slope"); Larsen, 1982: pl. 1, fig. 11; Loeblich & Tappan, 1987: 32 (syst. descr.), pl. 23, fig. 8.

Genus **Technitella** Norman, 1878

Technitella bradyi Earland, 1934

Earland, 1934: 65, pl. II, figs 7–9 (incl. *T. melo* of Brady, 1884: 246, pl. XXV, fig. 7, not of Norman 1878); Murray, 1895: 610 (N.Z. record as *T. melo* of Brady); Wiesner, 1931: 85, pl. VII, fig. 74; Cushman, 1955: 81 (generic descr.); Eade, 1967a: 15.

Technitella raphanus Brady, 1884

Brady, 1884: 247–248, pl. XXV, figs 13–14; Cushman, 1919: 594; Eade, 1967a: 15.

Subfamily THURAMMININAE
Genus **Astrammina** Rhumbler, 1931

Astrammina limnicola Hofker, 1972

Hofker, 1972: 24–25, pl. IV, fig 1-8 (descr. from 37°40'S, 77°01'E, 78 m, near Whale Is, New Zealand, Mortensen Expedition); Cushman, 1955: 72 (generic descr.); Buchanan & Hedley, 1960: 549–560, figs 1–5 (biol.); Todd & Low, 1981: 10 (in key), 1 fig; Loeblich & Tappan, 1987: 33 (generic syst. descr.).

Genus **Thurammina** Brady, 1879

Thurammina albicans Brady, 1879

Brady, 1879a: 46; Brady, 1884: 323, pl. XXXVII, figs 2–7; Heron-Allen & Earland, 1922: 108 (as *T. papillata* var. *albicans*, refs); Barker, 1960: 76, pl. 37 (XXXVII), figs 2–7; Eade, 1967a: 15; Loeblich & Tappan, 1987: 34 (generic descr.).

Thurammina compressa Brady, 1884

Brady, 1884: 322, pl. XXXVI, figs 13(?) & 14 only; [*fide* Lewis, 1979: 18]; Heron-Allen & Earland, 1917: 530–537, pl. 28, figs 4, 6, 10, pl. 26, fig. 15, as var. *haeusleri* cf. Barker, 1960: 76, pl. 37 (XXXVII), fig. 1 (see also p. 74, pl. 36, figs 13 & 14 re var. *haeusleri* Heron-Allen & Earland, 1917); Lewis, 1979: 18 (off Southern Hawke's Bay: "Rare, on mid and lower slope." — includes *T. heusleri* as junior synonym).

Thurammina papillata Brady, 1879

Brady, 1879a: 45-46, pl. V, figs 4–8; Brady, 1884: 321, pl. XXXVI, figs 7–18; Heron-Allen & Earland, 1917: 530–557 (var. analysis), pls XXVI–XXX; Wiesner, 1931: 83, pl. VI, figs 58–60; Parr, 1950: 259 (refs etc.), pl. III, fig. 25; Cushman, 1955: 80 (type species, generic descr.), 452 (in key), key pl. 2, fig. 17; Eade, 1967a: 15 (N.Z. refs); Boltovskoy & Wright, 1976: 129; Adams *et al.*, 1980: 12 (types); Todd & Low, 1981: 10 (in key), 1 fig.

Thurammina papillata var. **castanea** Heron-Allen & Earland, 1917

Heron-Allen & Earland, 1917: 545, pl. 26, figs 14–18, pl. 29, figs 17, 20; Cushman, 1921: 52–53; Heron-Allen & Earland, 1922: 107; Eade, 1967a: 16; Adams *et al.*, 1980: 12 (types).

Thurammina papillata var. **haeusleri** Heron-Allen & Earland, 1917

Heron-Allen & Earland, 1917: 547, pl. XXVIII, figs 1–12, pl. XXIX, fig. 16, pl. XXX, fig. 8; Heron-Allen & Earland, 1922: 107 (refs); [see also under *T. compressa* Brady, 1884, *fide* Lewis: 1979: 18]; Adams *et al.*, 1980: 12 (types).

Family HEMISPHAERAMMINIDAE
Subfamily HEMISPHAERAMMININAE
Genus **Hemisphaerammina** Loeblich & Tappan, 1957

Hemisphaerammina bradyi Loeblich & Tappan, 1957

Loeblich & Tappan, 1957: 224, pl. 72, figs 2a-b (incl. *Webbina hemisphaerica* of Brady, 1884, not of Jones, Parker & Brady 1866 = *Trochammina (Webbina) irregularis* (d'Orbigny) var. *hemisphaerica*); Murray, 1895: 610 (N.Z. record as *W. hemisphaerica*); Barker, 1960: 84, pl. 41, fig. 11 (generic placing etc.); Eade, 1967a: 16; Haynes, 1973: 21 (diag., descr., distrib., remarks), pl. 6, figs 1–2; Scott & Medioli, 1980: 40 (refs), pl. 1, figs 4–5; Todd & Low, 1981: 6 (in key), 2 figs; Loeblich & Tappan, 1987: 36 (generic descr., etc.).

Hemisphaerammina depressa Heron-Allen & Earland, 1932

Heron-Allen & Earland, 1932: 329, pl. 7, figs 10–11

(*Webbinella*); Hedley *et al.*, 1967: pl. 5, fig. 1 (*Hemisphaerammina*); Eade, 1967a: 16.

Hemisphaerammina lens Goës, 1896

Goës, 1896: 24, pl. 2, figs 5–8 (*Crithionina*); Eade, 1967a: 16 (N.Z. refs as *Daitrona* Loeblich & Tappan, 1961); Le Calvez & Cesana, 1980: 219 (syn. *Hemisphaerammina* Loeblich & Tappan).

Genus **Iridia** Heron-Allen & Earland, 1914

Iridia diaphana Heron-Allen & Earland, 1914

Heron-Allen & Earland, 1914: 371, pl. XXXVI, figs 1–2; Cushman, 1921: 47; Heron-Allen & Earland, 1922: 75–76 (N.Z. refs & syn.), 233; Heron-Allen & Earland, 1930a: 65 (refs etc.), pl. III, figs 32–33; Ellis & Messina, 1940: refs 1915–1935; Cushman, 1955: 82 (type species, generic descr.), 452 (generic key), key pl. 2, fig. 26; Eade, 1967a: 14 (N.Z. refs); Hedley *et al.*, 1973: 467 (ultrastructure); Boltovskoy & Wright, 1976: 8, 9, 20; Todd & Low, 1981: 6 (in key), 2 figs; Loeblich & Tappan, 1987: 36 (syst. descr.), pl. 27, figs 1–9; Venec-Peyre, 1989: 1353–1358 (sexual components/population dynamics).

Genus **Tholosina** Rhumbler, 1895

Tholosina bulla (Brady, 1881)

Brady, 1881: 51 (*Placopsilina*); Brady, 1884: 315, pl. XXXV, figs 16–17; Cushman, 1921: 51 (refs etc.), pl. 3, figs 1–2, pl. 4, fig. 4; Wiesner, 1931: 86, pl. VII, figs 77–78 (*Tholosina*); Cushman, 1955: 83 (type species, generic descr.), 452 (in key), key pl. 2, fig. 24; Eade, 1967a: 16 (ref.); Adams *et al.*, 1980: 9 (types); Todd & Low, 1981: 7 (in key), 2 figs; Loeblich & Tappan, 1987: 38 (syst. descr.), pl. 26.

Tholosina protea Heron-Allen & Earland, 1932

Heron-Allen & Earland, 1932: 330, pl. 8, figs 5–8; Hedley, 1963: 433–441 *passim* (organic cement analysis); Eade, 1967a: 16 (N.Z. refs).

Tholosina vesicularis (Brady, 1879)

Brady, 1879a: 51, pl. V, fig. 2 (*Placopsilina*); Cushman, 1919: 595 (N.Z. record as *Tholosina*); Eade, 1967a: 16; Adams *et al.*, 1980: 9 (types).

Subfamily CRITHIONININAE
Genus **Crithionina** Goës, 1894

Crithionina granum Goës, 1894

Goës, 1894: 15, pl. III, figs 28–33; Heron-Allen & Earland, 1922: 105 (refs); Hedley, 1963: 433–441 *passim* (organic cement analysis); Eade, 1967a: 16.

Crithionina hispida Flint, 1899

Flint, 1899: 267, pl. VI, fig. 2 (*C. pisum* var. *hispida*); Heron-Allen & Earland, 1922: 106 (refs); Parr, 1950: 264 (refs); Eade, 1967a: 16; Hofker, 1972: 68 (descr., distrib., etc.), pl. XX, figs 7–10.

Crithionina mamilla Goës, 1894

Goës, 1894: 15, pl. III, figs 34–36; Heron-Allen & Earland, 1922: 105–106; Cushman, 1955: 71 (type species, generic descr.), 450 (in key), key pl. 1, figs 7–8; Eade, 1967a: 16; Hofker, 1972: 78 (descr., distrib. etc.), pl. XX, figs 1–3; Loeblich & Tappan, 1987: 381 (generic descr., etc.), pl. 28, figs 1–4.

Crithionina pisum Goës, 1896

Goës, 1896: 24, pl. II, figs 1–2; Heron-Allen & Earland, 1922: 106 (refs); Wiesner, 1931: 78, pl. II, fig. 20; Parr, 1950: 264; Eade, 1967a: 16; Hofker, 1972: 67–68 (descr., distrib., etc.), pl. XX, figs 4–6; Todd & Low, 1981: 8 (in key), 1 fig.

Crithionina rugosa Goës, 1896

Goës, 1896: 24, pl. II, figs 3–4; Heron-Allen & Earland, 1922: 106, pl. IV, fig. 5; Eade, 1967a: 16.

Superfamily KOMOKIACEA
Family KOMOKIIDAE

Genus **Normanina** Cushman, 1928

Normanina elgata Saidova, 1975

Saidova, 1975: 30–31, pl. V, fig. 7 (distrib., incl. Kermadec Trench); Cushman, 1955: 85 (generic descr.).

Normanina ultrabyssalica Saidova, 1975

Saidova, 1975: 31, pl. VI, fig. 1, ("Vityaz" Stn 3831, Kermadec Trench, 9995–10 002 m).

Superfamily HIPPOCREPINACEA
Family HIPPOCREPINIDAE
Subfamily HYPERAMMININAE

Genus **Botellina** Carpenter, 1869

Botellina labyrinthica Brady, 1881

Brady, 1881: 48; Brady, 1884: pl. XXIX, figs 8–18; Mestayer, 1961: 128; Cushman, 1955: 271 (type

species, generic descr.), 460 (in key), key pl. 13, figs 13–14; Barker, 1960: 60, pl. 29, figs 8–18; Eade, 1967a: 15; Loeblich & Tappan, 1987: 42 (generic descr., etc.), pl. 32 [note: *B. labyrinthica* of Wiesner, 1931: 100 = *B. wiesneri* n.sp. Parr, 1950: 255–256].

Genus **Hyperammina** Brady, 1878

Hyperammina elongata alba Saidova, 1975

Saidova, 1975: 36, pl. VII, fig. 3 ("Ob" Stn 354, 266 m).

Hyperammina elongata elongata Brady, 1878

Brady, 1878: 433, pl. XX, figs 2a-b; Brady, 1884: 257, pl. XXIII, fig. 8; Cushman, 1910a: 60, figs 73–74; Cushman, 1921: 53 (refs), pl. 3, fig. 5; Cushman, 1955: 85 (type species, generic desc.), 452 (in key), key pl. 3, figs 1–2; Heron-Allen & Earland, 1922: 87, pl. 1, fig. 21; Barker, 1960: 46, pl. 23, fig. 8; Eade, 1967a: 14; Hofker, 1972: 45–46 (descr., distrib., etc.), pl. XII, figs 4–7; Adams *et al.*, 1980: 7 (types); Wells, 1985: 580 (descr., Wellington Harbour), figs 2–3 (distrib.), 4a-c; Loeblich & Tappan, 1987: 42 (generic descr., etc.), pl. 32, figs 7–9 [note: *H. elongata* Brady, 1884: 257, pl. XXIII, figs 4–7 (not of 1878) = *H. cylindrica* n.sp. Parr, 1950: 254; and of 1884: 257, pl. XXIII, figs 9 & 10 = *H. laevigata* Wright, 1891].

Hyperammina friabilis Brady, 1884

Brady, 1884: 258–289, pl. XXIII, figs 1–3, 5–6; Cushman, 1921: 54 (refs), pl. 3, fig. 4; Barker, 1960: 46, pl. 23, figs 1–3, 5–6; Eade, 1967a: 14 (N.Z. refs); Hofker, 1972: 46-47 (descr., distrib., etc. incl. "several samples around New Zealand..."), pl. XII, figs 8–12; Boltovskoy & Wright, 1976: 59; Lewis, 1979: 17, table 5 (off Southern Hawke's Bay: "Rare, on mid and lower slope.").

Hyperammina kermadecensis Saidova, 1975

Saidova, 1975: 37, pl. VII, fig. 5 ("Vityaz" Stn 3831, Kermadec Trench, 9995–10 002 m).

Hyperammina aff. laevigata Wright, 1891. Wells,1985.

Wells, 1985: 580, fig. 2 (Wellington Harbour: "Test more slender than *H. elongata* with smooth exterior and rough interior"), figs 2–3 (distrib.), 4e-f; Wright, 1891: 466, pl. XX, fig. 1 (*H. elongata* var. *laevigata*); Brady, 1884: 257 (in part), pl. XXIII, figs 8–10 (not 4 & 7) (as *H. elongata*, *fide* Hofker, 1972 and Wells, 1985) [*fide* Parr, 1950: 254 = figs 9 & 10, not 4, 7 & 8]; Cushman, 1918: 77, pl. XXIX, figs 5-6; Wiesner, 1931: 87, pl. VIII, figs 88–89; Höglund, 1947: 67, text-figs 26–31; Eade, 1967a: 14 (N.Z. refs); Hofker, 1972: 46 (descr., distrib., etc.), pl. XI, figs 10–14.

Hyperammina mestayeri Cushman, 1919

Cushman, 1919: 596, pl. 74, fig. 3; Eade, 1967a: 14 (listed).

Hyperammina novaezealandiae Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 89–90, pl. III, figs 1–5 (new name for *Technitella mestayeri* Cushman, 1919: 595, pl. LXXIV, fig. 4, not *H. mestayeri* Cushman, 1919 q.v.); Parr, 1950: 254–255; Eade, 1967a: 14; Hofker, 1972: 4, 49–50 (descr., distrib., etc. as *H. novaezealandica* from Mortensen Expedition stations from "Colville Channel, South Australia, depth 50 m ... 10 miles N. of Cyl Mana, New Zealand, depth 75 m), pl. XIII, figs 12–17; Thompson, 1975 thesis: 67, pl. 1, fig. 6.

Genus **Saccorhiza** Eimer & Fickert, 1899

Saccorhiza echinata Saidova, 1975

Saidova, 1975: 34, pl. VI, fig. 6 (distrib., incl. New Zealand).

Saccorhiza ramosa (Brady, 1879)

Brady, 1879a: 33, pl. III, figs 14–15 (*Hyperammina*); Brady, 1884: 261, pl. XXIII, figs 15, 19; Cushman, 1921: 54–55 (refs etc.), pl. 4, fig. 5; Cushman, 1955: 86 (type species, generic descr.), 452 (in key), key pl. 3, fig. 3; Barker, 1960: 46, pl. 23, figs 15–19 (generic placing); Eade, 1967a: 15 (N.Z. refs); Hofker, 1972: 53–54 (descr., distrib., etc. as *Hyperammina (Saccorhiza)*, new subgenus); Colom, 1974: 70, fig. 1f; Adams *et al.*, 1980: 7 (types); Tappan & Loeblich, 1982: pl. 47, fig. 2; Loeblich & Tappan, 1987: 43 (generic descr., etc.), pl. 32, figs 10–15.

Subfamily HIPPOCREPININAE

Genus **Jaculella** Brady, 1879

Jaculella acuta Brady, 1879

Brady, 1879a: 35–36, pl. III, figs 12–13; Brady, 1884: 255, pl. XXII, figs 14–18; Cushman, 1921: 59 (refs), pl. 3, fig 7; Cushman, 1955: 85 (genotype, generic descr.), 452 (in key), key pl. 3, fig. 4; Barker, 1960: 44, pl. 22, figs 14–18; Eade, 1967a: 15 (N.Z. refs); Boltovskoy & Wright, 1976: 230; Adams *et al.*, 1980: 7 (types); Loeblich & Tappan, 1987: 44 (generic descr., etc.), pl. 33, figs 5–6.

Jaculella obtusa Brady, 1882

Brady, 1882: 714; Brady, 1884: 256, pl. XXII, figs 19–22; Cushman, 1921: 59 (refs), pl. 3, fig. 6; Heron-Allen & Earland, 1922: 86; Barker, 1960: 44, pl. 22, figs 19–22; Eade, 1967a: 15; Hofker, 1972: 84 (descr., distrib., etc.), pl. XVII, figs 6–11.

Superfamily AMMODISCACEA
Family AMMODISCIDAE
Subfamily AMMODISCINAE

Genus **Ammodiscoides** Cushman, 1909

Ammodiscoides mestayeri (Cushman, 1919)

Cushman, 1919: 597, pl. 74, figs 1–2 (off Poor Knights Is, as *Ammodiscus*); Parr, 1945: 193, pl. VIII, figs 1–2 (*Ammodiscus*); Cushman, 1955: 96 (generic descr.); Eade, 1967a: 16 (N.Z. refs); Collins, 1974: 8 (*Ammodiscus*, Port Phillip, Vic); Loeblich & Tappan, 1987: 47 (generic descr.).

Genus **Ammodiscus** Reuss, 1862

Ammodiscus exsertus Cushman, 1910

Cushman, 1910a: 75, text-figs 97a-b; Cushman, 1921: 64, pl. 5, fig. 4; Hornibrook, 1952: 185; Eade, 1967a: 16 (refs); Loeblich & Tappan, 1987: 47–48 (generic descr., etc.).

Ammodiscus gullmarensis Höglund, 1948

Höglund, 1948: 45 (new name for *Ammodiscus planus* Höglund, 1947, not of Loeblich, 1946); Lewis, 1979: 18 (off Southern Hawkes Bay: "Rare, but generally distributed.").

Ammodiscus incertus (d'Orbigny, 1839)

d'Orbigny, 1839a (*in* de la Sagra): 49–50, 208, pl. VI, figs 16–17 (*Operculina*); Cushman, 1921: 62–63 (refs etc.), pl. 5, figs 1–2; Parr, 1950: 251; Cushman, 1955: 94 (type species, generic descr.), 453 (in key, text-pl. 9, fig. 1, key, pl. 4, figs 1–2; Eade, 1967a: 16 (N.Z. refs); Albani, 1968a: 12, fig. 10; Albani, 1968b: 94 (distrib.); Colom, 1974: 71–72, fig. 2c; Albani, 1979: 13 (features), fig. 1.1.

Ammodiscus planorbis Höglund, 1947

Höglund, 1947: 106, 107, 113, 114, 125 (descr., etc.), text-figs 91, 105, 109, pl. 8, figs 4 & 9, pl. 28, figs 13–14; Lewis, 1979: 19 (off Southern Hawkes Bay: "A few specimens at many stations on slope.").

Ammodiscus tenuis Brady, 1881

Brady, 1881: 51; Nuttall, 1927: 219 (locality details, "Challenger" figured specimens, Brady pl. XXXVIII, figs 5–6); Eade, 1967a: 16 (N.Z. refs); Lewis, 1970: frontispiece fig. from NZOI Stn C488; Bock, 1971: 4, pl. 1, fig. 6; Dawson, 1979: 17 (listed); Lewis, 1979: 19 (off Southern Hawkes Bay: "Rare, on upper slope only."); Poag, 1981: 37, pl. 7, fig. 2, pl. 8, figs 2a-2b.

Subfamily TOLYPAMMININAE
Genus **Ammolagena** Eimer & Fickert, 1899

Ammolagena clavata (Jones & Parker, 1860)

Jones & Parker, 1860: 304 (*Trochammina irregularis* var. *clavata*); Brady, 1884: 349, pl. XLI, figs 12–16 (Webbina); Cushman, 1918: 89, pl. XXXIV, figs 2–5, pl. XXXV, figs 1–3 (*Ammolagena*); Cushman, 1921: 61–62 (refs etc.), pl. 6, figs 1–4, pl. 10, figs 3–4; Cushman, 1955: 99 (type species, generic descr., syn.), 454 (in key), text pl. 9, fig. 12, key pl. 4, figs 19–20; Eade, 1967a: 17 (N.Z. refs); Tappan & Loeblich, 1982: pl. 47, fig. 6; Loeblich & Tappan, 1987: 49 (generic descr.), pl. 36, figs 1–6.

Ammolagena irregularis (d'Orbigny, 1850)

d'Orbigny, 1850: 111, No. 783 (Webbina); Heron-Allen & Earland, 1922: 115 (refs), pl. III, fig. 24; Eade, 1967a: 17.

Genus **Tolypammina** Rhumbler, 1895

Tolypammina horrida Cushman, 1919

Cushman, 1919: 597, pl. 74, fig. 5; Eade, 1967a: 16 (listed).

Tolypammina vagans (Brady, 1879)

Brady, 1879a: 33–34, pl. III, fig. 3 (*Hyperammina*); Brady, 1884 : 260, pl. XXIV, figs 1–9; Cushman, 1910: 67, figs 84–85 (*Tolypammina*); Heron-Allen & Earland, 1913: 41, pl. II, fig. 9; Cushman, 1921: 55–56 (refs & syn. etc.), pl. 4, figs 2–3, pl. 7, figs 1–2; Parr, 1950: 252; Cushman, 1955: 98 (type species, generic descr., syn.), 454 (in key), text pl. 90, fig. 11, key pl. 4, fig. 11; Eade, 1967a: 16 (N.Z. refs); Hofker, 1972: 55–56 (descr., distrib., etc. as *Hyperammina (Tolypammina)*), pl. XVI, figs 8–10; Colom, 1974: 72, figs 2d-j; Lewis, 1979: 19 (off Southern Hawkes Bay: "Rare, a few specimens on lower slope."); Adams *et al.*, 1980: 7 (types); Todd & Low, 1981: 6 (in key), 1 fig; Loeblich & Tappan, 1987: 50 (generic descr., etc.), pl. 37, figs 11–12.

Tolypammina sp. Hedley, Hurdle & Burdett, 1967
Hedley *et al.*, 1967: 13, 14, 18, text-figs 5-6, pl. 1, fig. 5, pl. 5, fig. 3 (incl. *Ammodiscus gordialis* of Heron-Allen & Earland, 1922: 110, from "Terra Nova" Stns 90, 96, 144); Eade, 1967a: 16.

Subfamily AMMOVERTELLININAE
Genus **Glomospira** Rzehak, 1885

Glomospira charoides (Jones & Parker, 1860)
Jones & Parker, 1860: 304 (*Trochammina squamata* var. *charoides*); Brady, 1884: 334, pl. XXXVIII, figs 10–16 (*Ammodiscus*); Murray, 1895: 604; Cushman, 1918: 100, pl. XXXVI, figs 10–15 (*Glomospira*); Cushman, 1955: 96 (generic descr.); Eade, 1967a : 16; Loeblich & Tappan, 1987: 50–51 (generic descr., etc.); Hornibrook *et al.*, 1989: 50 (descr., etc. as Cretaceous sp.), fig. 11;

Glomospira cf. **elongata** Collins, 1958. Lewis, 1979
Lewis, 1979: 19 (off Southern Hawkes Bay : "Rare, on mid slope."); cf. Collins, 1958: 347, pl. 1, figs 6a-b, 7a-b.

Glomospira gordialis (Jones & Parker, 1860)
Jones & Parker, 1860: 304 (*Trochammina squamata gordialis*); Parker & Jones, 1865: 408, pl. XV, fig. 32 (*T. squamata* var. *gordialis*); Brady, 1884: 333, pl. XXXVIII, figs 7–9 (*Ammodiscus*); Cushman, 1918: 100, pl. XXXVI, figs 7, 9; Parr, 1950: 252; Loeblich & Tappan, 1964 : C212, fig. 122, no. 6; Lewis, 1979: 19 (off Southern Hawkes Bay: "A few specimens at most sections on slope ...").

Subfamily USBEKISTANIINAE
Genus **Turritellella** Rhumbler, 1904

Turritellella shoneana (Siddall, 1878)
Siddall, 1878: 46, figs 1–2 (*Trochammina*); Cushman, 1955: 96 (type species, generic descr., syn.), 453 (in key), text-pl. 9, fig. 3, key pl. 4, fig. 14; Eade, 1967a: 16 (N.Z. refs); Loeblich & Tappan, 1987: 52 (generic descr.), pl. 39, figs 22–23.

Superfamily RZEHAKINACEA
Family RZEHAKINIDAE

Genus **Miliammina** Heron-Allen & Earland, 1930

Miliammina pelita Saunders, 1958
Saunders, 1958: 87, pl. 1, figs 10–11; Cushman, 1955: 174 (generic descr.); Hulme, 1964: 325; Eade, 1967a: 17; Gregory, 1973: 194, 195, 197, fig. 3.2, table 2 (N.Z. mangrove swamp ecol.); Boltovskoy & Wright, 1976: 153; Hayward, 1981a: 89 (Tutukaka Harbour); Loeblich & Tappan, 1987: 53–54 (generic descr., etc.).

Superfamily HORMOSINACEA
Family HORMOSINIDAE
Subfamily REOPHACINAE

* Genus **Reophax** Montfort, 1808

Reophax adunca Brady, 1882
Brady, 1882: 715; Brady, 1884: 296, pl. XXXI, figs 23–26; Cushman, 1921: 70, pl. 19, fig. 3; Parr, 1950: 265 (refs); Eade, 1967a: 17 (N.Z. refs); Haake, 1980: 6, pl. 1, fig. 6; Larsen, 1982: pl. 2, fig. 1.

Reophax advena Cushman, 1919
Cushman, 1919: 599, pl. 75, fig. 2; Eade, 1967a : 17 (listed).

Reophax bacillaris Brady, 1881
Brady, 1881: 49; Brady, 1884: 293, pl. XXX, figs 23–24; Cushman, 1921: 67, pl. 12, fig. 3; Barker, 1960: 62, pl. 30 (XXX); Lewis, 1979: 19 (off Southern Hawkes Bay: "Rare, at single stations on upper slope."); Hayward, 1981a: 89 (Tutukaka Harbour).

Reophax catenata Höglund, 1947
Höglund, 1947: 98–100, text-figs 75–76; Wells, 1985: 580 (descr., etc., Wellington Harbour), figs 2–3 (distrib.), 4m-n.

Reophax distans Brady, 1881
Brady, 1881: 50; Brady, 1884: 296, pl. XXXI, figs 18–22; Cushman, 1921: 66-67, pl. 12, fig. 2; Wiesner, 1931: 90, pl. IX, figs 104–105; Parr, 1950: 286; Eade, 1967a: 17 (N.Z. refs); Saidova, 1972: 158 (designated type species for new genus *Cadminus*); Lewis, 1979: 19 (off Southern Hawkes Bay: "Rare, on lower slope.").

Reophax euneta Jensen, 1905
Jensen, 1905: 821, pl. 23, figs 5–7; Heron-Allen & Earland, 1922: 96, pl. III, figs 13–14; Parr, 1950: 266 (refs etc.), pl. IV, fig. 12; Eade, 1967a: 17; Thompson, 1975 thesis: 68, pl. 1, figs 3–4; Hayward, 1981b: 131

* Emended generic definition by Brönnimann & Whittaker (1980: 262).

(Bay of Islands); Hayward, 1982b: 63 (off Little Barrier Is).

Reophax fusiformis (Williamson, 1858)

Williamson, 1858: 1, pl. 1, fig. 1 (*Proteonina*); Heron-Allen & Earland, 1922: 43; Loeblich & Tappan, 1955: 7, pl. 1, figs 2–3; Eade, 1967a: 17; Schnitker, 1971: pl. 1, fig. 3; Murray, 1971: 6, 7, 17–18 (diag. features etc.), pl. 1, figs 1–5; Haynes, 1973: 23–24 (diag., descr., distrib., remarks, refs), pl. 3, figs 3–4; Thompson, 1975 thesis: 67, pl. 1, fig. 5; Boltovskoy & Wright, 1976: 50.

Reophax guttifer Brady, 1881

Brady, 1881: 49; Brady, 1884: 295, pl. XXXI, figs 10–15; Murray, 1895: 604; Cushman, 1921: 69–70, pl. 12, fig. 6; Parr, 1950: 266 (refs etc.); Eade, 1967a: 17; Saidova, 1970: 159 (referred to *Reophanus*); Lewis, 1979: 19 (off Southern Hawke's Bay: "Rare on upper and mid slope, common on lower slope.").

Reophax aff. **R. guttifer** Brady, 1881. Lewis, 1979

Lewis, 1979: 20 (off Southern Hawke's Bay: "Smaller and more delicate than *R. guttifer* ... Moderately common on mid slope.").

Reophax micaceus Earland, 1934

Earland, 1934: 82, pl. II, figs 37–40; Lewis, 1979: 20 (off Southern Hawke's Bay: "Rare, at single station on lower slope.").

Reophax nana Rhumbler, 1911

Rhumbler, 1911: 182, pl. 8, figs 6–12; Hulme, 1964: 321; Eade, 1967a: 17; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 1, fig. 4; Thompson, 1975 thesis: 67, pl. 1, fig. 8; Scott & Medioli, 1980: 43 (refs), pl. 2, fig. 6; Buzas & Severin, 1982: 22 (refs), pl. 1, fig. 1.

Reophax nodulosus Brady, 1879

Brady, 1879a: 52–53, pl. IV, figs 7–8; Brady, 1884: 294, pl. XXXI, figs 1–9; Cushman, 1921: 68–69, pl. 12, fig. 5, pl. 10, figs 1–2; Wiesner, 1931: 91, pl. IX, fig. 108; Eade, 1967a: 17 (N.Z. refs); Saidova, 1970: 159 (designated type species for new genus *Pseudonodosinella*); Boltovskoy & Wright, 1976: 50, 80; Adams *et al.*, 1980: 10 (types).

Reophax pilulifer Brady, 1884

Brady, 1884: 292–293 (as *R. pilulifera*), pl. XXX, figs 18–20; Cushman, 1921: 66, pl. 12, fig. 1; Heron-Allen & Earland, 1922: 93; Earland, 1934: 80, pl. II, figs 10 & 36 (*R. pilulifer*); Cushman & Hobson, 1935: 53–64, pls VIII–IX; Eade, 1967a: 17; Haake, 1980: 4, pl. 1, fig. 4.

Reophax pseudodistans Cushman, 1919

Cushman, 1919: 598, pl. 75, fig. 1 (*R. spiculifera* var. *pseudodistans*); Heron-Allen & Earland, 1922: 95; Heron-Allen & Earland, 1932: 338, pl. VII, figs 17–20 (as *R. distans* Brady var. *pseudodistans*); Parr, 1950: 267–268, pl. IV, fig. 16; Eade, 1967a: 17; Hayward, 1981a: 89 (Tutukaka Harbour).

Reophax scorpiurus Montfort, 1808

Montfort, 1808: 331, text-fig. 130 (p. 330); Brady, 1884: 291, pl. XXX, figs 12, 15–17; Cushman, 1921: 65, pl. 6, fig. 6; Parr, 1932a: 3, pl. 1, fig. 3; Parr, 1950: 268–269; Cushman, 1955: 90 (type species, generic descr., syn.), 453 (in key), key pl. 3, figs 27–28; Todd & Brönnimann, 1957: pl. 1, fig. 18; Eade, 1967a: 17 (N.Z. refs); Schnitker, 1971: pl. 1, figs 4–5; Murray, 1971: 7, 18–19 (diag. features etc.), pl. 2, figs 5–8; Hofker, 1972: 38 (descr., distrib., etc.), pl. VIII, figs 17–18; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns ecol.), pl. 1, fig. 2; Colom, 1974: 86–87, fig. 5k-l; Collins, 1974: 8 (Port Phillip, Vic., refs); Thompson, 1975 thesis: 68, pl. 1, figs 1–2; Albani, 1979: 13 (features), fig. 3.1; Lewis, 1979: 20 (off Southern Hawke's Bay: "Almost ubiquitous, but rare at any station."); Boltovskoy *et al.*, 1980: 48 (descr., etc.), pl. 30, figs 8–10; Haake, 1980: 4, pl. 1, fig. 2; Brönnimann & Whittaker, 1980: 260–261 (neotype desig., descr., var., etc.; note *R. scorpiurus* de Montfort of Brady, 1884: 291 (in part), pl. 30, figs 12a-b only, of Goës, 1894: 24 (in part), pl. 6, figs 164–166 only, and of Loeblich & Tappan, 1964: 216, fig. 1281, = *Reophax bradyi* sp. nov. of Brönnimann & Whittaker, 1980: 264–265, figs 13–16), figs 1–7, 12 & 17; Todd & Low, 1981: 11 (in key), 1 fig.; Hayward, 1982: 63 (off Little Barrier Is); Larsen, 1982: pl. 2, fig. 4; Loeblich & Tappan, 1987: 58 (generic descr., etc.), pl. 44, figs 1–3, pl. 829, fig. 6.

Reophax scotti Chaster, 1892

Chaster, 1892: 57, pl. 1, fig. 1; Höglund, 1947: 94–96, text-fig. 72; Wells, 1985: 381 (descr., etc., Wellington Harbour), figs 2–3 (distrib.), 4j-l.

Reophax aff. **R. scottii** Chaster, 1892. Wells, 1985

Wells, 1985: 581 (descr., etc., Wellington Harbour), figs 2–3 (distrib.), 4g-i.

Reophax spiculifera Brady, 1879

Brady, 1879a: 54, pl. IV, figs 10–11; Brady, 1884: 295, pl. XXXI, figs 16–17; Wiesner, 1931: 91, pl. IX, fig. 113; Eade, 1967a: 17 (N.Z. refs); Hofker, 1972: 39–40 (descr., distrib., etc.), pl. IX, figs 9–13; Adams *et al.*, 1980: 10 (types).

Reophax subfusiformis Earland, 1933

Earland, 1933: 74, pl. 2, figs 16–19; Höglund, 1947: 82–86, text-figs 43–50, pl. 9, figs 1–4, pl. 26, figs 1–36, pl. 27, figs 1–19; Parr, 1950: 269; Kustanowich, 1965: 52; Eade, 1967a: 17; Hofker, 1972: 38 (descr., refs & syn.), pl. IX, figs 1–2; Boltovskoy & Wright, 1976: 141; Lewis, 1979: 20 (off Southern Hawke's Bay: "Rare on Motukura Bank only."); Wells, 1985: 581–582 (descr., Wellington Harbour), figs 2–3 (distrib.), 6, 7a-d.

Reophax wellingtonensis Wells, 1986

Wells, 1986: 709 (new name for *R. cylindricus* Wells, 1985 preoccupied by *R. cylindricus* Brady, 1884); Wells, 1985: 580–581, figs 5a-c, 7g, h, k.

Reophax spp. Lewis, 1979

Lewis, 1979: 20 (off Southern Hawke's Bay: "Common on mid slope.").

Subfamily HORMOSININAE

Genus **Archimerismus** Loeblich & Tappan, 1984

Archimerismus subnodosa Brady, 1884

Brady, 1884: 259–260, pl. XXIII, figs 11–14 (*Hyperammina*); Barker, 1960: 46, pl. 23, figs 11–14; Eade, 1967a: 14 (ref. to Cushman, 1919: 596(?); Hofker, 1972: 47-48 (descr., distrib., etc.), pl. XII, figs 13–16; Loeblich & Tappan, 1984 : 1161 (as type species new genus *Archimerismus*, diag. etc.).

Genus **Hormosina** Brady, 1879

Hormosina dentaliniformis Brady, 1881

Brady, 1881: 49 (*Reophax*); Brady, 1884: 293, pl. XXX, figs 21–22; Murray, 1895: 604, 610; Cushman, 1921: 68, pl. 12, fig. 4; Todd & Brönnimann, 1957: pl. 1, fig. 19; Barker, 1960: 62, pl. 30 (XXX), figs 21–22; Eade, 1967a: 17; Colom, 1974: 86, figs. 5h-i; cf. Collins, 1974: 8; Boltovskoy & Wright, 1976: 141; Lewis, 1979: 19, table 5 (off Southern Hawkes Bay, abundance: "Smaller than Brady's figures and consisting of only 2-4 chambers"); Haake, 1980: 4, pl. 1, fig. 3; Brönnimann & Whittaker, 1980: 265–266, figs 8–11 (to *Hormosina*, descr. (lectotype), var., etc; Hermelin, 1983: 155–163 (biogeogr. patterns, as *Reophax*); Werdelin & Hermelin, 1983: 303–307, figs 1-4 (ecophenotypic var., as *Reophax*).

Hormosina globulifera Brady, 1879

Brady, 1879a: 60–61, pl. IV, figs 4–5; Brady, 1884: 326, pl. XXXIX, figs 1–5; Cushman, 1921: 74–75, pl. 13, fig. 5; Cushman, 1955: 91 (type species, generic descr.), 453 (in key), key pl. 3, figs 20–22; Eade, 1967a: 17 (N.Z. refs); Lewis, 1970: frontispiece fig. from NZOI Stn C488; Hofker, 1972: 60-61 (descr., distrib., etc.), pl. XVII, figs 13–16; Dawson, 1979: 21 (listed); Lewis, 1979: 19 (off Southern Hawkes Bay : "Common at most stations on continental slope."); Adams *et al.*, 1980: 6 (types); Larsen, 1982: pl. 1, fig. 13; Loeblich & Tappan, 1987: 61 (generic descr., etc.), pl. 45, figs 18–20.

Hormosina monile Brady, 1881

Brady, 1881: 52; Murray, 1895: 610; Eade, 1967a: 17; Adams *et al.*, 1980: 6 (types).

Hormosina normani Brady, 1881

Brady, 1881: 52; Brady, 1884: 329, pl. XXXIX, figs 19–23; Murray, 1895: 604; Cushman, 1921: 75, pl. 13, fig. 7; Wiesner, 1931: 92, pl. X, figs 119–121; Eade, 1967a: 17; Hofker, 1972: 61–62 (descr., distrib., etc.), pl. XVIII, figs 1–3; Adams *et al.*, 1980: 6 (types).

Superfamily LITUOLACEA

Family HAPLOPHRAGMOIDIDAE

Genus **Cribrostomoides** Cushman, 1910

Cribrostomoides crassimargo Norman, 1892

Norman, 1892: 17 (*Haplophragmium*); Brady, 1884: 310, pl. XXXV, fig. 4 (not 1–3, 5) (as *H. canariense* (d'Orbigny)); Cushman, 1955: 102 (generic descr.); Baker, 1960: 72, pl. 35, figs 2a-b (*Haplophragmoides canariensis*); Vilks, 1969: 44, pl. 1, fig. 16a (*Cribrostomoides*); Thompson, 1975 thesis: 68, pl. 2, figs 1–2; Gordon & Ballantine, 1977: 95 (listed from Leigh region from Thompson, 1975 thesis); Boltovskoy *et al.*, 1980: 25 (descr., etc.), pl. 10, figs 1–3; Todd & Low, 1981: 16 (in key), 2 figs; Wells, 1985: 582, 584 (descr., distrib., etc., Wellington Harbour), figs 2–3 (distrib., abundance), 7e-f; Loeblich & Tappan, 1987: 65–66 (generic descr., etc.).

Cribrostomoides cf. **crassimargo** (Norman, 1892). (Kustanowich, 1965)

Kustanowich, 1965: 52 (as *Alveolophragmium* cf. *crassimargo* (Norman, 1892: 17) (*Haplophragmium*)); Eade, 1967a: 18 (listed).

Cribrostomoides cf. **jeffreysii** (Williamson, 1858). (Kustanowich, 1965)

Kustanowich, 1965: 52 (as *Alveolophragmium* cf. *jeffreysii* (Williamson, 1858: 34, pl. 3, figs 72–73 (*Nonionina*); Eade, 1967a: 18; cf. Murray, 1971: 5–7,

22–23 (diag. features etc. of *C. jeffreysi*), pl. 4, figs 1–5; cf. also Haynes, 1973: 29–30 (diag., descr., var., distrib., refs & syn.), text-fig. 5, nos 8–10, pl. 2, figs 5–6, pl. 8, fig. 9, pl. 29, fig. 10; Murray, 1979: 24 (descr.), figs 5I–J; cf. Boltovskoy *et al.*, 1980: 25–26 (descr. etc.), pl. 10, figs 4–7; cf. Haake, 1980: 7, pl. 1, fig. 10; cf. Todd & Low, 1981: 16 (in key), 2 figs.

Cribrostomoides ringens (Brady, 1879)

Brady, 1879a: 57–58, pl. V, figs 12a-b (*Trochammina*); Brady, 1884: 343, pl. XL, figs 17–18; Cushman, 1921: 81–82 (refs etc.), pl. 15, fig. 2 (*Haplophragmoides*); Heron-Allen & Earland, 1922: 114; Barker, 1960: 82, pl. 40, figs 17–18; Eade, 1967a: 18; Adams *et al.*, 1980: 12 (type).

Cribrostomoides wiesneri (Parr, 1950)

Parr, 1950: 272, pl. IV, figs 25–26 (*Labrospira*); Lewis, 197 : 21 (off Southern Hawke's Bay : "Ubiquitous, common at only a few stations on mid and lower slope.").

Cribrostomoides sp. Lewis, 1979

Lewis, 1979: 21 (off Southern Hawke's Bay, cf. Wiesner, 1931: pl. 11, fig. 135: "Common on outer shelf, rare elsewhere.").

Genus **Haplophragmoides** Cushman, 1910

Haplophragmoides canariensis (d'Orbigny, 1839)

d'Orbigny, 1839b (*in* Barker-Webb & Berthelot): 128, pl. 2, figs 33–34 (*Nonionina*); Brady, 1884: 310, pl. XXXV, figs 1–5; Cushman, 1921: 79 (refs); Wiesner, 1931: 95 (in part), pl. XI, fig. 135 (not pl. XII, fig. 136, *fide* Parr, 1950: 270); Todd & Brönnimann, 1957: pl. 1, fig. 27; Eade, 1967a: 17 (N.Z. refs); Albani, 1968a: 12, fig. 15; Albani, 1968: 95 (distrib.); Schnitker, 1971: pl. 1, fig. 6; Gregory, 1973: 194, 197, table 2 (N.Z. mangrove swamp ecol.); Colom, 1974: 73, figs 3c-d; Boltovskoy & Wright, 1976: 58, 59, 141–143, 146, 154; Albani, 1979: 13 (features), fig. 5.2; Hayward, 1979b: 184 (*Zostera* pool community); Lewis, 1979: 20 (off Southern Hawke's Bay : "Common on shelf, rare on slope."); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward 1981b: 130 (Bay of Islands); Hayward & Grace, 1981: 51 (Cuvier Is); Hayward, 1982b: 63 (off Little Barier Is); Wells, 1985: 582 (descr., etc., Wellington Harbour), figs 2–3 (distrib., abundance), 7i-j, l; Loeblich & Tappan, 1987: 66 (generic descr., etc.), pl. 49, figs 4, 5, 12–16, 19–23.

Haplophragmoides grandiformis Cushman, 1910

Cushman, 1910b: 440, text-fig. 11; Cushman, 1919: 599; Cushman, 1921: 82 (descr., etc.), pl. 11, fig. 2; Eade, 1967a: 17.

Haplophragmoides rotulatum (Brady, 1881)

Brady, 1881: 50 (*Haplophragmium*); Brady, 1884: 306, pl. XXXIV, figs 5-6; Heron-Allen & Earland, 1922: 99; Eade, 1967a: 17.

Haplophragmoides cf. **H. rotulatum** (Brady, 1881). Cushman, 1919

Cushman, 1919: 599 (N.Z. record as *Haplophragmium* cf. *rotulatum* Brady, 1881, *q.v.*); Eade, 1967a: 17 (listed).

Haplophragmoides scitulum (Brady, 1881)

Brady, 1881: 50 (*Haplophragmium*); Brady, 1884 308, pl. XXXIV, figs 11–13; Murray, 1895: 604; Cushman, 1921: 80; Parker, 1954: 487 (to *Alveolophragmium*); Barker, 1960: 70, pl. XXXIV, syn., as *Alveolophragmium*); Eade, 1967a: 18.

Haplophragmoides aff. scitulum (Brady, 1884). Lewis, 1979

Lewis, 1979: 20 (off Southern Hawke's Bay: "Rare, on upper and mid slope." — "Similar in shape to *H. scitulum* of Brady (1884), pl. 34, figs 11–13 but much smaller and fewer chambers in the whorl."); see also Barker, 1960: 70, pl. 34 (XXXIV) as *Alveolophragmium* (transf. by Parker, 1954: 487)).

Haplophragmoides sphaeriloculus Cushman, 1910

Cushman, 1910a: 107, text-fig. 175; Cushman, 1921: 83 (descr., etc.), pl. 15, fig. 3; Heron-Allen & Earland, 1922: 101 (*Haplophragmium*); Parr, 1950: 271 (status etc.); Eade, 1967a: 18; Boltovskoy & Wright, 1976: 124; Lewis, 1979: 20 (off Southern Hawke's Bay: "Rare, at several stations on slope.").

Haplophragmoides subtrullissatus Parr, 1950

Parr, 1950: 271 (BANZARE Stn 94, Antarctic, 114°59'E, 1718 m), pl. IV, figs 27a-b; Lewis, 1979: 20 (off Southern Hawke's Bay: "Moderately common on outer shelf and upper slope.").

Haplophragmoides sp. Vella, 1957

Vella, 1957: 8 (table 2 — listed from Cook Strait); Eade, 1967a: 18 (listed); Thompson, 1975 thesis: 68, pl. 2, figs 3–4.

Haplophragmoides sp. Phleger, 1970

Phleger, 1970: 522 *et seq.*, 529, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9).

Haplophragmoides sp. Hayward, 1981
Hayward, 1981b: 131 (Bay of Islands).

Genus **Trochamminita** Cushman & Brönnimann, 1948

Trochamminita irregularis (d'Orbigny, 1850)
d'Orbigny, 1850: 111, No. 783 (*Webbina*); Cushman & Brönnimann, 1948a: 17 (*Trochamminita*); Sherborn, 1955: 479; Cushman, 1955: 202–203 (type species, generic descr.), 463 (in key), key pl. 48, figs 4–5; Hayward, 1981a: 89 (Tutukaka Harbour).

Trochamminita cf. **salsa** (Cushman & Brönnimann, 1948). Hulme, 1964
Hulme, 1964: 322 (Manukau Harbour, as *T.* cf. *salsa* (Cushman & Brönnimann, 1948: 16, pl. 3, figs 5–6) (*Labrospira*)); Eade, 1967a: 18.

Family DISCAMMINIDAE
Genus **Ammoscalaria** Höglund, 1947

Ammoscalaria pseudospiralis (Williamson, 1858)
Williamson, 1858: 2, pl. 1, figs 2–3 (*Proteonina*); Heron-Allen & Earland, 1922: 97 (*Haplophragmium*); Eade, 1967a: 18; Murray, 1971: 7, 28–29, pl. 7, figs 1–5 (diag. features etc.); Boltovskoy *et al.*, 1980: 54 (descr., etc.), pl. 35, figs 4–7; Haake, 1980: 7, pl. 1, fig. 13.

Ammoscalaria tenuimargo (Brady, 1882)
Brady, 1882: 715 (*Haplophragmium*); Brady, 1884: 303, pl. XXXIII, figs 13–16; Cushman, 1920: 65, pl. 13, figs 3–5 (*Ammobaculites*); Höglund, 1947: 154–159 (descr., etc., transf. to *Ammoscalaria*), text-figs 133–136, 138, 139, pl. 9, figs 16–22, pl. 31, fig. 2; Cushman, 1955: 103 (type species, generic descr., syn.), 454 (in key), key pl. 43, fig. 2; Barker, 1960: 68, pl. 33 (XXXIII); Eade, 1967a: 19 (N.Z. refs); Lewis, 1979: 22 (off Southern Hawke's Bay: "Rare on mid and lower slope."); Boltovskoy *et al.*, 1980: 54 (descr.), pl. 35, figs 8–11; Haake, 1980: 7, pl. 1, fig. 12; Wells, 1985: 584 (descr., distrib., etc., Wellington Harbour), figs 2–3 (distrib., abundance), 8, 9b-d; Loeblich & Tappan, 1987: 68 (generic descr., etc.), pl. 51, figs 11–13.

Genus **Discammina** Lacroix, 1932

Discammina compressa Goës, 1882
Goës, 1882: 141, pl. 12, figs 421, 423 (*Lituolina irregularis* var. *compressa*); Cushman, 1955: 89 (generic descr.); Loeblich & Tappan, 1964: fig. 136, no. 10; Eade, 1967a: 18 (N.Z. refs); Lewis, 1979: 21 (off Southern Hawke's Bay : "Rare, at single station on lower slope.").

Genus **Glaphyrammina** Loeblich & Tappan, 1984

Glaphyrammina americanus Cushman, 1910
Cushman, 1910a: 117, text-figs 184–185; Heron-Allen & Earland, 1922: 98 (as *Haplophragmium fontinense*); Eade, 1967a: 18 (*Ammobaculites*); Loeblich & Tappan, 1984: 1161 (as type species of new genus *Glaphyrammina*, diag. etc.).

Family LITUOLIDAE
Subfamily AMMOMARGINULININAE
Genus **Ammobaculites** Cushman, 1910

Ammobaculites agglutinans (d'Orbigny, 1846)
d'Orbigny, 1846: 137, pl. 7, figs 10–12 (*Spirolina*); Brady, 1884: 301, pl. XXXII, figs 19–26 (*Haplophragmium*); Cushman, 1921: 89 (refs etc. as *Ammobaculites*), pl. 17, fig. 4; Cushman, 1955: 103 (type species, generic descr., syn.), 454 (in key), text pl. 10, fig. 5, key pl. 5, figs 10–12; Barker, 1960: pl. 32, figs 19–21, 24–26; Eade, 1967a: 18 (N.Z. refs); Albani, 1968b: 95 (distrib.); Boltovskoy & Wright, 1976: 141, 145, 154; Albani, 1979: 14 (features), fig. 6.1; Haake, 1980: 7, pl. 1, fig. 11; Chave, 1987: 31, pl. 1, fig. 2; Loeblich & Tappan, 1987: 74 (generic descr., etc.), pl. 58, figs 3–4.

Ammobaculites calcareus (Brady, 1884)
Brady, 1884: 302–303, pl. XXXIII, figs 5–12 (*Haplophragmium*); Cushman, 1921: 90, pl. 17, fig. 3; Eade, 1967a: 18 (N.Z. refs).

Ammobaculites exiguus Cushman & Brönnimann, 1948
Cushman & Brönnimann, 1948b: 38, pl. 7, figs 7–8; Parker *et al.*, 1953: 5, pl. 1, fig. 16; Hedley *et al.*, 1967: 19, pl. V, figs 5a-b; Eade, 1967a: 18 (N.Z. refs); Collins, 1974: 9; Boltovskoy & Wright, 1976: 142; Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 130 (Bay of Islands); Todd & Low, 1981: 12 (in key), 2 figs; Buzas & Severin, 1982: 22 (refs), pl. 1, figs 2–3.

Ammobaculites cf. **exiguus** Cushman & Brönnimann, 1948. Phleger, 1970
Phleger, 1970: 522 *et seq.*, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9, as *A.* cf. *exiguus* Cushman & Brönnimann, 1984, *q.v.*).

Ammobaculites filiformis Earland, 1934

Earland, 1934 : 92, pl. 3, figs 11 & 13; Brady, 1884: 301, pl. 32, figs. 22 (as *Haplophragmium agglutinans* (d'Orbigny)); Barker, 1960: 66 (Comments on identity of Brady's material, as pl. XXXII); Lewis, 1979 : 21 (off Southern Hawke's Bay: "Moderately common on mid slope.").

Ammobaculites aff. **A. filiformis** Earland, 1934. Lewis, 1979

Lewis, 1979: 21 (off Southern Hawke's Bay: "Common on mid and lower slope"; "Appears to be quite distinct from *A. filiformis*."); cf. Earland, 1934: 92–93, pl. III, figs 11–13 (as *A. agglutinans* var. *filiformis*, syn., etc.).

Ammobaculites villosus Saidova, 1975

Saidova, 1975: 93, pl. XXV, fig. 12 ("Ob" Stn 353, 156 m).

Ammobaculites sp. Hulme, 1964

Hulme, 1964: 32 (Manukau Harbour; "Rare slender specimens ... may be a variety of *A. exiguus*.").

Ammobaculites sp. Phleger, 1970

Phleger, 1970: 522 *et seq.*, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9).

Genus **Ammomarginulina** Wiesner, 1931

Ammomarginulina cf. **ensis** Wiesner, 1931. Lewis, 1979

Lewis, 1979: 21, table 5 (off Southern Hawke's Bay: cf. Wiesner, 1931: 97, pl. XII, fig. 147; Parr, 1950: 273 (refs) — "Initial coil same size and shape as *A. ensis* but only 1–3 uncoiled chambers. ... Common at a few stations on continental slope.").

Ammomarginulina foliaceus (Brady, 1881)

Brady, 1881: 50 (*Haplophragmium*); Brady, 1884: 304, pl. XXXIII, figs 20–25; Murray, 1895: 604, 610; Cushman, 1955 : 103 (generic descr.); Barker, 1960 68, pl. 33 (XXXIII), figs 20–25; Eade, 1967a: 18.

Ammomarginulina cf. **foliaceus** (Brady, 1881). Lewis, 1979

Lewis, 1979: 21–22, table 5 (off Southern Hawke's Bay : "Moderately common upper and mid slope." — referred to Brady, 1884: pl. XXXIII, figs 20–25 — "Similar to Brady's figure but with thin, fragile keel of fine grains ...").

Genus **Ammotium** Loeblich & Tappan, 1953

Ammotium cassis (Parker, 1870)

Parker *in* Dawson, 1870: 177, 180, text-fig. 3 (*Lituola*); Loeblich & Tappan, 1953: 33, pl. 2, figs 12–18; Hulme, 1964: 322 (Manukau Harbour); Eade, 1967a: 19; Albani, 1968a: 12, fig. 14; Albani, 1968b: 95 (distrib.), pl. 7, fig. 7; Boltovskoy & Wright, 1976: 50, 143, 154; Albani, 1979: 14 (features), fig. 7.1; Boltovskoy *et al.*, 1980: 54 (descr., etc.), pl. 35, figs 12–13; Todd & Low, 1981: 12 (in key), 1 fig; Loeblich & Tappan, 1987: 74–75 (generic descr., etc.), pl. 60, figs 1–4.

Ammotium salsum (Cushman & Brönnimann, 1948)

Cushman & Brönnimann, 1948a: 16, pl. 3, figs 7–9 (*Ammobaculites*); Parker *et al.*, 1953: 5, pl. 1, fig. 22; Phleger, 1970 : 522 *et seq.*, 529, 530, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9); Boltovskoy & Wright, 1976: 142, 143, 152, 153, 155, 156; Poag, 1978: 405, pl. V, figs 1–10, 33 (as forma *typicum*); Scott & Medioli, 1980: 35 (refs), pl. 1, figs 11–13; Boltovskoy *et al.*, 1980: 54–55 (descr., etc.), pl. 35, figs 14–17; Poag, 1981: 40–41, pl. 51, fig. 3, pl. 52, figs 3a-b (forma *typicum*; note, not incl. figs 17–21, 23–25 of Parker *et al.*, 1953 = *A. salsum* forma *exile* Cushman & Brönnimann, 1948), pl. 51, fig. 1, pl. 52, figs 1a-b (forma *dilatatum*), pl. 51, fig. 4, pl. 52, figs 4a-b (forma *exile*), pl. 51, fig. 2, pl. 52, figs 2a-b (forma *fragile*).

Family PLACOPSILINIDAE
Subfamily PLACOPSILININAE
Genus **Ammocibicoides** Saidova, 1975

Ammocibicoides notalnus Saidova, 1975

Saidova, 1975: 117–118, pl. XXXIV, fig. 3 ("Ob" Stn 358, 1418 m).

Genus **Placopsilina** d'Orbigny 1850

Placopsilina cenomana d'Orbigny, 1850

d'Orbigny, 1850: 185, No. 758; Brady, 1884: 315, pl. XXXVI, figs 1–3; Cushman, 1921: 95 (refs etc.); Heron-Allen & Earland, 1922: 103; Cushman, 1955: 207–208 (type species, generic descr.), 464 (in key), key pl. 19, figs 1–3; Barker, 1960: 74 (status), pl. XXXVI; Eade, 1967a: 19; Loeblich & Tappan, 1987: 80 (generic descr., etc.), pl. 65, figs 11–12.

Superfamily HAPLOPHRAGMIACEA
Family AMMOSPHAEROIDINIDAE

Subfamily AMMOSPHAEROIDININAE
Genus **Adercotryma** Loeblich & Tappan, 1952

Adercotryma glomerata (Brady, 1878)

Brady, 1878: 433, pl. 20, figs 1a-c (*Lituola*); Brady, 1884: 309, pl. 34, figs 15–18 (*Haplophragmium*); Loeblich & Tappan, 1953: 26, pl. 8, figs 1–4; Eade, 1967a: 18 (N.Z. refs); Boltovskoy & Wright, 1976: 237, 273; Lewis, 1979: 20 (off Southern Hawke's Bay: "Common on mid and lower slope."); Adams *et al.*, 1980: 7 (types); Todd & Low, 1981: 15 (in key), 2 figs; Loeblich & Tappan, 1987: 81 (generic descr., etc.), pl. 67, figs 1–3.

Genus **Ammosphaeroidina** Cushman, 1910

Ammosphaeroidina sphaeroidiniformis (Brady, 1884)

Brady, 1884: 313 (*Haplophragmium*); Cushman, 1910: 128, text-fig. 202 (*Ammosphaeroidina*); Cushman, 1921: 98; Parr, 1950: 281, pl. V, fig. 21; Cushman, 1955: 205 (type species, generic descr., syn.), 463 (in key), key pl. 18, fig. 11; Loeblich & Tappan, 1964: C259, fig. 174, no. 1; Eade, 1967a: 21 (N.Z. refs); Lewis, 1979: 23 (off Southern Hawke's Bay: "A few specimens at most stations ... "); Loeblich & Tappan, 1987: 81–82 (generic descr., etc.), pl. 67, figs 8–10, 13–16.

Genus **Cystammina** Neumayr, 1889

Cystammina pauciloculata (Brady, 1879)

Brady, 1879a: 58, pl. V, figs 13–14 (*Trochammina*); Brady, 1884: 344, pl. XLI, fig. 1; Heron-Allen & Earland, 1922: 114 (N.Z. refs); Wiesner, 1931: 113, pl. XVIII, fig. 206 (*Ammochilostoma*); Cushman, 1955: 205 (type species, generic descr., syn.), 463 (in key), key pl. 18, fig. 15; Barker, 1960: 84, pl. XLI, figs 1–2; Eade, 1967a: 21; Echols, 1971: 139 (Scotia Sea); Lewis, 1979: 23 (off Southern Hawke's Bay: "Moderately common on lower slope."); Adams *et al.*, 1980: 12 (type); Loeblich & Tappan, 1985a: 91–104 (transf. from Superfamily Trochamminacea, family Trochamminidae, subfamily Trochamminae to Lituolacea/Ammosphaeroidinidae/Ammoisphaeroidininae); Loeblich & Tappan, 1987: 82 (generic descr.), pl. 68, figs 1–6.

Subfamily RECURVOIDINAE
Genus **Recurvoides** Earland, 1934

Recurvoides contortus Earland, 1934

Earland, 1934: 91, pl. 10, figs 7–19 (incl. *Haplophragmium scitulum* of Heron-Allen & Earland, 1922: 99, not of Brady, 1881: 50); Parr, 1950: 273 (refs); Cushman, 1955: 102 (type species, generic descr.), 454 (in key), key pl. 42, figs 34–36; Eade, 1967a: 18; Boltovskoy & Wright, 1976: 238; Lewis, 1979: 21 (off Southern Hawke's Bay: "Moderately common on continental slope."); Boltovskoy *et al.*, 1980: 47 (descr., etc.), pl. 29, figs 17–20; Larsen, 1982: pl. 2, fig. 9; Loeblich & Tappan, 1987: 83 (generic descr.), pl. 68, figs 1–7.

Recurvoides rotundus Saidova, 1975

Saidova, 1975: 83, pl. XCVII, fig. 5 (distrib., incl. New Zealand).

Recurvoides sp. Lewis, 1979

Lewis, 1979: 21 (off Southern Hawke's Bay: "... no living specimens ... Rare, on mid and lower slope." — "Test larger and more globose than *R. contortus* ... Possibly the same as specimens assigned to *R. turbinatus* by Loeblich & Tappan, 1953: pl. 2, fig. 11").

Superfamily LOFTUSIACEA
Family CYCLAMMINIDAE
Subfamily ALVEOLOPHRAGMIINAE

Genus **Alveolophragmium** Stschedrina, 1936

Alveolophragmium zealandicum Vella, 1957

Vella, 1957: 15, pl. 3, figs 44–45; Cushman, 1955: 102 (generic descr.); Eade, 1967a: 18 (N.Z. refs); Lewis, 1979: 21 (off Southern Hawke's Bay : "Rare, on banks and slope."); Loeblich & Tappan, 1987: 99–100 (generic descr., etc.).

Subfamily CYCLAMMININAE
Genus **Cyclammina** Brady, 1879

Cyclammina cancellata Brady, 1879

Brady, 1879a: 62–63; Brady, 1884: 351, pl. XXXVII, figs 8–16; Cushman, 1921: 84–85 (descr., etc.), pl. 16, figs 1a-b; Cushman, 1955: 109 (type species, generic descr.), 455 (in key), text pl. 10, fig. 11, key pl. 6, figs 2–4; Barker, 1960: 76, pl. 37 (XXXVII), figs 8–16 (status, etc., incl. *C. miocenica* (Karrer, 1877)); Hedley, 1963: 433–441 *passim* (organic cement analysis); Eade, 1967a: 18 (N.Z. refs); Murray, 1971: 6, 24–25 (diag. features etc.), pl. 5, figs 3–6; Theyer, 1971: 309–313, text-figs 1–7, table 1 (size, depth var.);

Colom, 1974: 84, figs 4d-e; Boltovskoy & Wright, 1976: 60, 71, 72, 230, 243, 264; Lewis, 1979: 21 (off Southern Hawke's Bay: "Many specimens with chambers more globose than Brady's specimens."); Loeblich & Tappan, 1987: 105 (generic descr., etc.), pl. 107, figs 2–6.

Cyclammina orbicularis Brady, 1881

Brady, 1881: 53; Brady, 1884: 353, pl. XXXVII, figs 17–19; Wiesner, 1931: 97, pl. XIII, fig. 149 (*C. orbicularis*), 97, pl. XIII, fig. 150 (as *C. o.* var. *asellina*); Earland, 1936: 39, pl. I, figs 27–28; Parr, 1950: 273 (remarks); Eade, 1967a: 18 (N.Z. refs); Colom, 1974: 84, figs 3a-b; Boltovskoy & Wright, 1976: 238.

Cyclammina aff. **C. pusilla** Brady, 1884. Lewis, 1979

Lewis, 1979: 21 (Southern Hawke's Bay: "Rare, at single station on upper slope" — as C. aff. *pusilla* Brady, 1884: 353, pl. XXXVII, figs 20–23; Wiesner, 1931: 39, pl. VIII, fig. 151; Earland, 1936: 39, pl. I, figs 25–26; Barker, 1960: 76, pl. 37 (XXXVII), figs 20–23.

Cyclammina trullissata Brady, 1879

Brady, 1879a: 56–57, pl. V, figs 10a-b–11 (*Trochammina*); Brady, 1884: 342, pl. XL, fig. 13 (*Trochammina*); Cushman, 1910: 113 (to *Cyclammina bradyi*); Parker, 1952: 400 (status); Eade, 1967a: 18 (N.Z. refs); Lewis, 1979: 20 (off Southern Hawke's Bay: "Rare, at single station on lower slope." — in *Haplophragmoides*); Adams *et al.*, 1980: 12 (type) [note : *T. trullissata* Brady, 1884: 342 (in part), pl. XL, figs 14–15 (not 13 & 16) = *Labrospira wiesneri* n.sp. Parr, 1950: 272, pl. IV, figs 25–26].

Superfamily SPIROPLECTAMMINACEA
Family SPIROPLECTAMMINIDAE
Subfamily SPIROPLECTAMMININAE

Genus **Ammobaculoides** Plummer, 1932

Ammobaculoides earlandi (Barker, 1960)

Barker, 1960: 92, pl. 45, figs 22–23 (*Spiroplectella earlandi*, new name for recent forms of the Cretaceous *S. annectens* (Parker & Jones)); Cushman, 1955: 114 (generic descr.); Eade, 1967a: 18. (ref. to syn.); Loeblich & Tappan, 1987: 111 (generic descr., etc.).

Genus **Spiroplectammina** Cushman, 1927

Spiroplectammina biformis (Parker & Jones, 1865)

Parker & Jones, 1865: 370, pl. 15, figs 23–24 (*Textularia agglutinans* var. *biformis*); Brady, 1884: 376, pl. XLV, fig. 25; Heron-Allen & Earland, 1922: 122 (*Spiroplecta*); Höglund, 1947: 163, text-figs 140–141, pl. 12, fig. 1 (*Spiroplectammina*); Cushman, 1948: 30, pl. 3, figs 7–8; Loeblich & Tappan, 1953: 34, pl. 4, figs 1–6; Cushman, 1955: 113 (type species, generic descr., syn.), 455 (in key), text pl. 11, fig. 1, key pl. 7, figs 1–3; Nørvang, 1966: 14 (remarks, refs & syn., generic diag., p. 13), pl. 1, fig. 24, pl. 2, fig. 9; Eade, 1967a: 19; Lankford & Phleger, 1973: 101–132 (distrib. patterns & ecol.), pl. 1, fig. 11; Boltovskoy & Wright, 1976: 110, 155; Adams *et al.*, 1980: 12 (type); Todd & Low, 1981: 14 (in key), 1 fig.; Tappan & Loeblich, 1982: pl. 47, fig. 11; Loeblich & Tappan, 1987: 112 (generic descr., etc.), pl. 119, figs 19–20.

Spiroplectammina cf. **biformis** (Parker & Jones, 1865). Lewis, 1979

Lewis, 1979: 22, table 5 (off Southern Hawke's Bay: "Some specimens are longer than Brady's figure with one or two uniserial chambers ... Common on mid slope, moderately common on lower slope.").

Subfamily SPIROTEXTULARIINAE
Genus **Spirotextularia** Saidova, 1975

Spirotextularia fistulosa (Brady, 1884)

Brady, 1884: 362, pl. XLII, figs 19–22 (*T. sagittula* var. *fistulosa*); Cushman, 1919: 601 (N.Z.); Cushman, 1921: 104, pl. 20, fig. 6; Baker, 1960: 86, pl. 42, figs 19–22; Eade, 1967a: 20; Hayward & Grace, 1981: 48, 49 ("first NZ records" off Cuvier Island; "... uncommon in shallow sediments around northern New Zealand ..."), 51, fig. 5a (as *T. fistulosa* Brady); Hayward, 1982b: 63 (off Little Barrier Is); Loeblich & Tappan, 1987: 113, 173, 175 (transf. to *Spirotextularia*), pl. 121, figs 1–2, pl. 192.

* Genus **Vulvulinoides** Saidova, 1975

Vulvulinoides benignus Saidova, 1975

Saidova, 1975: 120–121, pl. XXXIV, fig. 3 ("Ob" Stn 358, 1418 m).

* Included in the Spirotextulariinae by Saidova (1975), this genus is listed among the genera of uncertain status by Loeblich & Tappan (1987: 714).

Family PSEUDOBOLIVINIDAE
Genus **Parvigenerina** Vella, 1957

Parvigenerina heronalleni Seiglie, 1964

Seiglie, 1964: 7 (new name for *Bolivina tortuosa* var. *arenacea* Heron-Allen & Earland, 1922: 136, pl. IV, figs 34–35); Eade, 1967a: 20; Loeblich & Tappan, 1987: 116 (generic descr., etc.), pl. 123, figs 13–16.

Parvigenerina inflata var. **arenacea** Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 135, pl. IV, figs 31–33 (*Bolivina*); Eade, 1967a: 20 (listed).

Genus **Pseudobolivina** Wiesner, 1931

Pseudobolivina antarctica Wiesner, 1931

Wiesner, [1929] 1931: 99, pl. XXI, figs 257–258, pl. XXIII, stereo fig. c (new name for *Bolivina punctata* var. *arenacea* Heron-Allen & Earland, 1922: 133, pl. IV, figs 21–22); Wells, 1985: 586 (descr., from Wellington Harbour etc. as *P. antarctica* (Heron-Allen & Earland, 1922: 132, pl. 4, figs 23–26, as *Bifarina porrecta* (Brady) var. *arenacea* — see also Vella, 1957: 8, 14, 18, Cook Strait records as *Parvigenerina arenacea* (Heron-Allen & Earland) and Eade, 1967a: 20 (listed)), figs 2–3 (distrib., abundance), 10a-c.

Pseudobolivina sp. Lewis, 1979

Lewis, 1979: 22 (off Southern Hawke's Bay: "Rare on outer shelf." — as *P.* sp — see Heron-Allen & Earland, 1922: pl. IV, figs 31–35).

Family NOURIIDAE
Genus **Nouria** Heron-Allen & Earland, 1914

Nouria harrisii Heron-Allen & Earland, 1914

Heron-Allen & Earland, 1914: 376, pl. XXXVII, figs 16–20; Heron-Allen & Earland, 1922: 103; Eade, 1967a: 17 (listed).

Nouria polymorphinoides Heron-Allen & Earland, 1914

Heron-Allen & Earland, 1914: 376, pl. 37, figs 1–15; Phleger & Parker, 1951: 2, pl. 1, figs 1–3 (as *Proteonina comprima*); Parker, 1954: 503, pl. 5, fig. 19; Cushman, 1955: 205 (generic descr.), 463 (in key), key pl. 18, figs 12–13; Eade, 1967a: 17 (N.Z. refs); Lankford & Phleger, 1973: 101–102 (distrib. patterns & ecol.), pl. 3, fig. 1; Haake, 1980: 6, pl. 1, fig. 7; Poag, 1981: 73–74, pl. 49, fig. 2, pl. 50, figs 2a-b; Loeblich & Tappan, 1987: 117 (generic descr., etc.), pl. 123, figs 11–12.

Superfamily TROCHAMMINACEA
Family TROCHAMMINIDAE
Subfamily TROCHAMMININAE

Genus **Tritaxis** Schubert, 1920

Tritaxis conica (Parker & Jones, 1865)

Parker & Jones, 1865: 406, pl. 15, fig. 27 (*Valvulina triangularis* var. *conica*); Brady, 1884: pl. XLIX, fig. 16; Barker, 1960: 100, pl. 49 (XLIX), figs 15–16 (transf. to *Tritaxis*); Eade, 1967a: 21 (N.Z. refs); Albani, 1968a: 14, fig. 23; Albani, 1968b: 96 (distrib.); Boltovskoy & Wright, 1976: 143; Albani, 1979: 16 (features), fig. 13.1; Lewis, 1979: 23 (off Southern Hawke's Bay: "Single specimens attached to sand grains at two stations ..."); Loeblich & Tappan, 1987: 122 (generic descr., etc.), 125, pl. 128, figs 1–4.

Tritaxis fusca (Williamson, 1858)

Williamson, 1858: 55–56, pl. 5, figs 114–115 (*Rotalina*); Eade, 1967a: 21 (N.Z. refs); Lewis, 1970: frontispiece fig. from NZOI Stn C488; Murray, 1971: 440–441, pl. 13, figs 6–9 (diag. features etc.); Mikhalevich, 1972: 26 (generic diffs from *Trochammina*; cf. Cushman, 1955: 202, included within *Trochammina*); Dawson, 1979: 22 (listed); Brönnimann *et al.*, 1983: 214 (status, classification, etc.); Brönnimann & Whittaker, 1983a: 291–302 (neotype etc.)

Genus **Trochammina** Parker & Jones, 1859

Trochammina adaperta Rhumbler, 1938

Rhumbler, 1938: 184, figs 21–26 (*T. squamata* forma *adaperta*); Eade, 1967a: 20 (N.Z. refs); Mikhalevich, 1972: 23 (age variabilities etc.); Wells, 1985: 588 (descr., etc., Wellington Harbour), figs 2–3 (distrib., abundance), 10d-e.

Trochammina cf. **astrifica** Rhumbler, 1938. Kustanowich, 1965

Kustanowich, 1965: 52 (as *T.* cf. *astrifica* Rhumbler, 1938); Eade, 1967a: 20; Haynes, 1973: 34–38 (diag., descr., distrib., remarks etc.), pl. 4, figs 18–20.

Trochammina bartrami Hedley, Hurdle & Burdett, 1967

Hedley *et al.*, 1967: 13, 14, 21–22, text-figs 9–10, pl. 6, figs 2A–C (incl. *T. ochracea* of Heron-Allen & Earland, 1922: 111–112, in part, not of Williamson, 1858 (*Rotalina*)); Eade, 1967a: 20; Collins, 1974: 11 (Australian record); Dawson, 1979: 22 (type data); Hayward, 1981a: 89 (Tutakaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Wells, 1985: 588 (descr.,

etc., Wellington Harbour), figs 2–3 (distrib., abundance), 10g-h.

Trochammina globigeriniformis Parker & Jones, 1865

Parker & Jones, 1865: 407, pl. 15, figs 46–47, pl. 17, figs 96–98 (*Lituola nautiloidea* var. *globigeriniformis*); Cushman, 1921: 96–97 (refs & syn. etc.), pl. 11, figs 4–5; Barker, 1960: 72, pl. 35, figs 10–11; Eade, 1967a: 20 (N.Z. refs); Boltovskoy & Wright, 1976: 141, 142, 154; Adams *et al.*, 1980: 7 (type); Haake, 1980: 8, pl. 1, fig. 18.

Trochammina ? aff. **globigeriniformis** (Parker & Jones, 1865). Lewis, 1979

Lewis, 1979: 22, table 5 (off Southern Hawke's Bay: "Moderately common on mid slope." as *T.* ? aff. *globigeriniformis* (Parker & Jones, 1865; *q.v.*): " ... chambers too few to be sure that coiling is trochospiral, it may be streptospiral.").

Trochammina inflata (Montagu, 1808)

Montagu, 1808: 81, pl. XVIII, fig. 3 (*Nautilus*); Brady, 1884: 338 (*Trochammina*), pl. XLI, fig. 4; Parr, 1945: 194, pl. VIII, figs 4a-b; Parker *et al.*, 1953: 15, pl. 3, figs 5–6; Cushman, 1955: 202 (type species, generic descr., syn.), 463 (in key), key pl. 18, figs 1–3; Parker & Athearn, 1959: 341, pl. 50, figs 18–20; Barker, 1960: 84, pl. 41, fig. 4; Eade, 1967a: 20 (N.Z. refs); Albani, 1968a: 14, fig. 22; Albani, 1968b: 96, pl. 7, figs 3–5 (descr., distrib. etc.); Kameswara Rao, 1969: 595–596 (descr., distrib., refs), pl. III, figs. 29; Phleger, 1970: 522 *et seq.*, 529, tables4–5 (N.Z. marine marsh ecol., localities on fig. 9); Murray, 1971: 4, 34–35 (diag. features), pl. 10, figs 3–6; Mik-halevich, 1972: 9 (age variability etc.); Gregory, 1973: 197 (N.Z. mangrove swamp ecol.), figs 3.4–3.5, table 2; Haynes, 1973: 37–39 (diag., descr., detailed distrib., refs etc.), 44, figs 15–17, pl. 6, fig. 3; Collins, 1974: 11 (ecol. notes etc.); Boltovskoy & Wright, 1976: 141–145, 152, 154, 233; Albani, 1979: 16 (features), fig. 12.1; Lewis, 1979: 23 (off Southern Hawke's Bay: "A few specimens at most stations on continental slope."); Murray, 1979: 26 (descr.), figs 6E–G; Scott & Medioli, 1980: 44 (refs), pl. 3, figs 12–14, pl. 4, figs 1–3; Boltovskoy *et al.*, 1980: 52 (descr., etc.), pl. 33, figs 17–19; Todd & Low, 1981: 17 (in key), 3 figs; Hayward, 1981b: 131 *&c.* (Bay of Islands), fig. 3a; Harrison & Gandhi, 1983: 163 (diag., refs), fig. 1b; Brönnimann & Whittaker, 1983c: 311–315 (neotype, wall structure etc.); Loeblich & Tappan, 1987: 122 (generic descr.), pl. 129, figs 20–23.

Trochammina sp. cf. **inflata** (Montagu, 1808). Wells, 1985

Wells, 1985: 588 (descr., etc., Wellington Harbour: "The specimens are minute, with a slightly more pronounced apertural arch than is typical of *T. inflata*."), figs 2–3 (distrib., abundance), 10i-j.

Trochammina moniliformis Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 112–113, pl. III, figs 18–23; Eade, 1967a: 21 (listed).

Trochammina multiloculata Höglund, 1947

Höglund, 1947: 211, text-fig. 193, pl. 15, fig. 5 (The Skagerak, c. 200 m); Wells, 1985: 590 (descr., etc., Wellington Harbour : "There is no previous record ... in New Zealand"), figs 2–3 (distrib., abundance : "Widespread. Rare"), 11c & f.

Trochammina nana (Brady, 1881)

Brady, 1881: 50 (*Haplophragmium*); Barker, 1960: 72, pl. 35, figs 6–8 (*Trochammina*); Eade, 1967a: 21 (N.Z. refs); Todd & Low, 1981: 18 (in key), 3 figs.

Trochammina cf. **nana** (Brady, 1881). Cushman, 1919

Cushman, 1919: 600 (as *T.* cf. *nana* (Brady, 1881), *q.v.*); Eade, 1967a: 21 (listed).

Trochammina nitida Brady, 1881

Brady, 1881: 52; Heron-Allen & Earland, 1922: 112; Barker, 1960: 84, pl. 41, figs 5–6; Eade, 1967a: 21; Boltovskoy & Wright, 1976: 141, 154.

Trochammina ochracea (Williamson, 1858)

Williamson, 1858: 55, pl. 4, fig. 112, pl. 5, fig. 113 (*Rotalina*); Heron-Allen & Earland, 1915: 619, pl. XLVI, figs 27–28; Heron-Allen & Earland, 1922: 111 (*Trochammina*; but, in part, = *T. bartrami* Hedley *et al.*, 1967, *q.v.*); Rhumbler, 1938: 190 (syn.); Höglund, 1947: 211–212 (descr.), text-fig. 190, pl. 16, fig. 2; Eade, 1967a: 21; Mikhalevich, 1972: 23 (age variability etc. as *Rotaliammina* Cushman, 1924); Haynes, 1973: 40–41 (diag., descr., remarks, distrib., etc.), pl. 5, figs 15–18; Collins, 1974: 12 (refs); Thompson, 1975 thesis: 70, pl. 4, fig. 7; Boltovskoy & Wright, 1976: 16, 143–145; Lewis, 1979: 23 (off Southern Hawke's Bay: "Moderately common on outer shelf."); Murray, 1979: 28 (descr.), figs 6H–J; Boltovskoy *et al.*, 1980: 52 (descr., etc.), pl. 33, figs 20–22; Todd & Low, 1981: 17 (in key), 3 figs; Buzas & Severin, 1982: 23 (refs), pl. 1, figs 10–11.

Trochammina pusilla Höglund, 1947

Höglund, 1947: 201–203, text-figs 183–184, pl. 17, figs 4 a-c; Lewis, 1979: 23 (off Southern Hawke's Bay: "Occurs at almost every station from outer shelf to lower slope ....").

Trochammina rotaliformis Wright, 1911

Wright *in* Heron-Allen & Earland, 1911a: 309; Heron-Allen & Earland, 1913a: 52, pl. III, figs 11–13; Heron-Allen & Earland, 1922: 114–115 (var., etc.); Loeblich & Tappan, 1953: 51, pl. 8, figs 6–9; Eade, 1967a: 21; Murray, 1971: 4, 5, 38–39 (diag. features etc., as *T. rotaliformis* Heron-Allen & Earland), pl. 12, figs 1–5; Todd & Low, 1981: 18 (in key), 3 figs.

Trochammina cf. **rotaliformis** Wright, 1911. Hulme, 1964

Hulme, 1964: 323 (Manukau Harbour, as *T.* cf. *rotaliformis* Wright, 1911, *q.v.*); Eade, 1967a: 21 (listed).

Trochammina sorosa Parr, 1950

Parr, 1950: 278 (BANZARE Stn 113, off Tasmania), pl. V, figs 15–17; Hedley *et al.*, 1967: 1–86, text-figs 11–15, pl. 6, fig. 4; Eade, 1967a: 21; Gordon & Ballantine, 1977: 95 (listed from Leigh region after Thompson, 1975 thesis: 70, pl. 4, figs 5–6); Lewis, 1979: 23 (off Southern Hawke's Bay: "Moderately common at a few isolated stations..."); Hayward, 1981a: 81, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 63 (off Little Barrier Is); Wells, 1985: 590 (descr., etc., Wellington Harbour), figs 2–3 (distrib., abundance), 11a-b.

Trochammina squamata Jones & Parker, 1860

Jones & Parker, 1860: 304, table; Brady, 1884: 337, pl. XLI, figs 3a-c; Heron-Allen & Earland, 1913a: 50, pl. III, figs 7–10; Heron-Allen & Earland, 1915: 41, pl. VI, figs 4–6; Cushman, 1921: 95–96 (refs etc.), pl. 17, fig. 2, pl. 22, fig. 6; Eade, 1967a: 21 (N.Z. refs); Schnitker, 1971: pl. 1, fig. 17; Boltovskoy & Wright, 1976: 103, 144; Lewis, 1979: 23 (off Southern Hawke's Bay: "Moderately common on shelf, rare on slope."); cf. Boltovskoy *et al.*, 1980: 52–53 (descr., etc.), pl. 34, figs 5–8; Todd & Low, 1981: 17 (in key), 3 figs.

Trochammina cf. **squamata** Jones & Parker, 1860. Hulme 1964

Hulme, 1964: 323 (Manukau Harbour, as *T.* cf. *squamata* Jones & Parker, 1860, *q.v.*); Eade, 1967a: 21 (listed).

Trochammina cf. **squamata** Jones & Parker, 1860. Kustanowich, 1965

Kustanowich, 1965: 52 (as *T.* cf. *squamata* Jones & Parker, 1860, *q.v.*); Eade, 1967a: 21 (listed).

Trochammina tasmanica Parr, 1950

Parr, 1950: 279, pl. V, figs 18a-c; Hulme, 1964: 322; Eade, 1967a: 21; Mikhalevich, 1972: 9, fig. 58 (age variability etc.); Collins, 1974: 11 (Port Phillip, Vic.); Lewis, 1979: 23 (off Southern Hawke's Bay: "Moderately common at many places ...").

Trochammina uviformis Grzybowski, 1901

Grzybowski, 1901: 65, 221–226, pl. VIII, figs 1–2; Heron-Allen & Earland, 1922: 113, pl. III, figs 16–17; Eade, 1967a: 21.

Trochammina cf. **T. wiesneri** Parr, 1950. Hulme, 1964

Hulme, 1964: 323 (Manukau Harbour, as *T.* cf. *wiesneri* Parr, 1950: 279, pl. V, fig. 14 (incl. *T. inflata* (Montagu, 1808) of Wiesner, 1931, BANZARE Stns 41, 42, Antarctic, not *T. inflatus* Montagu, 1808 (*Nautilus*), *q.v.*); Eade, 1967a: 21.

Trochammina sp. Lewis, 1979

Lewis, 1979: 23 (off Southern Hawke's Bay: "Moderately common on outer shelf.").

Trochammina sp. Hayward & Grace, 1981

Hayward & Grace, 1981: 51 (off Cuvier Is).

Subfamily ROTALIAMMININAE
Genus **Rotaliammina** Cushman, 1924

Rotaliammina cf. **mayori** Cushman, 1924. Wells, 1985

Wells, 1985: 590 (descr., etc., from Wellington Harbour as *Rotaliamminia* sp. cf. *R. mayori* Cushman, 1924: 11, pl. 1, figs 4–5 — see also Brönnimann *et al.*, 1983: 211–213, pl. 3, fig. 2: "Not previously recorded from New Zealand ..."), figs 2 (distrib., abundance), 5d-i, 11h-i.

Rotaliammina sigmoidea Wells, 1985

Wells, 1985: 590,592 (Wellington Harbour: "Infrequent"), figs 2 (distrib., abundance), 5d-i, 11d-e & g.

Subfamily JADAMMININAE
Genus **Jadammina** Bartenstein & Brand, 1938

Jadammina macrescens (Brady, 1870)

Brady *et al.*, 1870: 51 [290], pl. XI, figs 5a–e (*Trochammina inflata* (Montagu) var. *macrescens*); Heron-Allen & Earland, 1913a: 52; Parker *et al.*, 1953: 15, pl. 3, figs 7–8 (*Trochammina*); Phleger, 1965: 175 (as *Trochammina*, comparison with *Jadammina polystoma* Bartenstein & Brand, 1938: 381, text-figs 1–3; Mikhalevich, 1972: 9 (age variability, syn. *J. polystoma*, Antarctic); Haynes, 1973: 41; Gregory, 1973: 195, fig. 3.3, table 2 (N.Z. marine marsh ecol.); Boltovskoy & Wright, 1976: 153 (*J. macrescens*), 141, 145, 147, 152, 153, 216 (*J. polystoma*); Murray, 1979: 28 (descr.), figs 6K–M; Scott & Medioli, 1980: 44 (remarks, refs, in *Trochammina*, inc. *J. polystoma* as in Murray (1971) but "*Jadammina* appears now to be a junior synonym of *Trochammina*. ..."); Boltovskoy *et al.*, 1980: 55 (descr. etc.), pl. 36, figs 5–7 (*J. polystoma* ... "*Jadammina* is monospecific ..."); Todd & Low, 1981: 19 (in key, as *J. polystoma*), 3 figs; Brönnimann *et al.*, 1983: 207 (status — see the following reference); Brönnimann & Whittaker, 1983b: 207 (*J. polystoma* Bartenstein & Brand, 1938, a junior synonym of *Trochammina inflata* (Montagu) var. *macrescens* Brady, 1870, lectotype established); Loeblich & Tappan, 1987: 125–126 (generic descr., etc.), pl. 133, figs 4–13.

Family REMANEICIDAE
Subfamily REMANEICINAE

Genus **Remaneica** Rhumbler, 1938

Remaneica plicata (Terquem, 1876)

Terquem, 1876: 72, pl. 8, fig. 9 (*Patellina*); Heron-Allen & Earland, 1922: 112 (*Trochammina*); Cushman, 1955: 203 (generic descr.); Eade, 1967a: 21; Collins, 1974: 12 (refs); Poag & Tresslar, 1981: 54, 56, pl. 10, figs 8–9; Loeblich & Tappan, 1987: 129 (generic descr., etc.).

Superfamily VERNEUILINACEA
Family VERNEUILINIDAE
Subfamily VERNEUILININAE

Genus **Gaudryina** d'Orbigny, 1839

Gaudryina anaticula Saidova, 1975

Saidova, 1975: 109, pl. XXX, fig. 9 ("Ob" Stn 354, 266 m).

Gaudryina convexa (Karrer, 1865)

Karrer, 1865: 78, pl. 16, figs 8a-c (*Textularia*); Cushman, 1937a: 63, 66 (desc., refs etc.), pl. 9, fig. 17; Cushman, 1955: 123–124 (generic/subgeneric descr.); Flügel, 1961: 84 (type); Galhano, 1963: 20 (refs), pl. 1, fig. 15; Burdett *et al.*, 1963: 513–530 (incl. var., etc. *G. hastata* Cushman, 1937 and *G. rugosa* of Brady, 1884 and later authors), figs 2–6; Eade, 1967a: 21 (N.Z. refs); Collins, 1974: 12 (refs etc.); Quilty, 1974: 39, pl. 1, figs 14–15; Thompson, 1975 thesis: 71 (descr., refs), pl. 5, figs 3–5; Hayward & Buzas, 1979: 33; Lewis, 1979: 23 (off Southern Hawke's Bay: "Occurs on the inner shelf and on slope banks where sediment is coarse."); Albani, 1979: 15 (features), fig. 9.1; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Hayward & Grace, 1981: 47, 51 (off Cuvier Is); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 130 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6b; Hayward, 1982b: 61, 63 (off Little Barrier Is); Wells, 1985: 592 (comments, distrib., etc., Wellington Harbour), figs 2 (distrib., abundance), 9a; Loeblich & Tappan, 1987: 136 (generic descr., etc.).

Gaudryina ferruginea Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 123, pl. IV, figs 13–15; Eade, 1967a: 21 (listed).

Gaudryina quadrangularis Bagg, 1908

Bagg, 1908: 133, pl. 5, fig. 1; Cushman, 1921: 147, pl. 29, fig. 2; Cushman, 1937: 63 (descr., refs etc.), pl. 10, figs 11, 15–17; Galhano, 1963: 21 (refs), pl. II, fig. 3; Eade, 1967a: 21 (N.Z. refs); Albani, 1968a: 13, fig. 21; Albani, 1968b: 96–97 (distrib.); Albani, 1979: 15 (features), fig. 9.2; Chave, 1987: 31, pl. 1, fig. 6.

Gaudryina rugulosa Cushman, 1932

Cushman, 1932a: 15–16, pl. 4, figs 1a-b (for Recent forms referred to the Upper Cretaceous *Textularia rugosa*, see Brady, 1884: 363, pl. XLII, figs 23a-b, 24); Eade, 1967a: 21 (N.Z. refs).

Gaudryina triangularis Cushman, 1911

Cushman, 1911: 65, text-figs 104a-c; Cushman, 1919: 604 (N.Z.); Cushman, 1921: 148; Cushman, 1937: 66 (descr., refs etc.), pl. 9, fig. 16; Eade, 1967a: 21; Boltovskoy & Wright, 1976: 104.

Genus **Verneuilina** d'Orbigny, 1840

Verneuilina polystropha (Reuss, 1846)

Reuss, 1846: 109, pl. XXIV, fig. 53 (*Bulimina*); Brady, 1884: 386, pl. XLVII, figs 15–17; Cushman, 1921: 139–140, pl. 32, fig. 1; Heron-Allen & Earland, 1922: 124 (*Verneuilina*, refs); Heron-Allen & Earland, 1930a: 75 (refs); Cushman, 1937a: 11 (descr., refs

etc.), pl. 1, figs 14–15; Cushman, 1955: 122 (generic descr.); Hedley, 1963: 433–441 *passim* (organic cement analysis); Eade, 1967a: 21.

Verneuilina triquetra (Münster, 1838)

Münster *in* Roemer, 1938: 384, pl.3, fig.19 (*Textularia*); Cushman, 1921: 142 (refs); Heron-Allen & Earland, 1922: 124 (*Verneuilina*, refs); Eade, 1967a: 21; Loeblich & Tappan, 1987: 137 (generic descr., etc.).

Superfamily ATAXOPHRAGMIACEA
Family TEXTULARIELLIDAE

Genus **Textulariella** Cushman, 1927

Textulariella barrettii (Jones & Parker, 1863)

Jones & Parker, 1863: 80, 105 (*Textularia*); Jones & Parker, 1876: 99; Mestayer, 1916 : 129 (N.Z.); Cushman, 1937b: 66 (descr., refs & syn.), pl. 7, figs 5–8; Cushman, 1955: 134 (type species, generic descr.),457 (in key), text pl. 12, fig. 15, key pl. 8, figs 24–25; Barker, 1960: 88, pl. 43, fig. 17, pl. 44, figs 3, 6-8; Andersen, 1961: 1–208, pl. 3, figs 4a-b; Eade, 1967a: 22; Schnitker, 1971: 212 (ref.), pl.1, fig. 20; Adams *et al.*, 1980: 12 (type); Chave, 1987: 56, pl. 2, fig. 8; Loeblich & Tappan, 1987: 147 (generic descr., etc.), pl. 154, figs 5–11, pl. 155, fig. 7.

Textulariella simplex Cushman, 1936

Cushman, 1936a : 45, pl. 6, fig. 20; Cushman, 1937b : 67–68 (descr. etc.), pl. 7, fig. 14; Eade, 1967a : 22.

Family GLOBOTEXTULARIIDAE
Subfamily GLOBOTEXTULARIINAE

Genus **Globotextularia** Eimer & Fickert, 1899

Globotextularia anceps Brady, 1884

Brady, 1884: 313–314, pl. XXXV, figs 12–15 (*Haplophragmium*); Heron-Allen & Earland, 1922: 102; Cushman, 1955: 204 (type species, generic descr.), 463 (in key), key pl. 18, fig. 14; Eade, 1967a: 22; Larsen, 1982: pl. 4, fig. 7; Loeblich & Tappan, 1987: 143–144 (generic descr., etc.), pl. 150, figs 1–7.

Genus **Rhumblerella** Brönnimann, 1981

Rhumblerella humboldti (Todd & Brönnimann, 1957)

Todd & Brönnimann, 1957: 26, pl. 2, fig. 26 (*Eggerella*); Hulme, 1964: 322 (Manukau Harbour); Eade, 1967a: 22; Brönnimann & Zaninetti, 1984: 100 (type species of *Toddella*); Loeblich & Tappan, 1987: 144 (transf. to *Rhumblerella*; generic descr., etc.), pl. 151, figs 1–4.

Subfamily LIEBUSELLINAE
Genus **Liebusella** Cushman, 1933

Liebusella soldanii (Jones & Parker, 1860)

Jones & Parker, 1860: 307 (*Lituola*); Brady, 1884: 318, pl. XXXII, figs 12–18; Cushman, 1937b: 166–167 (descr., refs & syn.), pl. 20, figs 1–11; Cushman, 1955: 139 (type species, generic descr., syn.), 457 (in key), text pl. 12, fig. 17, key pl. 8, figs 18–21; Barker, 1960: 66, pl. 32, fig. 13; Eade, 1967a: 22 (N.Z. refs); Thompson, 1975 thesis: 71; Loeblich & Tappan, 1987: 145 (generic descr., etc.), pl. 152, figs 11–16.

Superfamily TEXTULARIACEA
Family EGGERELLIDAE
Subfamily DOROTHIINAE

Genus **Dorothia** Plummer, 1931

Dorothia filiformis (Berthelin, 1880)

Berthelin, 1880: 25, pl. I (XXIV), fig. 8 (*Gaudryina*); Heron-Allen & Earland, 1922: 122 (refs); Cushman, 1937: 73–74 (descr., refs etc.), pl. 8, figs 1–2; Cushman, 1955: 136 (generic descr.); Eade, 1967a : 22; Loeblich & Tappan, 1987: 169 (generic descr., etc.).

Dorothia scabra (Brady, 1884)

Brady, 1884: 381, pl. XLV, figs 7, a, b, (*Gaudyrina*); Cushman, 1937: 98, pl. 11, figs 3–4 (to *Dorothia*); Barker, 1960: 90, pl. 44 (XLIV), figs 12–13 (*Textularia aspera* of Brady, 1884, "Challenger" Stn 23, West Indies, 450 fm), 94, pl. (XLVI), fig. 7; Wells, 1985: 592 (descr., etc., Wellington Harbour : "This is the first Recent record for New Zealand. Many fossils."), fig. 2 (distrib., abundance), 7 m; Hornibrook *et al.*, 1989: 116 (table 2(4), first appearance), 119 (table 3(1), last occurrence).

Dorothia (?) subrotundata (Schwager, 1866)

Schwager, 1866: 198, pl. 4, fig. 9 (*Gaudryina*); Brady, 1884: 380, pl. XLVI, figs 13a-c; Flint, 1899: 287, pl. XXIII, fig. 1; Heron-Allen & Earland, 1922: 122 (*Dorothia* (?)); Cushman, 1937: 94 (status etc.), pl. 10, fig. 15; Eade, 1967a: 22.

Subfamily EGGERELLINAE
Genus **Eggerella** Cushman, 1933

Eggerella bradyi (Cushman, 1911)

Cushman, 1911: 54, text-fig. 87 (*Verneuilina*) (incl. *V. pygmaea* Egger, 1857 of Brady, 1884: (385–386, pl. XLVII, figs 4–7) and other authors as a Recent species); Cushman, 1937b: 52 (descr., refs & syn.), as *Eggerella*), pl. 5, fig. 19; Cushman, 1955: 131 (type species, generic descr.), 457 (in key), text pl. 11, fig. 15, text pl. 12, fig. 5, key pl. 8, fig. 9; Barker, 1960: 96, pl. 47 (XLVII), figs 4–7 (refers to *Verneuilina pygmaea* (Egger) of Brady, 1884); Eade, 1967a: 22 (N.Z. refs); Kameswara Rao, 1969: 588 (descr., distrib., refs), pl. I, fig. 9; Hayward & Buzas, 1979: 33 (refs); Lewis, 1979: 24, table 5 (off Southern Hawke's Bay: "Common on mid slope, moderately common on lower slope."); Loeblich & Tappan, 1987: 170 (generic descr., etc.), pl. 189, figs 1–4.

Eggerella propinqua (Brady, 1884)

Brady, 1884: 387, pl. XLVII, figs 8–14 (*Verneuilina*); Murray, 1895: 604 (N.Z.); Cushman, 1937b: 53 (descr., refs etc.), pl. 5, figs 21–22; Eade, 1967a: 22.

Eggerella scabra (Williamson, 1858)

Williamson, 1858: 65, pl. V, figs 136–137 (*Bulimina*); Brady, 1884: 386–387 (as *Verneuilina polystropha* (Reuss, 1845) [cf. Murray, 1971: 45], syn., refs etc.), pl. XLVII, figs 15–17; Cushman, 1922: 55 (*V. scabra*); Cushman, 1937b: 50, pl. 5, figs 10–11 (to *Eggerella*, syn., etc.); Höglund, 1947: 191–193 (descr., etc.), text-figs 162–165, pl. 15, figs 12–14; Barker, 1960: 96, pl. 47 (XLVII), figs 15–17 (*E. scabra* (Williamson) from Brady, 1884 as *V. polystropha*); Murray, 1971: 44–45 (diag. features, distrib.), pl. 15; Lewis, 1979 : 24, table 5 (off Southern Hawke's Bay : "A few specimens at many stations ... ."); Wells, 1985: 592, 594 (descr. etc., Wellington Harbour), figs 2–3 (distrib., abundance), 11j-k.

Genus **Karreriella** Cushman, 1933

Karreriella albida Saidova, 1975

Saidova, 1975: 113, pl. XXXII, fig. 7 ("Ob" Stn 358, 1418 m); Cushman, 1955: 139 (generic descr.).

Karreriella apicularis Cushman, 1911

Cushman, 1911: 69, text-fig. 110 (*Gaudryina*) (for Recent forms attributed to the fossil species *G. siphonella* Reuss, 1851, incl. Brady, 1884: 382, pl. XLVI, figs 17–18 — see also Barker, 1960: 94, pl. 46 (XLVI), figs 17–19 (generic placings)); Heron-Allen & Earland, 1922: 123 (as *G. siphonella*); Eade, 1967a: 22; Lewis, 1979: 24, table 5 (off Southern Hawke's Bay: "Moderately common on mid and lower slope.").

Karreriella bradyi (Cushman, 1911)

Cushman, 1911: 67, text-figs 107a-c (*Gaudryina*) (for Recent forms called *G. pupoides* by Brady, 1884: 378, pl. XLVI, figs 1–4, not of d'Orbigny); Cushman, 1911: 67, text-fig. 107; Cushman, 1937b: 135–136 (descr., refs & syn.), pl. 16, figs 6–11 (*Karrieriella*); Phleger & Parker, 1951: 6, fig. 4 ; Andersen, 1961: pl. 3, figs 2a-b; Eade, 1967a: 22 (N.Z. refs); Murray, 1971: 6, 46–47 (diag. features etc.), pl. 16, figs 1–4; Hayward & Buzas, 1979: 34; Lewis 1979: 24, table 5 (off Southern Hawke's Bay : "Most specimens resemble Brady's figures 1–4 but some aberrant specimens resemble figures 9, 10 which Brady and subsequent authors have regarded as a separate species. ... Common at a few stations on the continental slope."); cf. also Larsen, 1982: pl. 5, fig. 1; Loeblich & Tappan, 1987: 171 (generic descr., etc.).

Genus **Martinottiella** Cushman, 1933

Martinottiella communis (d'Orbigny, 1826)

d'Orbigny, 1926: 268, Modèles No. 4 (*Clavulina*); d'Orbigny, 1846: 196, pl. XII, figs 1–2; Cushman, 1955: 138 (genotype, generic descr.), 457 (in key), text pl. 12, fig. 11, key pl. 8, figs 6–8; Baker, 1960: 98, pl. 48, figs 3–4, 6–8 (generic placing etc.); Eade, 1967a: (N.Z. refs); Colom, 1974: 91; Hayward & Buzas, 1979: 34, pl. 1, figs 9–10; Loeblich & Tappan, 1987: 171 (generic descr., etc.), pl. 190, figs 1–4.

Martinottiella cf. **communis** (d'Orbigny, 1826). Cushman, 1919

Cushman, 1919: 604 (as *Clavulina* cf. *communis* d'Orbigny, 1826, *q.v.*); Eade, 1967a: 22 (listed); Lewis, 1979: 24, table 5 (off Southern Hawke's Bay as *M.* cf. *communis* (d'Orbigny) *cf.* Brady, 1884: pl. XLVIII, figs 1–8: "Test smaller than Brady's figures and wall composed of even-sized grains ..." — "Rare, at only two stations ..." — *see also* Barker, 1960 : 98, pl. 48 (XLVIII), re generic placings, syn. etc. of Brady's material).

Family TEXTULARIIDAE
Subfamily TEXTULARIINAE

Genus **Bigenerina** d'Orbigny, 1826

Bignerina cylindrica Cushman, 1911

Cushman, 1911: 28, figs 49a-b; Brady, 1884: 468, pl. 48, fig. 8 (as *B. digitata*); Thompson, 1975 thesis: 69, pl. 3, figs 6–7 (off northeastern New Zealand).

Bigenerina nodosaria d'Orbigny, 1826

d'Orbigny, 1826: 261, pl. 11, figs 9–11; Brady, 1884: 369, pl. XLIV, figs 14–18; Cushman, 1919: 603 (N.Z.); Cushman, 1921: 125–126 (refs etc.), pl. 26, fig. 2; Cushman, 1955: 116 (type species, generic descr.), 455 (in key), text pl. 6, key pl. 7, figs 10–11; Eade, 1967a: 20; Colom, 1974: 87, figs 6a-k; Boltovskoy & Wright, 1976: 249; cf. Banner & Pereira, 1981: 105–106, pl. 7, figs 4, 8–9, 12 & 15; Larsen, 1982: pl. 3, fig. 10; Loeblich & Tappan, 1987: 172 (generic descr., etc.), pl. 191, figs 1–2.

Genus **Textularia** Defrance *in* de Blainville, 1824

Textularia abbreviata d'Orbigny, 1846

d'Orbigny, 1846: 249, pl. 15, figs 9–12; Cushman, 1921: 122–123, pl. 21, figs 2a-b; Eade, 1967a: 19 (N.Z. refs).

Textularia agglutinans d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra : 144–145, 202, pl. I, figs 17–18, 32–34; Brady, 1884: 363, pl. XLIII, figs 1–3; Cushman, 1922: 7, pl. 1, figs 4–5 (*T. agglutinans*), pl. 1, figs 1–3 (as *T. candeina, fide* Nørvang, 1966: 8); Galhano, 1963: 19 (refs), pl. I, fig. 10; Nørvang, 1966: 8–9, pl. 1, figs 2–4, pl. 2, figs 3–4, 13 (in n.g. *Textilina*, refs, syn., etc.); Eade, 1967a: 19 (N.Z. refs); Colom, 1974: 87, figs W-a[1]; Boltovskoy *et al.*, 1980: 51 (descr., etc.), pl. 32, figs 5–7; Banner & Pereira, 1981: 93, pl. 1, figs 6–7, pl. 2, fig. 1; Loeblich & Tappan, 1987: 177 (generic descr., etc.).

Textularia aspera Brady, 1882

Brady, 1882: 715; Barker, 1960: 90, pl. 44, figs 9–11; Eade, 1967a: 19 (N.Z. refs).

Textularia candeiana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra) : 143–144, pl. I, figs 25–27; Galhano, 1963: 17 (refs), pl. I, fig. 5; Nørvang, 1966: 8–9 (incl. in *Textilina* [new genus] *agglutinans* (d'Orbigny, 1839: 143, pl. 1, figs 25–27, as *Textularia*); Eade, 1967a: 19 (N.Z. refs); Albani, 1968a: 13, fig. 16; Albani, 1968b: 95 (distrib.); Kameswara Rao, 1969: 587–588 (descr., distrib., refs), pl. I, fig. 8; Schnitker, 1971: pl. 1, fig. 10; Albani, 1979: 14 (features), fig. 8.1; Boltovskoy *et al.*, 1980 : 51 (descr., etc.), pl. 32, figs 8–11; Larsen, 1982: pl. 3, fig. 5.

Textularia conica d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 143, 202, pl. I, figs 19–20; Brady, 1884: 365, pl. XLIII, figs 13–14, pl. CXIII, figs 1a-b; Cushman, 1921: 123–124, pl. 25, figs 2a-c; Cushman, 1922: 22, pl. 5, figs 5–7; Cushman, 1932a: 11, pl. II, figs 8–10, pl. III, figs 1 & 3; Parr, 1950: 275; Phleger & Parker, 1951: 5, pl. 1, fig. 27; Galhano, 1963: 17 (refs), pl. I, fig. 6; Nørvang, 1966: 9 (in new genus *Textilina*); Eade, 1967a: 19 (N.Z. refs); Schnitker, 1971: pl. 1, fig. 11; Albani, 1979: 14 (features), fig. 8.2; Lewis, 1979: 22, table 5, (Southern Hawke's Bay); Larsen, 1982: pl. 3, fig. 6.

Textularia earlandi Parker, 1952

Parker, 1952: 458 (*T. earlandi*, new name for *T. tenuissima* Earland, 1933: 95–98, pl. 3, figs 21–30, not of Haeusler, 1887); Hulme, 1964: 321 (Manukau Harbour, as *T. tenuissima* Earland); Eade, 1967a: 19 (listed); Murray, 1971: 522–523 (diag. features etc.), pl. 9, figs 1–5; Boltovskoy & Wright, 1976: 143, 144, 152, 153, 155; Boltovskoy *et al.*, 1980: 51 (descr., etc.), pl. 32, figs 12–16; Todd & Low, 1981: 14 (in key), 2 figs; Lewis, 1979: 22, table 5 (Southern Hawke's Bay: "Common on outer shelf."); Wells, 1985: 584 (descr., distrib. etc., Wellington Harbour), figs 2 (distrib., abundance), 9e-f.

Textularia cf. **earlandi** Parker, 1952. Kustanowich, 1965

Kustanowich, 1965: 52 (as *T.* cf. *tenuissima* Earland); Eade, 1967a: 19 (listed as *T.* cf. *earlandi* Parker, *q.v.*).

Textularia ensis Vella, 1957

Vella, 1957: 8, 16, pl. 3, figs 46–47 (incl. *T. sagittula* of Cushman, 1919: 601); Eade, 1967a: 19 (N.Z. refs); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 51 (off Cuvier Is); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6p; Wells, 1985: 584 (distrib., etc., Wellington Harbour), figs 2 (distrib., abundance), 7n.

Textularia aff. **ensis** Vella, 1957. Hayward, 1979

Hayward, 1979b: 185 (*Zostera* pool community).

Textularia fistula Cushman, 1911

Cushman, 1911: 10, text-fig. 11 (*T. agglutinans* var. *fistula*); Eade, 1967a: 19 (N.Z. refs).

Textularia fungiformis Fornasini, 1887

Fornasini, 1887: 387, pl. X, figs 1, 1a-b; Heron-Allen & Earland, 1922: 120; Eade, 1967a: 19.

Textularia goesii Cushman, 1911

Cushman, 1911: 15, text-fig. 24 (incl. Recent forms attributed to the Cretaceous *T. trochus*); Cushman, 1921: 113 (refs), pl. 21, fig. 3; Galhano, 1963: 17–18 (refs), pl. I, fig. 7; Eade, 1967a: 19 (N.Z. refs); Banner & Pereira, 1981: 92, pl. 1, figs 1–5.

Textularia cf. **goesii** Cushman, 1911. Vella, 1957

Vella, 1957: 8, 13 (Cook Strait, as *T.* cf. *goesii* Cushman, *q.v.*); Eade, 1967a: 19 (listed).

Textularia gramen d'Orbigny, 1846

d'Orbigny, 1846: 248, pl. XV, figs 4–6; Brady, 1884: 365, pl. XLIII, figs 9–10; Cushman, 1921: 105, pl. 20, fig. 7; Cushman & Hobson, 1935: 153–164, pl. VIII–IX; Galhano, 1963: 18 (refs), pl. I, fig. 123; Eade, 1967a: 19 (N.Z. refs); Colom, 1974: 88–89, figs 7m-v; Quilty, 1974: 35, pl. 1, fig. 7; Boltovskoy & Wright, 1976: 103, 144; Boltovskoy *et al.*, 1980: 51 (descr., etc.), pl. 32, figs 17–21.

Textularia aff. **gramen** d'Orbigny. Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 121 (as *T.* cf. *gramen* d'Orbigny, 1846, *q.v.*); Hedley *et al.*, 1965: 12, pl. 1, fig. 5; Eade, 1967a: 19.

Textularia horrida Egger, 1893

Egger, 1893: 270, pl. 6, figs 11–12; Heron-Allen & Earland, 1922: 121, pl. IV, figs 3–4 as *Textularia conica* var. *horrida*; Eade, 1967a: 19.

Textularia laevigata Saidova, 1975

Saidova, 1975: 125, pl. XXXV, fig. 6 ("Ob" Stn 352, 300 m).

Textularia lythostrota (Schwager, 1866)

Schwager, 1866: 194, pl. 4, fig. 4 (*Plecanium*); Eade, 1967a: 19 (N.Z. refs, notes on syn.).

Textularia monstrata Saidova, 1975

Saidova, 1975: 125–126, pl. XXXV, fig. 9 ("Ob" Stn 354, 266 m).

Textularia porrecta Brady, 1884

Brady, 1884: 364, pl. XLIII, figs 4a-b (*T. agglutinans* d'Orbigny var. *porrecta*); Cushman, 1921: 109–110 (refs, remarks), pl. 22, fig. 1; Barker, 1960: 88, pl. 43, fig. 4; Eade, 1967a: 19 (N.Z. refs); Albani, 1968a: 13, fig. 17; Albani, 1970: 73–74, pl. 10, fig. 1; Gregory, 1973: table 2 (*T.* sp.), fig. 4.6 (N.Z. mangrove swamp ecol.); Thompson, 1975 thesis: 69, pl. 3, fig. 4; Albani, 1979: 14 (features), fig. 8.3; Hayward, 1981a: 89 (Tutukaka Harbour); Wells, 1985: 584, 586 (descr., distrib. etc., Wellington Harbour), figs 2–3 (distrib., abundance), 9g-h.

Textularia proxispira Vella, 1957

Vella 1957: 8, 15–16, pl. 3, figs 48, 52; Eade, 1967a: 19 (N.Z. refs); Gordon & Ballantine, 1977: 95 (listed from Leigh region after Thompson, 1975 thesis: 68, pl. 2, figs 5–6); Lewis, 1979: 22, table 5 (Southern Hawke's Bay: "Rare, on shelf and upper slope."); Hayward, 1982b: 63 (off Little Barrier Is).

Textularia sagittula Defrance, 1824

Defrance, 1824 : 177, 344, Atlas Conch., pl. XIIIm, figs 5–5a; Brady, 1884: 361, pl. XLII, figs 17–18; Cushman, 1921: pl. 20, figs 2–4; Cushman, 1955: 115 (type species, generic descr., syn.), 455 (in key), text pl. 11, fig. 4, key pl. 7, figs 5–6; Barker, 1960: 86, pl. 42, figs 17–18; Galhano, 1963: 16 (refs), pl. I, fig. 4; Nørvang, 1966: 11–12 (neotype descr., remarks, refs & syn.), pl. 1, figs 9–23, pl. 2, fig. 12; Eade, 1967a: 20 (N.Z. refs); Murray, 1971: 6, 7, 10, 30–31 (diag. features etc.), pl. 8, figs 1–9; Colom, 1974: 89–90, figs 7i-l; Boltovskoy & Wright, 1976: 60, 252; Albani, 1979: 15 (features), fig. 8.5; Hayward & Buzas, 1979: 35; Haake, 1980: 7, pl. 1, fig. 15; Hayward, 1981a: 81, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 51 (Cuvier Is); Larsen, 1982: pl. 3, fig. 9.

Textularia aff. **sagittula** Defrance, 1824. Lewis, 1979

Lewis, 1979: 22, table 5 (Southern Hawke's Bay : "Rare, on middle slope.").

Textularia sagittula var. **atrata** Cushman, 1911

Cushman, 1911: 7, text-figs 2–5; Cushman, 1919: 601 (N.Z.); Cushman, 1921: 103–104, pl. 20, fig. 5; Eade, 1967a: 20; Albani, 1968a: 13, fig. 19; Albani, 1968b: 96 (descr., distrib.), pl. 7, fig. 6; Kameswara Rao, 1969: 586, 587 (descr., distrib.), pl. I, fig. 5; Albani, 1979: 15 (features, as subsp. *attrata*), fig. 8.6.

Textularia stricta Cushman, 1911

Cushman, 1911: 11, text-fig. 13; Eade, 1967a: 20 (N.Z. refs); Kameswara Rao, 1969: 587 (descr., distrib.), pl. I, fig. 6; Loeblich & Tappan, 1987: 173–174 (generic descr., etc.), pl. 192, figs 10–12.

Textularia subantarctica Vella, 1957

Vella, 1957: 8, 14, 16, pl. 3, figs 49–51; Eade, 1967a: 20 (listed); Hayward & Grace, 1981: 51 (off Cuvier Is).

Textularia torquata Parker, 1952

Parker, 1952: 403, pl. 3, figs 9–11; Hedley *et al.*,

1967: 1–86, pl. 5, fig. 7; Eade, 1967a: 20; Hayward, 1981a: 89 (Tutukaka Harbour).

Textularia turris d'Orbigny, 1840

d'Orbigny, 1840: 46, pl. 4, figs 27–28; cf. Cushman, 1937: 58 (refs re Tertiary naming problem); Eade, 1967a: 20 (N.Z. refs).

Textularia vertebralis Cushman, 1913

Cushman, 1913: 633, pl. LXXVIII, fig. 1; Cushman, 1921: 110, pl. XXII, fig. 3, pl. XXIV, fig. 1; Parr, 1950: 274–275 (refs & syn., incl. *Spiroplecta sagittula* of Chapman, 1906, and *S. s.* var. *fistulosa* of Chapman, 1906, *Textularia stricta* of Cushman, 1919 (not of 1911), *T. porrecta* of Heron-Allen & Earland, 1922: 119, pl. IV, figs 6–7 (not of Brady, 1884: pl. IV, fig. 29; q.v.); Nørvang, 1966: 7–8 (incl. in syn. of *Textilina* [new genus] *stricta* (Cushman, 1911: 11, fig. 13, as *Textularia*), pl. 1, fig. 1, pl. 2, figs 1–2; Thompson, 1975 thesis: 69, pl. 3, figs 1–2 (off northeastern New Zealand, outer shelf, 200+ m).

Textularia villosa Saidova, 1975

Saidova, 1975: 127, pl. XXXV, fig. 10 ("Ob" Stn 354, 266 m).

Textularia spp. Hayward, 1981

Hayward, 1981a: 89 (Tutukaka Harbour).

Textularia sp. Hayward, 1981

Hayward, 1981b : 131 (Bay of Islands).

Textularia sp. Hayward & Grace, 1981

Hayward & Grace, 1981: 51 (off Cuvier Is).

Textularia sp. Hayward, 1982

Hayward, 1982b: 55, 56, 61, 63, fig. 3e (Hauraki Gulf nearshore sediments).

Subfamily SIPHOTEXTULARIINAE

Genus **Siphotextularia** Finlay, 1939

Siphotextularia aperturalis (Cushman, 1911)

Cushman, 1911: 20, figs 34–35 (*Textularia*); Cushman 1919: 602 (N.Z.); Cushman, 1955: 116 (generic descr.); Eade, 1967a: 20; Loeblich & Tappan, 1987: 175 (generic descr., etc.).

Siphotextularia blacki Vella, 1957

Vella, 1957: 8, 16–17, pl. 4, figs 53–54; Hulme, 1964: 321 (Manukau Harbour); Eade, 1967a: 20; Hornibrook, 1968: 68; Thompson, 1975 thesis: 69; Wells, 1985: 586 (comments, distrib., etc., Wellington Harbour), figs 2–3 (distrib., abundance), 9m-n.

Siphotextularia concava (Karrer, 1868)

Karrer, 1868: 129, pl. 1, fig. 3 (*Plecanium*); Barker, 1960: 86, pl. 42, fig. 14 (*Siphotextularia*); Andersen, 1961: 24, pl. 2, figs 4a-b; Eade, 1967a: 20 (N.Z. refs); Thompson, 1975 thesis: 69, pl. 4, figs 2–3.

Siphotextularia fretensis Vella, 1957.

Vella, 1957: 8, 14, 17, pl. 4, figs 58–59; Kustanowich, 1965: 52; Eade, 1967a: 20; Lewis, 1979: 22 (off Southern Hawke's Bay: "Abundant on banks, common on upper slope.").

Siphotextularia aff. fretensis Vella, 1957. Lewis, 1979

Lewis, 1979: 22 (off Southern Hawke's Bay: "Smaller and narrower than *S. fretensis* ... Rare, on lower slopes only.").

Siphotextularia heterostoma (Fornasini, 1896)

Fornasini, 1896: 2, figs 6–12 (*Textularia*); Heron-Allen & Earland, 1922: 117 (remarks etc. as *Textularia concava* var. *heterosomata*); Eade, 1967a: 20; Larsen, 1982: pl. 4, fig. 1.

Siphotextularia cf. heterostoma (Fornasini, 1896). Hornibrook, 1951

Hornibrook *in* Knox, 1951: 43 (as. *S.* cf. *heterostoma* (Fornasini, 1891) (*Textularia*), *q.v.*); Eade, 1967a: 20 (listed).

Siphotextularia mestayerae Vella, 1957

Vella, 1957: 8, 17, pl. 4, figs 55–57; Eade, 1967a: 20 (N.Z. refs); Hornibrook, 1968: 68; Lewis, 1979: 22 (off Southern Hawke's Bay: "Common on North Madden Bank."); Hayward, 1979b: 185 (*Zostera* pool community); Hayward, 1981a: 89 (Tutukaka Harbour); Wells, 1985: 586, 588 (descr., distrib. etc., Wellington Harbour), figs 2–3 (distrib., abundance), 10f.

Siphotextularia aff. mestayerae Vella, 1957. Kustanowich, 1965

Kustanowich, 1965: 52 (as *S.* aff. *mestayerae* Vella, *q.v.*); Eade, 1967a: 20 (listed).

(?) **Siphotextularia** sp. 'A'. Thompson, 1975

Thompson, 1975 thesis: 70, pl. 4, fig. 4 (off northeastern New Zealand).

Family VALVULINIDAE

Subfamily VALVULININAE

Genus **Cylindroclavulina** Bermundez & Key, 1952

Cylindroclavulina bradyi (Cushman, 1911)
Cushman, 1911: 73, text-figs 118a-b–119 (*Clavulina*) for *C. cylindrica* of Brady, 1884: 396, pl. XLVIII, figs 32–38, not of d'Orbigny, 1826; Cushman, 1921: 155, pl. 31, fig. 4; Eade, 1967a: 22 (notes on syn., refs); Chave, 1987: 31, pl. 1, fig. 4; Loeblich & Tappan, 1987: 182–183 (generic descr., etc.), pl. 201, figs 7–13.

Genus **Goesella** Cushman, 1933

Goesella obscura (Chaster, 1892)
Chaster, 1892: 58, pl. 1, fig. 4 (*Clavulina*); Heron-Allen & Earland, 1922: 126 (refs); Cushman, 1955: 137 (generic descr.); Eade, 1967: 22; Colom, 1974: 92–93, figs 10f-j; Loeblich & Tappan, 1987: 183 (generic descr., etc.).

Suborder INVOLUTININA
Family PLANISPIRILLINIDAE

Genus **Planispirillina** Bermudez, 1952

Planispirillina denticulata (Brady, 1884)
Brady, 1884: 632, pl. LXXXV, fig. 17 (*Spirillina limbata* var. *denticulata*); Barker, 1960: 176, pl. 85 (LXXXV), fig. 17; Eade, 1967a: 45 (refs, note on syn.); Collins, 1974: 40 (Australia, refs).

Planispirillina cf. denticulata (Brady, 1884). Hayward & Grace, 1981
Hayward & Grace, 1981: 54 (recorded off Cuvier Is on *Spirillina* cf. *denticulata* Brady).

Planispirillina ornata (Sidebottom, 1908)
Sidebottom, 1908: 9, pl. 2, figs 7–8 (*Spirillina*); Heron-Allen & Earland, 1922: 196 (N.Z.); Eade, 1967a: 45.

Suborder SPIRILLININA
Family SPIRILLINIDAE

Genus **Mychostomina** Berthelin, 1881

Mychostomina revertens (Rhumbler, 1906)
Rhumbler, 1906: 32, pl. 2, figs 8–10 (*Spirillina vivipara* Ehrenberg var. *revertens*); Cushman, 1955: 283 (generic descr., as syn. of *Spirillina* Ehrenberg, 1843); cf. Smith & Ishan, 1974: 66–68; Boltovskoy *et al.*, 1980: 39 (descr., etc.), pl. 21, figs 17–20; Hayward, 1981a: 84 ("First record, fossil or Recent, of the genus from New Zealand."), 91, fig. 5i; Hayward, 1981b: 133 (Bay of Islands); Buzas & Severin, 1982: 36 (refs & syn.), pl. 7, figs 7–8.

Mychostomina n.sp. Hayward, 1982
Hayward, 1982b: 64 (off Little Barrier Is).

Mychostomina sp. Hayward, 1981
Hayward, 1981a: 91 (Tutukaka).

Genus **Spirillina** Ehrenberg, 1843

Spirillina decorata Brady, 1884
Brady, 1884: 633, pl. LXXXV, figs 22–25; Sidebottom, 1918: 250 (remarks); Barker, 1960: 176, pl. 85 (LXXXV); Eade, 1967a: 45 (N.Z. refs); Tappan & Loeblich, 1982: pl. 49, fig. 1.

Spirillina denticulogranulata Chapman, 1907
Chapman, 1907: 133, pl. X, figs 6a-c; Sidebottom, 1918: 250 (remarks etc.), pl. V, figs 28–29; Hayward, 1982b: 59 (first mainland N.Z. record, off Little Barrier Is, Cavalli Is etc.), 65, figs 5b-c.

Spirillina inaequalis Brady, 1879
Brady, 1879b: 278, pl. VIII, figs 25a-b; Rhumbler, 1906: 34 (Chatham Is record), pl. 2, fig. 12; Parr, 1945: 199; Parr, 1950: 350; Barker, 1960: 176, pl. 85 (LXXXV), figs 8–11; Eade, 1967a: 45 (N.Z. refs); Collins, 1974: 39 (Australia); Adams *et al.*, 1980: 11 (type).

Spirillina limbata Brady, 1879
Brady, 1879b: 278–279, pl. VIII, figs 26a-b; Brady, 1884: 632, pl. LXXXV, figs 18–21; Baker, 1960: 176, pl. 86 (LXXXV), figs 18–21; Eade, 1967a: 45 (N.Z. refs); Adams *et al.*, 1980: 11 (type).

Spirillina lucida Sidebottom, 1908
Sidebottom, 1908: 9, pl. 2, fig. 9; Heron-Allen & Earland, 1922: 196, (N.Z. refs); Eade, 1967a: 45.

Spirillina margaritifera Wiliamson, 1858
Williamson, 1858: 93, pl. 7, fig. 204; Heron-Allen & Earland, 1922: 197 (N.Z.); Eade, 1967a: 45.

Spirillina novaezealandiae Chapman, 1909
Chapman, 1909: 352, pl. 17, figs 4–5; Heron-Allen & Earland, 1922: 196 (N.Z.); Eade, 1967a: 45.

Spirillina obconica Brady, 1879
Brady, 1879b: 279, pl. VIII, figs 27a-b; Brady, 1884: 630, pl. LXXXV, figs 6–7; Chapman, 1909: 352; Heron-Allen & Earland, 1922: 195 (N.Z.); Barker,

1960: 176, pl. 85 (LXXXV), figs 6–7; Eade, 1967a: 45; Lewis, 1979: 34–35, table 5 (off Southern Hawkes Bay: "Rare, at single station on inner shelf only."); Adams *et al.*, 1980: 11 (type).

Spirillina selseyensis Heron-Allen & Earland, 1909

Heron-Allen & Earland, 1909: 440, pl. 18, figs 6–7; Heron-Allen & Earland, 1922: 197, pl. VII, fig. 3 (N.Z.); Eade, 1967a: 45.

Spirillina spinigera Chapman, 1900

Chapman, 1900: 10, pl. 1, fig. 7; Chapman, 1901: 188, pl. XIX, figs 9–10; Sidebottom, 1908: 8, pl. II, fig. 6; Chapman, 1909: 353; Sidebottom, 1918: 251; Eade, 1967a: 45; Boltovskoy & Wright, 1976: 105.

Spirillina aff. tuberculata Brady, 1879. Kustanowich, 1965

Kustanowich, 1965: 53 (cf. Brady, 1879b: 279, pl. 8, fig. 28); Eade, 1967a: 45 (listed).

Spirillina aff. tuberculatolimbata Chapman, 1900. Vella, 1957

Vella, 1957: 10 (table 2, listed from Cook Strait; cf. Chapman, 1900: 11, pl. 1 fig. 8); Eade, 1967a: 45 (listed).

Spirillina vivipara vivipara Ehrenberg, 1843

Ehrenberg, [1841] 1843: 323, 422, pl. III, sec. 7, fig. 41; Brady, 1884: 630, pl. LXXXV, fig. 2; Rhumbler, 1906: 32 (Chatham Is record as *S. v.* var. *revertens* n. var.), pl. 2, fig. 7; Parr, 1950: 347; Collins, 1958: 399; Barker, 1960: pl. 85, figs 1–4 (taxon, notes on Brady, 1884); Eade, 1967a: 45 (N.Z. refs); Albani, 1968a: 85; Albani, 1968b: 110 (distrib., etc.); Murray, 1971: 4–6, 144–145 (diag. features etc.), pl. 60, figs 1–2; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol), pl. 6, fig. 2; Colom, 1974: 139, figs 23c-d; Boltovskoy & Wright, 1976: 103, 141, 225, 226, 234, 258; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Murray, 1979: 38 (descr.), fig. 11a; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay: "A few specimens on inner shelf and single specimen on lower slope."); Hayward & Buzas, 1979: 75 (Miocene), pl. 2; Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Larsen, 1982: pl. 16, fig. 10.

Spirillina vivipara simulata McCulloch, 1977

McCulloch, 1977: 275, pl. 109, fig. 1; Hayward & Grace, 1981: 50 (first N.Z. records, off Cuvier Is: "... occasionally encountered in nearshore sediments around northern New Zealand", 54, fig. 5h; Hayward, 1981a: 92 (Tutukaka); Hayward, 1981: 134 (Bay of Islands); Hayward, 1982b: 65 (off Little Barrier Is).

Spirillina viviparina Saidova, 1975

Saidova, 1975: 218, pl. LVIII, fig. 3 ("Ob" Stn 74, 180 m).

Family PATELLINIDAE
Subfamily PATELLININAE

Genus **Patellina** Williamson, 1858

Patellina advena Cushman, 1922

Cushman, 1922e: 135, pl. 31, fig. 9; Cushman, 1930: 16, pl. 3, fig. 2; Eade, 1967a: 45; Boltovskoy & Wright, 1976: 105.

Patellina corrugata Williamson, 1858

Williamson, 1858: 46, pl. III, figs 86–89; Brady, 1884: 634, pl. LXXXVI, figs 1–7; Rhumbler, 1906: 35 (Chatham Is record); Cushman, 1915: 9, pl. 7, fig. 1; Cushman, 1921: 303; Nuttall, 1927: 234 (locality details "Challenger" figured specimens, Brady, pl. LXXXV, figs 1–7); Parr & Collins, 1930: 90, pl. IV, figs 1–5; Myers, 1934: 436–437 (life history); Myers, 1935: 355–392 (life history); Loeblich & Tappan, 1953: 114, pl. 21, figs 4–5; Cushman, 1955: 285 (type species, generic descr.), pl. 24, fig. 3, key pl. 29, fig. 13; Eade, 1967a: 45 (N.Z. refs); Berthold, 1971: 147–184 (develop. and morphol.), 19 figs, 9 pls; Murray, 1971: 4, 5, 146–147 (diag. features etc.), pl. 61, figs 2–5; Schnitker, 1971: pl. 6, fig. 12; Haynes, 1973: 142–143 (diag., descr., detailed distrib. and refs), pl. 15, fig. 17, pl. 16, figs 7–9; Lankford & Phleger, 1973: 101–132 *passim* (distr. patterns and ecol.), pl. 5, fig. 7; Colom, 1974: 139, figs 23e-f; Collins, 1974: 40 (Australia, refs); Boltovskoy & Wright, 1976: 25, 27, 30, 110, 141, 144, 225, 375; Berthold, 1976: 167–185 (test morphol, refs etc.), 8 pls; Murray, 1979: 38 (descr.), figs 11B–D; Boltovskoy *et al.*, 1980: 42–43 (descr., etc.), pl. 24, figs 17–20; Hayward & Grace, 1981: 47, 53 (off Cuvier Is); Loeblich & Tappan, 1981: 159–164; Todd & Low, 1981: 38 (in key), 3 figs; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Poag & Tresslar, 1981: 50 (refs, etc.), pl. 8, figs 5–6; Hayward, 1982b: 64 (off Little Barrier Is); Tappan & Loeblich, 1982: pl. 49, fig. 2.

Suborder CERTERININA
Family CARTERINIDAE

Genus **Carterina** Brady, 1870

Carterina spiculotesta (Carter, 1877)

Carter, 1877: 470, pl. 16, figs 1–3 (*Rotalia*); Brady, 1884: 346, pl. XLI, figs 7–10; Cushman, 1955: 204 (type species, generic descr.), key pl. 18, figs 4–5; Loeblich & Tappan, 1955: 28 (type); Barker, 1960: 84, pl. 41, figs 7–10; Loeblich & Tappan, 1964: C764–766; Deutsch & Lipps, 1976: 312–317 (test structure); Hansen & Grønlund, 1977: 147–154 (morphol., taxon. position); Hayward, 1980: 186 (first N.Z. record); Hayward & Grace, 1981: (off Cuvier Is); Tappan & Loeblich, 1982: pl. 53, fig. 12; Hayward, 1990: 981 (negative record in Bay of Plenty of subtropical species at southerly limit).

Suborder MILIOLINA
Superfamily CORNUSPIRACEA
Family CORNUSPIRIDAE
Subfamily CORNUSPIRINAE

Genus **Cornuspira** Schultze, 1854

Cornuspira carinata (Costa, 1856)

Costa, 1856: 209, pl. 17, fig. 15 (*Operculina*); Mestayer, 1916: 128 (N.Z., in *Cornuspira*); Eade, 1967a: 22; Loeblich & Tappan, 1987: 310 (generic descr., etc.; *Cyclogyra* as syn. of *Cornuspira*), therefore N.Z. species transferred).

Cornuspira involvens (Reuss, 1850)

Reuss, 1850: 370, pl. 46, figs 20a-b (*Operculina*); Brady, 1884: 200, pl. XI, figs 1–3 (*Cornuspira*); Rhumbler, 1906: 30 (Chatham Is), pl. 2, fig. 6; Cushman, 1921: 389–390 (refs, remarks etc.), pl. 77, figs 3–4; Cushman, 1929: 80–81 (refs); Cushman, 1932: 67–68, pl. 16, figs 2a-b (*Cornuspira*); Barker, 1960: 22, pl. 11, figs 1–3; Eade, 1967a: 22 (N.Z. refs); Murray, 1971: 4, 5, 52–53 (diag. features etc.), pl. 18, figs 1–3; Haynes, 1973: 49 (comparison with *C. selseyensis* (Heron-Allen & Earland)); Gregory, 1973: 193–204, table 2 (N.Z. marine marsh ecol., localities, fig. 9); Quilty, 1974: 42, pl. 1, fig. 22; Thompson, 1975 thesis: 71; Boltovskoy & Wright, 1976: 144; Hayward, 1979: 184 (*Zostera* pool communities, N.Z.); Murray, 1979: 2a (descr.), figs 7A–B; Boltovskoy *et al.*, 1980: 26 (descr., etc.), pl. 10, figs 11–12; Hayward & Grace, 1981: 51 (off Cuvier Is); Hayward, 1981a: 89 (Tutukaka); Hayward, 1981b: 131 (Bay of Islands); Todd & Low, 1981: 20 (in key, as *Cornuspira*), 2 figs; Tappan & Loeblich, 1982: 527–552, pl. 48, fig. 1 (*Cornuspira*).

Cornuspira cf. **involvens** (Reuss, 1850). (Kustanowich, 1965)

Kustanowich, 1965: 52 (as *Cornuspira* cf. *involvens* (Reuss, 1850), *q.v.*); Eade, 1967a: 22 (listed).

Cornuspira lacunosa (Brady, 1884)

Brady, 1884: 202–203, pl. CXIII, fig. 21 (*Cornuspira*); Cushman, 1919: 634 (N.Z.); Cushman, 1921: 391, pl. 78, fig. 1; Barker, 1960: 234, pl. 113, fig. 21; Eade, 1967a: 23.

Cornuspira selseyensis (Heron-Allen & Earland, 1909)

Heron-Allen & Earland, 1909a: 319, pl. XV, figs 9–11 (*Cornuspira*); Heron-Allen & Earland, 1922: 74; Eade, 1967a: 23; Schnitker, 1971: 196 (ref.), pl. 2, fig. 2; Haynes, 1973: 48.

Cornuspira tasmanica (Parr, 1950)

Parr, 1950: 285 (BANZARE Stn 113, off Tasmania), pl. V, figs 28a-b (*Cornuspira*); Vella, 1957: 8, 14; Eade, 1967: 23.

Cornuspira sp. (Cushman, 1919)

Cushman, 1919: 634 (*Cornuspira*); Eade, 1967a: 23 (listed).

Subfamily CORNUSPIROIDINAE

Genus **Cornuspirella** Cushman, 1928

Cornuspirella diffusa (Heron-Allen & Earland, 1913)

Heron-Allen & Earland, 1913b: 272, text-fig. 37, pl. 12 (*Cornuspira*); Cushman, 1955: 192 (type species, generic descr.), 462 (in key), text pl. 15, fig. 5, key pl. 16, fig. 13; Eade, 1967a: 23 (N.Z. refs); Murray, 1971: 7, 52–53 (diag. features etc.), pl. 18, figs 6–8; Thompson, 1975 thesis: 71, pl. 5, fig. 6; Loeblich & Tappan, 1987: 311 (generic descr., etc.), pl. 323, fig. 1.

Genus **Cornuspiroides** Cushman, 1928

Cornuspiroides expansus (Chapman, 1915)

Chapman, 1915: 12, pl. 1, fig. 3 (*Cornuspira carinata* var. *expansus*); Cushman, 1919: 633 (N.Z., as *Cornuspira foliacea* var. *expansus*); Cushman, 1921: 338 (pl. LXXVII, fig. 2 (as *C. foliacea* (Philippi) var. *expansa*); Parr, 1950: 285–286, pl. V, fig. 29; Cushman, 1955: 192 (generic descr.); cf. Andersen, 1961: 43, pl. 10, fig. 3 (as *Cornuspira*); Eade, 1967a: 23.

Cornuspiroides foliaceus (Philippi, 1844)

Philippi, 1844: 147, pl. 24, fig. 26 (*Orbis*); Brady, 1884: 199, pl. XI, figs 5–9 (*Cornuspira*); Cushman, 1921: 387–388 (refs, remarks), pl. 77, fig. 1; Wiesner, 1931: 61 (*Cornuspiroides*); Bermudez, 1949: 113, pl. 6, figs 42 & 49 (*Cornuspiroides*); Barker, 1960: 222, pl. 11, figs 5–6 (*Cornuspiroides*); Andersen, 1961: pl. 10, fig. 4; Eade, 1967a: 23 (N.Z. refs); Albani, 1970: 74, pl. 10, fig. 5 (as *Cyclogyra foliacea*); Lewis, 1979: 24, table 5 (off Southern Hawke's Bay : "Rare, on upper and lower slope."); Loeblich & Tappan, 1987: 311 (generic descr., etc.).

Family FISCHERINIDAE
Subfamily FISCHERININAE

Genus **Fischerina** Terquem, 1873

Fischerina antarctica (Chapman, 1909)

Chapman, 1909: 324, pl. 14, fig. 5 (*Planispirina*); Cushman, 1955: 201 (generic descr.); Eade, 1967a: 23 (listed); Loeblich & Tappan, 1987: 317 (generic descr., etc.).

Fischerina cliarensis (Heron-Allen & Earland, 1913)

Heron-Allen & Earland, 1913a: 35, pl. II, figs 7–8 (*Planispirina*); Heron-Allen & Earland, 1922: 73; Eade, 1967a: 23; Adams *et al.*, 1980 : 9 (type).

Genus **Planispirinella** Wiesner, 1931

Planispirinella exigua (Brady, 1879)

Brady, 1879b: 267 (*Hauerina*); Chapman, 1909: 323 (N.Z., in *Planispirina*); Barker, 1960: X, 24, pl. 12, figs 1–4 (generic placing); Eade, 1967a: 23; Loeblich & Tappan, 1987: 317–318 (generic descr., etc.), pl. 329, figs 13–16.

Subfamily FISCHERINELLINAE
Genus **Fischerinella** Loeblich & Tappan, 1962

Fischerinella helix (Heron-Allen & Earland, 1915)

Heron-Allen & Earland, 1915: 591, pl. XLVI, figs 10–14 (*Fischerina*); Heron-Allen & Earland, 1922: 73; Eade, 1967a: 23; Collins, 1974: 13 (distrib. notes).

Fischerinella pellucida (Millett, 1898)

Millett, 1898c: 611-612, pl. XIII, figs 14–15 (*Fischerina*); Cushman, 1919: 636 (N.Z.), pl. 75, figs 7–8; Eade, 1967a: 23; Adams *et al.*, 1980: 6 (type); Hayward & Grace, 1981: 51 (off Cuvier Is, in *Fischerina*); Loeblich & Tappan, 1987: 318 (generic descr., etc.), pl. 329, figs 10–12.

Subfamily NODOBACULARIELLINAE
Genus **Wiesnerella** Cushman, 1933

Wiesnerella auriculata (Egger, 1893)

Egger, 1893: 245, 246, pl. 3, figs 13–15 (*Planispira*); Heron-Allen & Earland, 1915: 590, pl. 46, figs 3–7; Cushman, 1922: 62, pl. 10, fig. 8; Cushman, 1932: 72, pl. 16, figs 6a-c; Cushman, 1933a: 33, pl. 3, figs 7–9 (*Weisnerella*); Parker, 1954: 501, 502, pl. 5, fig. 13; Cushman, 1955: 198 (type species, generic descr.), 463 (in key), text pl. 15, fig. 21, key pl. 17, figs 9–10; Hornibrook, 1961: 32 (fossil record in N.Z.), pl. 3, fig. 47; Andersen, 1961: 45, pl. 10, figs 6-b; Hayward, 1980: 184 (first N.Z. records, off Cavalli Is), fig. 1; Hayward, 1981a: 90 (Tutukaka Harbour); Poag, 1981: 88, pl. 54, figs 4, 4a-b; Buzas & Severin, 1982: 24, pl. 1, fig. 17 (refs); Loeblich & Tappan, 1987: 319 (generic descr., etc.), pl. 330, figs 11–13.

Family NUBECULARIIDAE
Subfamily NODOBACULARIINAE

Genus **Nodobacularia** Rhumbler, 1895

(?) **Nodobacularia tibia** (Jones & Parker, 1860)

Jones & Parker, 1860: 455, pl. XX, figs 48–51 (*Nubecularia lucifuga* var. *tibia*); Brady, 1884: 135, pl. I, figs 1–4; Cushman, 1921: 415 (remarks, refs etc.), pl. 85, figs 2–3; Heron-Allen & Earland, 1922: 59 (*Nubecularia*); Cushman, 1955: 195 (generic descr., incl. in *Nodophthalimidium* Macfadyen, 1939 in part and *Bullopora* Quenstedt, 1856, in part); Eade, 1967a: 24 (ref.: "*N. tibia* is a Jurassic species and the recent species recorded under this name could well be a new species."); Loeblich & Tappan, 1987: 321 (generic descr., etc.), pl. 331, figs 1–4.

Subfamily NUBECULINELLINAE
Genus Calcituba Roboz, 1884

Calcituba polymorpha Roboz, 1884

Roboz, 1884: 420, figs 1–16; Cushman, 1955: 200 (type species, generic descr.), 462 (in key), text pl. 15, fig. 18, key pl. 17, fig. 21; Hedley *et al.*, 1967: 25, pl. 7; Eade, 1967a: 23; Colom, 1974: 175–176, figs 50h-i; Boltovskoy & Wright, 1976: 215, 231, 247; Hayward, 1982b 63 (off Little Barrier Is).

Genus **Cornuspiramia** Cushman, 1928

Cornuspiramia cf. antillarum (Cushman, 1928) Eade, 1968

Eade, 1968 *in* Gordon & Ballantine, 1977: 95 (listed from Leigh region), cf. *C. antillarum* (Cushman, 1922): 58 (*Nubecularia*), text-figs 7-8, Cushman, 1928: 4 (*Cornuspiramia*); Cushman, 1929: 77, 87–88; Cushman, 1933: 158; Cushman, 1955: 192 (type species, generic descr.), 462 (in key), text pl. 15, fig. 41, key pl. 16, figs 14–15).

Subfamily NUBECULARIINAE
Genus **Nubecularia** Defrance, 1825

Nubecularia decorata Heron-Allen & Earland, 1915

Heron-Allen & Earland, 1915: 549, pl. XL, figs 6–7 (*N. lucifuga* Defrance var. *decorata*); Heron-Allen & Earland, 1922: 60; Eade, 1967a: 23.

Nubecularia lucifuga Defrance, 1825

Defrance, 1825: 210, Atlas Zoophyt., pl. XLIV, fig. 3; Brady, 1884: 134, pl. I, figs 9–16; Heron-Allen & Earland, 1916b: 34, pl. V, figs 1–2; Cushman, 1955: 199 (type species, generic descr.), 462 (in key), text pl. 15, fig. 15, key pl. 17, fig. 13; Eade, 1967a: 23 (N.Z. refs); Colom, 1974: 174–175, figs 47a-e, 48a-f; Collins, 1974: 13 (Australia); Boltovskoy & Wright, 1976: 24, 30, 256.

Nubecularia tubulosa Heron-Allen & Earland, 1915

Heron-Allen & Earland, 1915: 548, pl. 40, figs 1–5; Heron-Allen & Earland, 1922: 60; Eade, 1967a: 23.

Family OPHTHALMIDIIDAE
Genus **Cornuloculina** Burbach, 1886

Cornuloculina aff. inconstans (Brady, 1879). Kusttanowich, 1965

Kustanowich, 1965: 52 (as *Hauerinella* cf. *inconstans* (Brady, 1879: 268 (*Hauerina*)); Eade, 1967a: 23 (*Cornuloculina*).

Genus **Edentostomina** Collins, 1958

Edentostomina cultrata (Brady, 1881)

Brady, 1881: 45 (*Miliolina*); Brady, 1884: 161, pl. V, figs 1–2; Hulme, 1964: 324 (*Quinqueloculina*) (refs); Eade, 1967a: 24; Haake, 1975: 19, pl. 1, figs 5–6 (in *Edentostomina* Collins, 1958); Hayward, 1981a: 89 (Tutukaka Harbour, as *Quinqueloculina*); Buzas & Severin, 1982: 23–24 (refs, as *Edentostomina*), pl. 1, figs 15–16.

Genus **Ophthalmidium** Kübler & Zwingli, 1870

Ophthalmidium margaritiferum Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 72–73, pl. I, figs 9–12; Parr, 1950: 286 (remarks, refs); Cushman, 1955: 196 (generic descr.); Eade, 1967a: 23 (listed).

Superfamily MILIOLACEA
Family SPIROLOCULINIDAE

Genus **Planispirinoides** Parr, 1950

Planispirinoides bucculentus (Brady, 1884)

Brady, 1884: 170–171, pl. CXIV, fig. 3 (*Miliolina*); Wiesner, 1931: 107, pl. XV, fig. 178 (as *Miliolinella subrotunda* (Montagu) var. *trigonina* (Wiesner)); Parr, 1950: 287–288, text-figs 1–5, pl. VI, figs 1–6 (*Planispirinoides*); Eade, 1967a: 24 (N.Z. refs); Collins, 1974: 15 (Australian records); Loeblich & Tappan, 1987: 331 (generic descr.), pl. 340, figs 6–18.

Planispirinoides bucculentus var. **placentiformis** (Brady, 1884)

Brady, 1884: 171, pl. IV, figs 1–2 (*Miliolina*); Chapman, 1909: 324 (*Planispirina*); Eade, 1967a: 24.

Genus **Spiroloculina** d'Orbigny, 1826

Spiroloculina acutimargo Brady, 1884

Brady, 1884: 154, pl. X, figs 12–13; Heron-Allen & Earland, 1913: 24, pl. I, fig. 8; Barker, 1960: 20, pl. X, fig. 13 (in *Spirophthalmidium*, generic placing of Brady's material etc.); Lewis, 1979: 24, table 5 (off Southern Hawkes Bay: generic status etc. "Rare, at several stations on inner shelf and upper slope.").

Spiroloculina angulata Cushman, 1917

Cushman, 1917: 36, pl. 7, figs 5a-b (as *S. grata* Terquem var. *angulata*); Brady, 1884: 155, pl. X, figs 16–17, 22–23 (as *S. grata*, not of Terquem); Cushman, 1921: 408, pl. 81, figs 5a-b; Cushman, 1955: 178–179 (generic descr.); Hayward, 1980: 183–184 (first NZ records), fig. 2; Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 61, 63 (off Little Barrier Is).

Spiroloculina circularis Chapman, 1915

Chapman, 1915: 71, pl. 1, fig. 1 (*S. dorsata* var.

circularis); Cushman & Todd, 1944: 49–50, pl. 7, figs 15–16; Eade, 1967a: 23.

Spiroloculina communis Cushman & Todd, 1944

Cushman & Todd, 1944: 63–64 (descr., distrib., refs & syn.), pl. 9, figs 4–5, 7–8; Brady, 1884: 151, pl. IX, figs 5–6 (as *S. excavata*, not of d'Orbigny), 151, pl. X, figs 3–4 (as *S. impressa*, not of Terquem); Galhano, 1963: 34 (refs), pl. III, fig. 14; Hedley *et al.*, 1965: 13, pl. 2, fig. 2 (inc. *S. grateloupi* of Cushman, 1917 &c). and *S. excavata* of Heron-Allen & Earland, 1922); Eade, 1967a: 23 (N.Z. refs); Albani, 1968a: 15, fig. 29; Resig, 1969: pl. 1, fig. 15; Collins, 1974: 14 (Australian records); Phillips, 1977: pl. 2, fig. 9; Albani, 1979: 17 (features), fig. 14.4; Chave, 1987: 56, pl. 2, fig. 2.

Spiroloculina depressa d'Orbigny, 1826

d'Orbigny, 1826: 298, Modèles No. 92; Brady, 1884: 150, pl. IX, figs 15–17 (as *S. limbata*, not of d'Orbigny); Cushman, 1917: 29, pl. 3, figs 6–10; Cushman, 1921: 394, pl. 81, fig. 2, pl. 100, figs 4–5; Cushman & Todd, 1944: 28–30 (descr., distrib., refs & syn.), pl. 1, figs 1 & 6, pl. 5, figs 1–9; Cushman, 1955: 178–179 (type species, generic descr.), 461 (in key), text pl. 14, fig. 10, key pl. 14, figs 10–11; Sherborn, 1955: 416-417 (refs & syn.); Bandy, 1956: 197, pl. 29, fig. 2; Galhano, 1963: 35 (refs), pl. III, fig. 15; Hulme, 1964: 326 (ref.); Eade, 1967a: 23; Kameswara Rao, 1969: 59–591 (descr., distrib., refs), pl. II, fig. 16; Schnitker, 1971: 169–215, pl. 2, fig. 11; Haynes, 1973: 78–79 (diag., descr., remarks, distrib., refs), pl. 9, figs 6–7; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 2, fig. 21; Colom, 1974: 208, figs 62a-b; Boltovskoy & Wright, 1976: 252; Boltovskoy *et al.*, 1980: 50 (descr., etc.), pl. 31, figs 19–20; Haake, 1980 : 8, pl. 2, fig. 1; Buzas & Severin, 1982: 24, pl. 2, figs 1–2.

Spiroloculina disparilis Terquem, 1878

Terquem, 1878: 55, pl. 5 (10), fig. 12; Cushman & Todd, 1944: 35–36 (descr., distrib., refs & syn.), pl. 5, figs 22–31; Eade, 1967a: 23 (N.Z. refs, notes on syn.); Collins, 1974: 14 (refs, incl. Tasmanian records *S. affixa* Terquem of Parr, 1950); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is).

Spiroloculina elevata Wiesner, 1923

Wiesner, 1923: 36; Brady, 1884: 154, pl. 10, figs 12–15 (as *S. acutimargo*); Barker, 1960: 20, pl. X, fig. 12 (*S. elevata*); Thompson, 1975 thesis: 72, pl. 5, figs 7–8 (off northeastern New Zealand); cf. Lewis, 1979: 24 (comment on Wiesner's referring of Brady's (1884: pl. X, fig. 12) figure of *S. acutimargo* to *S. elevata* etc.).

Spiroloculina excavata d'Orbigny, 1846

d'Orbigny, 1846: 271, pl. 16, figs 19–21; Mestayer, 1916: 128; Cushman & Todd, 1944: 23–24 (descr., distrib., refs & syn.), pl. 4, figs 12–16; Galhano, 1963: 32 (refs), pl. III, fig. 10; Eade, 1967a: 23; Murray, 1971: 4, 5, 54–55 (diag. features etc.), pl. 19, figs 1–3; Colom, 1974: 208–209, figs 62c-d, h-i; Murray, 1979: 29 (descr.), figs 7D-E.

Spiroloculina foveolata Egger, 1893

Egger, 1893: 224, pl. 1, figs 33–34; Cushman, 1919: 635 (as *S. antillea* var. *reticulosa*); Cushman & Todd, 1944: 48 (descr., distrib., refs & syn.), pl. 7, figs 7–12; Eade, 1967a: 23.

Spiroloculina henbesti Petri, 1955

Petri *in* Thalmann, 1955: 82 (for the Recent species attributed to *S. planulata* (Lamarck, 1804)); Heron-Allen & Earland, 1922: 63 (N.Z. as *S. planulata*); cf. Cushman & Todd, 1944: 29, 71, 76 (= *Quinqueloculina*); Eade, 1967a: 24; Hayward, 1981a: 90 (Tutukaka Harbour).

Spiroloculina nitida d'Orbigny, 1826

d'Orbigny, 1826: 298, Modèles No. 4; Heron-Allen & Earland, 1922: 63 (N.Z.); Cushman & Todd, 1944: 40 (remarks, refs etc.), pl. 1, figs 3 & 18, pl. 6, fig. 15; Eade, 1967a: 24; Colom, 1974: 209, figs 62e-g.

Spiroloculina tenuiseptata Brady, 1884

Brady, 1884: 153–154, pl. X, figs 5–6; Mestayer, 1916: 128 (N.Z.); Cushman, 1921: 401–402 (refs etc.); Cushman & Todd, 1944: 47–48 (descr., distrib., refs & syn.), pl. 7, figs 3–6; Eade, 1967a: 24.

Spiroloculina sp. Hayward, 1979

Hayward, 1979b: 185 (*Zostera* pool community).

Family HAUERINIDAE
Subfamily SIPHONAPERTINAE

Genus **Siphonaperta** Vella, 1957

Siphonaperta crassa Vella, 1957

Vella, 1957: 8, 14, 19, pl. 4, figs 62, 64–66; Eade, 1967a: 27 (listed); Lewis, 1979: 26, table 5 (off Southern Hawkes Bay : "Common only on Madden Banks"); Hayward, 1981a: 90 (Tutukaka Harbour).

Siphonaperta macbeathi Vella, 1957

Vella, 1957: 19 (Lower Pleistocene, S.E. Wairara-

pa), pl. 4, figs 60, 61, 63; Lewis, 1979: 26, table 5 (off Southern Hawkes Bay: "Smaller than most fossil specimens ... occurs where sediments are coarse on inner shelf and on banks."); Hayward, 1982b: 63 (off Little Barrier Is).

"Siphonaperta" n.sp. Hayward, 1982
Hayward, 1982b: 63 (off Little Barrier Is).

Subfamily HAUERININAE
Genus Biloculinella Wiesner, 1931

Biloculinella depressa (d'Orbigny, 1826)
d'Orbigny, 1826: 298, Modèles No. 7 (*Biloculina*); Brady, 1884: 145, pl. II, figs. 12, 16-17, figs 1–2 (*Biloculina*); Cushman, 1921: 469–470 (remarks etc.), pl. 96, figs 2a-b; Cushman, 1955: 186 (generic descr.); Barker, 1960: 4, 6, pl. 2 (II), figs 12, 16, 17, pl. 3, figs 1–2 (*Pyrgo*); Loeblich & Tappan, 1987: 337 (generic descr., etc.).

Biloculinella microformis Saidova, 1975
Saidova, 1975 : 160, pl. XLV, fig. 5, pl. CII, fig. 7 ("Ob" Stn 354, 266 m).

Genus **Hauerina** d'Orbigny, 1839

Hauerina fragilissima (Brady 1884)
Brady, 1884: 149–150, pl. IX, figs 12–14 (*Spiroloculina fragilissima*), 190, pl. XI, figs 12–13 (as *Hauerina compressa* d'Orbigny); Cushman, 1919: 638 (N.Z.); Cushman, 1932: 42–43 (descr., refs), pl. 10, fig. 9 (*Hauerina*); Cushman, 1955: 183 (generic descr.); Eade, 1967a: 28; Kameswara Rao, 1969: 594 (descr., distrib., refs), pl. III, fig. 26; Ponder, 1975: 14–19 (diag., descr., distrib., refs & syn.), figs 28–47; Loeblich & Tappan, 1987: 334 (generic descr., etc.).

Hauerina pacifica Cushman, 1917
Cushman, 1917: 64, pl. XXI, figs 2a-c; Cushman, 1932: 44 (descr.), pl. 10, figs 10-11; Resig, 1969: pl. 1, fig. 8; Ponder, 1975: 19–24 (diag., descr., refs & syn.), figs 51–65; Phillips, 1977: pl. 4, fig. 3; Hayward, 1982b: 57 (first N.Z. record, off Little Barrier Is), 61, 63, fig. 5a; Chave, 1989: 57, pl. 3, fig. 2.

Genus **Massilina** Schlumberger, 1893

Massilina arenaria (Brady, 1884)
Brady, 1884: 153, pl. VIII, fig. 12 (*Spiroloculina*); Cushman, 1921: 446–447 (remarks etc.), pl. 94, figs 3a-b; Heron-Allen & Earland, 1922: 64; Eade, 1967a: 25.

Massilina asperula (Karrer, 1868)
Karrer, 1868: 136, pl. 1, fig. 10 (*Spiroloculina*); Brady, 1884: 152, pl. VIII, figs 13–14 (11?); Chapman, 1909: 318 (N.Z.); Cushman, 1921: 447–448 (remarks etc.); Eade, 1967a: 25.

Massilina brodiei Hedley, Hurdle & Burdett, 1967
Hedley *et al.*, 1967: 13, 14, 27–28, text-figs 17–19, pl. 8, figs 1 A-C; Eade, 1967a: 25 (listed); Hicks, 1971: 48, 54 (ecol. at Island Bay); Dawson, 1979: 21 (type data and depositories); Hayward, 1979b: 185 (*Zostera* pool community); Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Rare, on inner shelf only.").

Massilina milletti (Wiesner, 1912)
Wiesner, 1912: 207 (*Spiroloculina*); Hulme, 1964: 325; Eade, 1967a: 25.

Massilina secans (d'Orbigny, 1826)
d'Orbigny, 1826: 303, No. 43, Modèles 96 (*Quinqueloculina*); Haeusler, 1887: 199 (*Miliolina*); Cushman, 1955: 178 (type species, generic descr.), 461 (in key), text pl. 14, fig. 9, key pl. 14, figs 7–9; Eade, 1967a: 25; Murray, 1971: 4, 5, 66-67 (diag. features etc.), pl. 25, figs 1–6; Haynes, 1973: 53–54 (diag., descr., distrib., refs etc.), pl. 5, figs 3–4, pl. 8, fig. 6, pl. 32, fig. 4; Colom, 1974: 206, figs 58a-c; Boltovskoy & Wright, 1976: 20, 102, 103, 251; Murray, 1979: 36 (descr.), figs 10A-C; Boltovskoy *et al.*, 1980: 38 (descr., etc.), pl. 21, figs 1–4; Loeblich & Tappan, 1987: 335 (generic descr., etc.), pl. 344, figs 1–7.

Genus **Quinqueloculina** d'Orbigny, 1826

Quinqueloculina agglutinans d'Orbigny, 1839
d'Orbigny, 1839a (*in* de la Sagra): 195, pl. XII, figs 11–13; Cushman, 1917: 42, pl. 9, figs 1–9; Cushman, 1921: 441, pl. 91, figs 1-c; Cushman, 1929: 22, pl. 1, figs 1-c; Cushman & Valentine, 1930: 9–10, pl. 1, figs 7a-c; Cole, 1931: 19, pl. 1, fig. 12; Galhano, 1963: 23 (refs), pl. II, fig. 4; Eade, 1967a: 27 (N.Z. refs, in *Siphonaperta* Vella, 1957); Thompson, 1975 thesis: 72, pl. 6, figs 1–3 (as *Q. anguina* Terquem var. *wiesneri* Terquem, 1878, see also Parr, 1950: 200, pl. VI, figs 9–10); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.), fig. 3l; Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Buzas & Severin, 1982: 24 (refs), pl. 2, figs 3–6.

Quinqueloculina cf. **akneriana** d'Orbigny, 1846. Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait oyster beds, as *Q.* cf. *akneriana* d'Orbigny, 1846: 29, pl. 18, figs 16–21); Eade 1967a: 24; cf. also Buzas & Severin, 1982: 24, pl. 2, figs 7–8.

Quinqueloculina angulata (Williamson, 1858)

Williamson, 1858: 88, pl. 7, fig. 196 (*Miliolina bicornis* var. *angulata*); Chapman, 1909: 321, pl. 13, fig. 5 (*Miliolina*); Eade, 1967a: 24; Boltovskoy & Wright, 1976: 144; Boltovskoy *et al.*, 1980: 45 (descr., etc.), pl. 26, figs 14–17.

Quinqueloculina cf. **ariminensis** d'Orbigny, 1902. Hulme, 1964

Hulme, 1964: 325 (Manukau Harbour, as *Q.* cf. *ariminensis* d'Orbigny *in* Fornasini, 1902: 22, pl. 15 (= *Q. ariminensis* d'Orbigny, 1826: 301, *nomen nudum*); Eade 1967a: 24; Murray, 1979: 32 (descr. as *bicornis* var. *angulata* (Williamson)), figs 8 A-C; Hayward, 1981a: 81, 89 (Tutukaka Harbour, as *Q. ariminensis*), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6K; Hayward, 1982b: 653 (off Little Barrier Is).

Quinqueloculina auberiana d'Orbigny, 1839

d'Orbigny 1839a (*in* de la Sagra): 193, 215, pl. XII, figs 1–3; Eade, 1967a: 24 (N.Z. refs); Haynes, 1973: 65–66 (varieties); Thompson, 1975 thesis: 72; Boltovskoy & Wright 1976: 61; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Todd & Low, 1981: 21 (in key), 3 figs; Hayward, 1982b: 63 (off Little Barrier Is).

Quinqueloculina bicornis (Walker & Jacob, 1798)

Walker & Jacob *in* Kanmacher [Adam] 1798: 633, pl. 14, fig. 2 (*Serpula*); Galhano, 1963: 25–26 (refs), pl. II, fig. 8; Eade, 1967a: 24 (N.Z. refs); Murray, 1971: 4, 7, 56–57 (diag. features etc.), pl. 20, figs 1–5; Haynes, 1973: 67–68 (diag., descr., neotype desig., distrib., refs); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Todd & Low, 1981: 21 (in key), 3 figs.

Quinqueloculina bicostata d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 195, 216, pl. XII, figs 8–10; Cushman, 1919: 637 (N..Z.); Phleger & Parker, 1951: 7, pl. 3, figs 15a-b; Andersen, 1961: pl. 4, figs 4a-c; Eade, 1967a: 24; Schmitter, 1971: pl. 2, fig. 12; Poag, 1981: 77, pl. 63, fig. 1, pl. 64, figs 1a-b.

Quinqueloculina bicostatensis Saidova, 1975

Saidova, 1975: 144–145, pl. XL, fig. 2, pl. CI, fig. 2 (distrib. incl. New Zealand).

Quinqueloculina bicostoides Vella, 1957

Vella, 1957: 9, 14, 25–26, pl. 5, figs 89–92 (in new subgenus *Lachlanella*); Eade, 1967a: 24 (listed); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward & Grace, 1981: 47, 52 (off Cuvier Is).

Quinqueloculina bosciana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 191, 215, pl. XI, figs 22–24; Heron-Allen & Earland, 1922: 66 (*Miliolina*); Eade, 1967: 24; Schmitter 1971: pl. 2, fig. 13; Chave, 1987: 58, pl. 4, fig. 2.

Quinqueloculina bradyana (Cushman, 1917)

Cushman, 1917: 52, pl. XVIII, fig. 2 (for *Q. undosa* of Brady, 1884: 176, pl. VI, figs 6–8 (as *Miliolina*) not of Karrer); Cushman, 1919: 637 (N.Z.); Cushman, 1921: 432; Parr, 1950: 290 (remarks), pl. VI, fig. 11; Eade, 1967a: 24; Collins, 1974: 15 (refs); Quilty, 1974: 50, pl. 2, figs 45–46; Chave, 1987: 58, pl. 4, fig. 3.

Quinqueloculina cf. **bradyana** Cushman, 1917, Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 2 (Foveaux Strait oyster beds, as *Q.* cf. *bradyana* Cushman, 1917, *q.v.*); Eade, 1967a: 24 (listed).

Quinqueloculina candeiana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 199–200, pl. XII, figs 24–26 [listed as figs 25–26 on p. 216]; Heron-Allen & Earland, 1922: 68 (*Miliolina*); Cushman, 1929: 27, pl. III, figs 1a-c (*Quinqueloculina*); Cushman & Parker, 1931: 4, pl. I, figs 10a-c; Phleger & Parker, 1951: 7, pl. 4, figs 1a-b, 2a-b (as *Q. lamarckiana* d'Orbigny); Carvalho & Chermont, 1952: 80–81 (depth range etc., cf. with *Q. lamarckiana*, geogr. distrib.), pl. I, figs 1a-c; Eade, 1967a: 24; Colom, 1974: 188, fig. 59m; Boltovskoy & Wright, 1976: 33; Le Calvez, 1977: 68, pl. 11, figs 1-3; Poag, 1981: 77, pl. 55, fig. 4, pl. 56, figs. 4a-b.

Quinqueloculina colleenae Vella, 1957

Vella, 1957: 9, 13, 25, pl. 5, figs 86, 93 (in new subgenus *Lachlanella*); Eade, 1967a: 24 (N.Z. refs, notes on syn.); Hayward, 1979b: 185 (*Zostera* pool community); Lewis, 1979: 24, table 5 (off Southern Hawkes Bay: "... possibly a variant of *Q. cooki* ... Only on Madden Banks, where common"); Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 63 (off Little Barrier Is); Hayward & Grace, 1981: 52 (off Cuvier Is).

Quinqueloculina cooki Vella, 1957

Vella, 1957: 9, 13, 25, pl. 5, figs 82-83, 87 (in new subgenus *Lachlanella*); Eade, 1967a: 24 (listed); Thompson, 1975 thesis: 72; Gordon & Ballantine, 1977: 95 (listed from Leigh region); Lewis, 1979: 24, table 5 (off Southern Hawkes Bay: "Rare, on inner shelf only").

Quinqueloculina delicatula Vella, 1957

Vella, 1957: 9, 13, 26, pl. 4, figs 77–79; Eade, 1967a: 24 (N.Z. refs); Luczkowksa, 1972: 365 (referred to new genus *Cycloforina*).

Quinqueloculina disparilis d'Orbigny, 1826

d'Orbigny, 1826: 302, Modèles No. 21; Cushman, 1919: 637 (N.Z.); Cushman, 1921: 424–425 (remarks etc.), pl. 86, figs 1a-c; Eade, 1967a: 24; Luczkowska, 1972: 365 (referred to new genus *Cycloforina*); Colom, 1974: 200, figs 55a-g (in *Quinqueloculina* s. str.); Albani, 1979: 18 (features), fig. 17.2.

Quinqueloculina aff. **disparilis** d'Orbigny, 1826. Hornibrook 1951

Hornibrook *in* Knox, 1951: 43 (off Banks Peninsula, as *Q.* aff. *disparilis* d'Orbigny, 1826, *q.v.*); Eade, 1967a: 24 (listed).

Quinqueloculina ferussacii d'Orbigny, 1826

d'Orbigny, 1826: 301, Modèles No. 18; Cushman, 1921: 429 (remarks, refs etc.), pl. 90, figs 2a-c; Eade, 1967a: 24 (N.Z. refs).

Quinqueloculina cf. **flexuosa** d'Orbigny, 1839. Hulme, 1964

Hulme, 1964: 324 (Manukau Harbour, as *Q.* cf. *flexuosa* d'Orbigny, 1839c: 73, 79, pl. IV, figs 4-6); Eade, 1967a: 24; see also Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns and ecol. of *Q. flexuosa*), pl. 1, fig. 20.

Quinqueloculina fusca Brady, 1870

Brady *in* Brady *et al.*, 1870: 286, pl. XI, figs 2a-c, 3; Cushman, 1921: 442–443 (refs), pl. 84, figs 6a-c; Heron-Allen & Earland, 1922: 69 (N.Z. as *Miliolina*); Parker *et al.*, 1953: 10, pl. 1, figs 40–41; Eade, 1967a: 25; Phleger 1970: 522 *et seq.*, 529, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9); Haynes, 1973: 54–56 (diag., descr., distrib., refs & syn; in *Miliammina*), pl. 2, figs 9–10, pl. 31, figs 6–7.

Quinqueloculina gualtieriana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 186–187, 214, pl. XI, figs 1–3; Cushman, 1932: 23 (descr., etc.), pl. 6, figs 1a-c; Hulme, 1964: 324; Eade, 1967a: 25 (listed); Buzas & Severin, 1982: 25, pl. 3, figs 1–2.

Quinqueloculina incisa Vella, 1957

Vella, 1957: 9, 13, 24, pl. 6, figs 118–121; Kennett, 1966: 34 (in N.Z. Upper Miocene, remarks etc.); Eade, 1967a: 25 (N.Z. refs); Luczkowska, 1972: 365 (referred to new genus *Cycloforina*); Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Moderately common inner shelf ...").

Quinqueloculina kapitiensis Vella, 1957

Vella, 1957: 9, 13, 26–27, pl. 4, figs 74, 80–81; Kennett, 1966: 34 (in N.Z. Upper Miocene, remarks etc.); Kustanowich, 1965: 52; Eade, 1967a: 25; Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Moderately common on inner and outer shelf").

Quinqueloculina laevigata d'Orbigny, 1826

d'Orbigny, 1826: 301; Cushman, 1929: 30, pl. IV, figs 3a-c; Cushman & Parker, 1931: 5, pl. I, figs 5-6; Galhano, 1963: 31 (refs), pl. III, fig. 7; Carvalho & Chermont, 1952: 82 (distrib.), pl. I, figs 3a-c; Hulme, 1964: 324; Eade, 1967a: 25; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 2, figs 5-6; Colom, 1974: 187, figs 52a-j (in subgenus *Adelosina*); Quilty, 1974: 52, pl. 2, fig. 51.

Quinqueloculina lamarckiana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 189–190, 214, pl. XI, figs 14–15; Brady, 1884: 162, pl. V, figs 12a-c (a *Q. cuvieriana*); Cushman, 1921: 418–420, pl. 87, figs 2, 3 a-c; Cushman, 1929: 26, pl. II, figs 6a-c; Cushman & Parker, 1931: 4, pl. I, figs 7a-c; Cushman, 1932: 24–25 (descr., refs & syn.), pl. 6, figs 2a-c; Parr, 1945: 196 (remarks); Phleger & Parker, 1951: 7, pl. 4, figs 1a-b; Carvalho & Chermont, 1952: 81–82 (distrib., etc.), pl. I, figs 2a-c; Andersen, 1961: pl. 5, figs 3a-c, 4a-c; Galhano, 1963: 27 (refs), pl. II, fig. 12; Eade, 1967a: 25 (N.Z. refs, note on syn.); Albani, 1968a: 16, fig. 31; Albani, 1968b: 98 (refs); Kameswara Rao, 1969: 588–589 (descr., distrib., refs), pl. I, figs 10a-b; Haake, 1971: 188 (ultrastructure of surface), pl. 1, fig. 1; Schnitker, 1971: pl. 2, fig. 16; Sellier de Civrieux, 1973: 84, pl. 1, figs 2–3; Colom, 1974: 200, figs 54g-i (in *Quinqueloculina* s. str.); Collins, 1974: 16 (Australian records); Boltovskoy & Wright, 1976: 103, 141, 144, 408, 409; Albani, 1979: 18 (features), fig. 17.4; Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Moderately common on inner and outer shelf."); Boltovskoy *et al.*, 1980: 46 (descr., etc.), pl. 28, figs 9–12; Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 131 &c. (Bay of Islands), fig. 3h; Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is); Chave, 1987: 58, pl. 4, fig. 7.

Quinqueloculina cf. **lamarckiana** d'Orbigny, 1839. Vella, 1957

Vella, 1957: 8, 13, 23 (Cook Strait, as *Q.* cf. *lamarckiana* d'Orbigny, 1839a, *q.v.*); Eade, 1967a: 25 (listed).

Quinqueloculina aff. **lata** Terquem, 1876. Vella, 1957

Vella, 1957: 8, 24, pl. 6, figs 112–114 (Cook Strait, as *Q.* aff. *lata* Terquem, 1876: 82, pl. 11, figs. 8a-c, see also Murray, 1979: 34 (descr.), figs 9A–C); Eade, 1967a: 25; cf. Murray, 1971: 4, 7, 62–63, pl. 23, figs 1–3 (for *Q. lata*); Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Common at some stations on inner shelf."); Hayward, 1981a: 89 (Tutukaka Harbour, as *Q. lata*); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); cf. Todd & Low, 1981: 22 (in key), 3 figs; Hayward, 1982b: 63 (off Little Barrier Is).

Quinqueloculina miles Vella, 1957

Vella, 1957: 9, 27, pl. 6, figs 109–111; Eade, 1967a: 25 (listed); Luczkowska, 1972: 365 (referred to new genus *Cycloforina*).

Quinqueloculina neosigmoilinoides Kennett, 1966

Kennett, 1966c: 71 (new name for *Q. sigmoilinoides* Vella, 1957: 24, pl. 6, figs 115–117, and in Hulme, 1964: 323, preoccupied by *Q. sigmoilinoides* Gianotti, 1953, middle Miocene of Italy); Eade 1967a: 25; Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Common on shelf, single specimens at several stations on slope.").

Quinqueloculina notalnella Saidova, 1975

Saidova, 1975: 146-147, pl. XL, figs 11–12 ("Ob" Stn 354, 266 m).

Quinqueloculina parvaggluta Vella, 1957

Vella, 1957: 9, 17, pl. 4, figs 71–73 (*Quinqueloculina*); Eade, 1967a: 27 (listed under *Siphonaperta*); Lewis, 1979: 26, table 5 (off Southern Hawkes Bay, in *Siphonaperta* : "Rare, on inner shelf only."); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is).

Quinqueloculina patagonica d'Orbigny, 1839

d'Orbigny, 1839c: 74, pl. 4, figs 14–16; Wiesner, 1931: 105, pl. XV, fig. 176 (*Miliolina*); Parr, 1950: 289 (*Quinqueloculina*, remarks); Hedley *et al.*, 1967: pl. 8, fig. 6; Eade, 1967a: 25; Boltovskoy & Wright, 1976: 144; Hayward, 1979b: 185 (*Zostera* pool community); Boltovskoy *et al.*, 1980: 46-47 (descr., etc.), pl. 28, figs 18–21; Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is).

Quinqueloculina poeyana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 191–192, 216, pl. XI, figs 25–27; Cushman, 1929: 31, pl. V, fig. 2; Galhano, 1963: 30 (refs), pl. III, fig. 1; Hulme, 1964: 325; Eade, 1967a: 25; Resig, 1969: pl. 2, fig. 6; Schnitker, 1971: pl. 2, fig. 17; Sellier de Civrieux, 1973: 82, 84, pl. 1, fig. 1; Colom, 1974: 200–201, figs 55h-j; Collins, 1974: 15–16 (refs etc.); Boltovskoy & Wright, 1976: 34; Phillips, 1977: 12–52, pl. 3, fig. 1; Albani, 1979: 19 (features), fig. 17.6; Buzas & Severin, 1982: 26, pl. 3, figs 5–6 (refs); Chave, 1987: 59, pl. 4, fig. 9.

Quinqueloculina polygona d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 198–199, 216, pl. XII, figs 21–23; Cushman, 1921: 431–432 (remarks etc.), pl. 90, figs 3a-c; Galhano, 1963: 27–28 (refs), pl. II, fig. 11; Eade, 1967a: 25 (N.Z. refs); Schnitker, 1971: pl. 2, fig. 18; Phillips, 1977: 12–52, pl. 3, fig. 8; Boltovskoy *et al.*, 1980: 47 (descr., etc.), pl. 29, figs 1–6; Chave, 1987: 59, pl. 4, fig. 10.

Quinqueloculina pygmaea Reuss, 1850

Reuss, 1850: 384, pl. 50, fig. 3; Heron-Allen & Earland, 1922: 67 (N.Z. as *Miliolina*); Galhano, 1963: 30 (refs), pl. III, fig. 6; Eade, 1967a: 25.

Quinqueloculina rebeccae Vella, 1957

Vella, 1957: 9, 14, 25, pl. 5, figs 84–85, 88 (in new subgenus *Lachlanella*); Eade, 1967a: 25 (listed); Hayward, 1979b: 185 (*Zostera* pool community); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward & Grace, 1981: 52 (off Cuvier Is).

Quinqueloculina sclerotica Karrer, 1868

Karrer, 1868: 152, pl. 3, fig. 5; Cushman, 1921 : 441–442 (remarks, refs etc.); Flügel, 1961: 82 (type); Eade, 1967a: 25 (N.Z. refs).

Quinqueloculina seminula (Linnaeus, 1758)

Linnaeus, 1758: 786 (*Serpula*); Linnaeus 1767: 1264, No. 791; Brady, 1884: 157, pl. V, figs 6a-c; Cushman, 1921: 416–417 (remarks, refs etc.), pl. 88, figs 4a-c; Cushman, 1929: 24, pl. II, figs 1–2; Cushman, 1955: 177 (type species, generic descr.), 460 (in key), text pl. 14, fig 2, key pl. 14, figs 3–5; Galhano, 1963: 25 (refs), pl. II, fig. 5; Hedley *et al.*, 1965: 13, pl. 2, fig. 8 (*Quinqueloculina*) (incl. *Q. triangularis* of Vella, 1957: 8, 23, pl. 6, figs 100-101, 108, not of d'Orbigny, 1846; see also Hulme, 1964: 324); Kennett, 1966a: 35

(in N.Z. upper Miocene (Kapitean Stage), remarks etc.); Eade, 1967a: 25 (N.Z. refs); Albani, 1968a: 16, fig. 39; Albani, 1968b: 99; Kameswara Rao, 1969: 589 (descr., distrib., refs), pl. II, figs 12 a-b; Murray, 1971: 4, 6, 7, 10, 64–65 (diag. features etc.), pl. 24, figs 1–6; Haynes, 1973: 74–76 (diag., descr., remarks, distrib., refs), text-fig. 18, nos 1–4, pl. 7, figs 14, 19, pl. 8, fig. 3, pl. 32, figs 1–3; Gregory 1973: 194, 197 (N.Z. mangrove swamp ecol.), fig. 3.7, table 2; Sellier de Civrieux, 1973: 84, pl. 1, figs 4–5; Colom, 1974: 202, figs 54d-f (in *Quinqueloculina* s. str.); Collins, 1974: 16 (Australian records, refs.); Quilty, 1974: 52–53 (refs etc.), pl. 2, figs 52–53; Thompson, 1975 thesis: 72–73 (descr., refs & syn.); Boltovskoy & Wright, 1976: 30, 41, 42, 63, 97, 102, 116–118, 142, 144, 148, 214, 227, 251; Albani 1979: 19 (features), fig. 17.8; Hayward, 1979b: 185 &c (*Zostera* pool community, N.Z.), figs 3K & 4; Hayward & Buzas, 1979: 36–37, pl. 3, fig. 34; Murray, 1979: 34 (descr.), figs 9G–I; Boltovskoy *et al.*, 1980: 47 (descr., etc.), pl. 29, figs 7–13; Haake, 1980: 8, pl. 2, fig. 3; Hayward, 1981a: 82, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 &c (Bay of Islands), fig. 3g; Todd & Low, 1981: 22 (in key), 3 figs; Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol., see also Adams, 1979), fig. 5t; Hayward, 1982b: 32, 56, 61, 63, fig. 3c (dominant in Hauraki Gulf nearshore sediments); Buzas & Severin, 1982: 26, pl. 3, figs. 7–8 (refs); Loeblich & Tappan, 1987: 336 (generic descr., etc.), pl. 344, figs 8–13.

Quinqueloculina cf. **seminula** (Linnaeus, 1767) Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait oyster beds, as *Q.* cf. *seminulum* (Linnaeus, 1767), *q.v.*; Eade, 1967a: 25 (listed).

Quinqueloculina suborbicularis d'Orbigny, 1826

d'Orbigny, 1826: 302, Modèles No. 29; Hulme, 1964: 324 (Manukau Harbour, as *Q. suborbicularis* d'Orbigny *in* Fornasini, 1905: 67, pl. 4, figs 3, 3a-b, = *Q. suborbicularis* d'Orbigny, 1826: 302, *nomen nudum*); Eade, 1967a: 25 (N.Z. refs); Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Rare, on inner shelf."); Hayward, 1979b: 185 (*Zostera* pool community); Hayward, 1981a: 81, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6a; Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments).

Quinqueloculina tenagos Parker, 1962

Parker, 1962a: 110; Hedley *et al.*, 1967: 13, 14, 27, pl. 9, figs 1A–C (incl. *Q. castata* of Hulme, 1964: 324, not of d'Orbigny, 1826, (?) not of Cushman & Valentine, 1930); Eade, 1967a: 25; Gregory, 1973: fig. 3.8 (N.Z. mangrove swamp ecol.); Thompson, 1975 thesis: 73; Albani, 1979: 20 (features), fig. 17.11; Hayward, 1979b: 185 (*Zostera* pool community); Hayward, 1981a: 81, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Buzas & Severin, 1982: 26 (refs), pl. 3, figs 11–12.

Quinqueloculina triangularis d'Orbigny, 1846

d'Orbigny, 1846: 288, pl. XVIII, figs 7–9; Vella 1957: 8 (Cook Strait records), 23 (status), pl. 6, figs 100, 101, 108; Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Specimens of this species have frequently been recorded as *Q. seminulum*, which is distinctly more elongate (cf. Loeblich & Tappan 1964, fig. 349, no. 1 ... moderately common on inner shelf and on banks")); Hayward, 1981a: 81, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 5w; Hayward, 1982b: 63 (off Little Barrier Is).

Quinqueloculina vellai Saidova, 1975

Saidova, 1975: 143–144, pl. CI, fig. 1 ("Ob" Stn, 74, 186 m).

Quinqueloculina venusta Karrer, 1868

Karrer, 186 : 147, pl. II, fig. 6; Brady, 1884: 162, pl. V, figs 5–7; Cushman, 1921: 420–421, pl. 91, figs 2a-c; Eade, 1967a: 25 (N.Z. refs); Flügel, 1961: 82 (type); Eade, 1970: 35, table II (present day ecol. of Upper Miocene occurrence).

Quinqueloculina cf. **Q. venusta** Karrer, 1868. Lewis, 1979

Lewis, 1979: 26, table 5 (off Southern Hawkes Bay: "Common at two stations on mid and lower slope").

Quinqueloculina vulgaris d'Orbigny, 1826

d'Orbigny, 1826: 302, Modèles No. 33; Cushman, 1921: 417–418 (remarks, refs), pl. 87, figs 1a-c; Nørvang, 1945: 9, fig. 3; Galhano, 1963: 26–27 (refs), pl. II, fig. 10; Eade, 1967a: 25 (N.Z. refs); Kameswara Rao, 1969: 589 (descr., distrib., refs), pl. I, figs 11a-b; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 2, fig. 1; Colom, 1974: 202, figs 54a-c; Collins, 1974: 17 (Australia); Quilty, 1974: 53, pl. 2, figs 56–57; Boltovskoy & Wright, 1976: 118, 267.

Quinqueloculina wiesneri Parr, 1950

Parr, 1950: 290, pl. VI, figs 9–10 (from BANZARE Stn 113, off Tasmania, as *Q. anguina* var. *wiesneri*); Lewis, 1979 : 25, table 5 (off Southern Hawkes Bay: "Common only on lower slope").

Quinqueloculina sp. Lewis, 1970

Lewis, 1970: frontispiece fig. (from NZOI Stn C488); Dawson, 1979 : 22.

Quinqueloculina sp. Hayward, 1981

Hayward, 1981b: 131 (Bay of Islands).

Subfamily MILIOLINELLINAE

Genus **Cribromiliolinella** Saidova, 1981

Cribromiliolinella subvalvularis (Parr, 1950)

Parr, 1950: 296, pl. VII, figs 4a-c (incl. *Miliolina valvularis* Reuss of Brady, 1884: 161, pl. IV, figs 4–5, not of Reuss, 1851); Eade, 1967a: 27; Saidova, 1981: 31 (northeast New Zealand at 2,200 m); Larsen, 1982: pl. 7, fig. 3; Loeblich & Tappan, 1987: 340 (transf. to *Cribromiliolinella* Saidova, 1981).

Genus **Miliolinella** Wiesner, 1931

Miliolinella australis (Parr, 1932)

Parr, 1932a: 7, pl. 1, fig. 8 (*Quinqueloculina*); Hornibrook *in* Fleming, 1952: 82 (*Miliolinella*); Cushman, 1955: 177 (generic descr.); Eade, 1967a: 27; Loeblich & Tappan, 1987: 340 (generic descr., etc.).

Miliolinella aff. australis (Parr, 1932). (Vella, 1957)

Vella, 1957: 9 (Cook Strait, as *Sigmoilina* aff. *australis* (Parr, 1932), *q.v.*); Eade, 1967a: 27 (listed).

Miliolinella circularis (Bornemann, 1855)

Bornemann, 1855: 349, pl. 19, figs 4a-c (*Triloculina*); Brady, 1884: 169, pl. IV, figs 3a-c, pl. V, figs 13–14; Cushman, 1921: 462–463 (refs etc.), pl. 92, figs 1–2; Cushman, 1929: 58, pl. XIII, fig. 67, pl. XIV, figs 1–2 (*Triloculina*); Cushman & Parker, 1931: 5, pl. I, figs 12a-c; Carvalho & Chermont, 1952: 83–84 (distrib., etc.), pl. I, figs 4a-c; Eade, 1967a: 27 (N.Z. refs); Schnitker, 1971. pl. 3, fig. 12; not of Bock, 1971: 29, pl. 12, fig. 5 = *M. labiosa, q.v.*; Colom, 1974: 206, figs 57t-v; Wantland, 1975: 390, figs 15f-g; Albani, 1979: 22 (descr.), fig. 23.2; Poag, 1981: 72, pl. 59, fig. 3, pl. 60, figs 3a-b; Larsen, 1982: pl. 7, fig. 6.

Miliolinella hauerinoides (Rhumbler, 1936)

Rhumbler, 1936: 206, 217, 226, text-figs 167, 208–212 (*Quinqueloculina subrotundata* var. *hauerinoides*); Eade, 1967a: 25 (notes on syn., N.Z. refs); Murray, 1971: 5, 7–9, 68–69 (diag. features etc.), pl. 26, figs 1–4; Hayward, 1979b: 185 &c (*Zostera* pool community, N.Z.); Murray, 1979: 36 (descr.), figs 10D–E; Todd & Low, 1981: 20 (in key), 3 figs; Loeblich & Tappan, 1987: 340 (transf. from *Pateoris*).

Miliolinella cf. **hauerinoides** (Rhumbler, 1936). Kustanowich, 1965

Kustanowich, 1965: 52 (as *P.* cf. *hauerinoides* (Rhumbler, 1936) *q.v.*; Eade, 1967a: 25 (listed).

Miliolinella labiosa (d'Orbigny, 1839)

d'Orbigny, 1839a (*in* de la Sagra): 178–179, 213, pl. X, figs 12–14 (*Triloculina*); Parr, 1932b: 220, pl. XXII, fig. 44; Eade, 1967a: 27 (N.Z. refs); Albani, 1968a: 19, fig. 41; Albani, 1968b: 101 (descr., distrib.); Bock, 1971: 29, pl. 12, fig. 5 (as *M. circularis* (Bornemann); Collins, 1974: 18 (Australia); Thompson, 1975 thesis: 74 (descr., N.Z.); Albani, 1979: 22 (descr.), fig. 23.3; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.).; Poag, 1981: 72.

Miliolinella labiosa var. **schauinslandi** (Rhumbler, 1906)

Rhumbler, 1906: 41–42, pl. 3, figs 20–21 (*Miliolina schauinslandi*); Hedley *et al.*, 1967: pl. 8, fig. 3; Eade, 1967a: 27; Collins, 1974: 18 ("The wild-growing form [of *M. labiosa*] which has been distinguished as var. *schauinslandi* is common at Barwon Heads [Port Phillip, Victoria] ... Its status appears to be doubtful."); Hayward, 1981a: 89 (Tutukaka Harbour, as *M. l. schauinslandi*); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 51 (off Cavalli Is).

Miliolinella sublineata (Brady, 1884)

Brady, 1884: 169, pl. IV, figs 7a-c; (*Miliolina circularis* var. *sublineata*); Chapman, 1909: 319, pl. 13, fig. 7; Eade, 1967a: 28; Colom, 1974 : 207, fig. 57s (as *M. circularis* var. *sublineata*); Larsen, 1982: pl. 7, fig. 9.

Miliolinella subrotundata (Montagu, 1803)

Montagu, 1803: 521 (*Vermiculum*); Walker & Boys, 1784: pl. I, fig. 4; Brady, 1884: 168, pl. IV, fig. 3, pl. V, figs. 10, 11, 13, 14; Rhumbler, 1906: 44 (Chatham Is), pl. 3, figs 26–28 (note also record of *M. cylindrica* (Fornasini, 1905); Barker, 1960: 8, pl. 4 (IV), fig. 3 (status of Brady's *Miliolina circularis* (Bornemann) etc.), 10, pl. VI, figs. 10–11 (as *Miliolinella (?) australis* (Parr, 1932a: 7 (*Quinqueloculina*)), and to *Sigmoilina* by Parr, 1950: 292, notes on status etc.), figs 13–14 (placing of Brady's material from "Challenger" Stn. 135); Loeblich & Tappan, 1964: fig. 335, no. 1; Eade,

1967a: 28 (N.Z. refs); Murray, 1971: 5, 72–73 (diag. features etc.), pl. 28, figs 5–6; Haynes, 1974 : 56–59 (diag., descr., remarks, detailed distrib., refs & syn.), text-figs 11, (nos 1–4), text-figs 12 (nos 1–11), pl. 5, figs 6, 12–13, pl. 31, figs 8–9; Collins, 1974: 18 (Australia); Quilty, 1974: 60–61, pl. 3, figs 84–85; Boltovskoy & Wright, 1976: 102, 117, 144, 156; Lewis, 1979: 26, table 5 (off Southern Hawkes Bay : "Large specimens are typical of *M. subrotundata*, but small specimens ... are similar to *M. australis* (Parr)."); Murray, 1979: 36 (descr.), figs 10F–H; Boltovskoy *et al.*, 1980: 39 (descr., etc.), pl. 21, figs 11–14; Hayward, 1981a: 81, 89 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 47, 51 (off Cuvier Is); Todd & Low, 1981: 23 (in key), 3 figs; Hayward, 1982a: 27–56 *passim* (off Cuvier Is, ecol.), fig. 5p; Hayward, 1982b: 56, 63, fig. 3g (Hauraki Gulf nearshore sediments); Buzas & Severin, 1982: 27 (refs), pl. 4, figs 5–6; Murray, 1986: 435–445; Chave, 1987: 57, pl. 3, fig. 10; Loeblich & Tappan, 1987: 340 (generic descr., etc.), 344, 345.

Miliolinella vigilax Vella, 1957

Vella, 1957: 13, 21, pl. 7, figs 123–126; Eade, 1967a: 28 (N.Z. refs); Hayward, 1981a: 89 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 5 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is).

Genus **Nevillina** Sidebottom, 1905

Nevillina coronata (Millett, 1898)

Millett, 1898a: 263, pl. 6, figs 6a-c (*Biloculina*); Sidebottam, 1905: 1, figs 1–8 (*Nevillina*); Cushman, 1917: 83–84, pl. 35, figs 2–5; Cushman, 1921: 480, pl. 99, figs 1a-b; Finlay & Marwick, 1940: 129 (noted in N.Z. Recent); Parr, 1945: 199, pl. VIII, figs 8a-b; Cushman, 1955: 187 (genotype, generic descr.), 461 (in key), text pl. 14, fig. 16, key pl. 15, figs 15–16; Hayward, 1981a: 82 (first specific N.Z. record, Tutukaka Harbour), 89, fig. 5a; Loeblich & Tappan, 1987: 340–341 (generic descr., etc.), pl. 349, figs 11–15.

Genus **Pyrgo** Defrance, 1824

Pyrgo anomala (Schlumberger, 1891)

Schlumberger, 1891: 56, text-figs 32–34, pl. 11, figs 84–86, pl. 12, fig. 101 (*Biloculina*); Vella, 1957: 29, pl. 7, figs 135–136; Eade, 1967a: 26 (N.Z. refs); Gibson, 1967: 18 (Tongaporutuan Stage, Taranaki); Hayward & Buzas, 1979: 36, pl. 2, fig. 24; Hayward, 1979b: 185 &c (*Zostera* pool community, N.Z.); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is).

Pyrgo bulloides (d'Orbigny, 1826)

d'Orbigny, 1826: 297, Modèles No. 1, pl. XVI, figs 1–4 (*Biloculina*); Heron-Allen & Earland, 1922: 61; Eade, 1967 : 26.

Pyrgo collaprocera Saidova, 1975

Saidova, 1975: 149, pl. XLII, fig. 2 ("Ob" Stn 358, 1418 m).

Pyrgo comata (Brady, 1881)

Brady, 1881: 45 (*Biloculina*); Brady, 1884: 144, pl. III, figs 9a-b; Barker, 1960: 6, pl. 3 (III), fig. 9; Eade, 1967a: 26 (N.Z. refs); Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Larsen, 1982: pl. 6, fig. 4; Chave, 1987: 57, pl. 3, fig. 5.

Pyrgo denticulata (Brady, 1884)

Brady, 1884: 143, pl. III, figs. 4–5 (*Biloculina ringens* Lamarck var. *denticulata*); Chapman, 1909: 315, pl. 13, fig. 2 (as *Biloculina bradii* var. *denticulata*); Cushman, 1929: 69, pl. XVIII, figs 3–4 (*Pyrgo*); Cushman, 1932: 62–63 (descr., refs & syn.), pl. 14, figs 1–9; Barker, 1960: 6, figs 4–5; Eade, 1967a: 26; Schnitker, 1971: 169–215, pl. 3, fig. 2; Collins, 1974: 17 (Australia); Phillips, 1977: 12–52, pl. 4, fig. 6; Poag & Tresslar, 1981: 52 (refs), pl. 9, figs 1–2; Chave, 1987: 57, pl. 3, fig. 6; Loeblich & Tappan, 1987: pl. 351, figs 14–16.

Pyrgo depressa (d'Orbigny, 1826)

d'Orbigny, 1826: 298, no. 7, Modèles, No. 91; Cushman, 1929: 71, pl. XIX, figs 4–5; Wiesner, 1931: 110, pl. XVII, fig. 196; Vella, 1957: pl. 7, figs 137, 140; Barker, 1960: 6, pl. 3, figs 1–2 ("Challenger" Stn 168, off N.Z.); Galhano, 1963: 40 (refs), pl. IV, fig. 6; Thompson, thesis 1975: 73, pl. 6, figs. 4–5 (descr., N.Z.); Gordon & Ballantine, 1977: 95 (listed from Leigh region after Thompson, 1975 thesis); Hayward & Buzas, 1979: 36, pl. 2, fig. 25; Hayward, 1981b: 131 (Bay of Islands); Hayward & Grace, 1981: 52 (off Cuvier Is); Larsen, 1982: pl. 6, fig. 5.

Pyrgo elongata (d'Orbigny, 1826)

d'Orbigny, 1826: 298, Modèles No. 4 (*Biloculina*); Parker & Jones, 1865: 409, pl. 17, figs 88, 90–91 (*Miliola (Biloculina)*); Galhano, 1963: 39 (refs), pl. IV, fig. 7; Eade, 1967a: 26 (N.Z. refs); Colom, 1974: 204, figs 57n-o; Quilty, 1974: 47, pl. 2, figs 34–35; Boltovskoy *et al.*, 1980: 44 (descr., etc.), pl. 25, figs 16–17; Chave, 1987: 57, pl. 3, fig. 8.

Pyrgo [aff.] **ezo** Asano, 1938. [Vella, 1957]

Vella, 1957: 9, 29, pl. 7, figs 138–139 (Cook Strait, as *P.* aff. *ezo* Asano, 1938: 93, pl. 9, fig. 1); Eade, 1967a: 26 (refs); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward, 1981 : 89 (Tutukaka Harbour); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments).

Pyrgo fornasinii Chapman & Parr, 1935

Chapman & Parr, 1935: 5 (new name for *Biloculina bradyi* Schlumberger, 1891, preoccupied by *B. bradyi* Fornasini, 1886); Eade, 1967a: 26 (N.Z. refs).

Pyrgo globulus (Bornemann, 1855)

Bornemann, 1855: 349, pl. 19, fig. 3 (*Biloculina*); Chapman, 1909: 317; Cushman, 1932: 65–66 (descr., refs. incl. Chapman, 1909, N.Z.), pl. 15, figs 6–8, table 23; Eade, 1967a: 26.

Pyrgo guerreri Silvestri, 1900

Silvestri, 1900a: 22, text-figs 1–5 (*Biloculina*); Vella, 1957: 9, 29, pl. 7, figs 144–145; Eade, 1967a : 26.

Pyrgo imlimba Saidova, 1975

Saidova, 1975: 149–150, pl. XLII, fig. 6 ("Ob" Stn 358, 1418 m).

Pyrgo laevis Defrance, 1824

Defrance, 1824: 273, Atlas Conch., pl. 88, fig. 2; Hornibrook *in* Fleming, 1952: 82; Cushman, 1955: 185 (type species, generic descr.), 461 (in key), text pl. 14, fig. 14, key pl. 15, figs 7–10; Eade, 1967a: 26; Loeblich & Tappan, 1987: 343 (generic descr., etc.), pl. 351, figs 5–6.

Pyrgo lucernula (Schwager, 1866)

Schwager, 1866: 202, pl. 4, figs 14, 17 (*Biloculina*); Chapman, 1909: 315 (N.Z.); Eade, 1967a: 26.

Pyrgo murrhina (Schwager, 1866)

Schwager, 1866: 203, pl. 4, figs 15a-c [as *murrhyna* in descr. of plate] (*Biloculina*); Brady, 1884: pl. II figs 10, 11, 15 (as *Biloculina depressa* var. *murrhyna* (figs 10–11), *B. depressa* d'Orbigny (fig. 15)); Cushman, 1929: 71, pl. XIX, figs 6–7 (*Pyrgo*); Wiesner, 1931: 110, pl. XVII, fig. 195 (*Biloculina*); Cushman, 1932: 64–65 (descr., refs & syn.), pl. 15, figs 2–3, table 22; Phleger *et al.*, 1953: 28, pl. 5, figs 22–24; Barker, 1960: 4, pl. 2 (II), figs 10, 11, 15 (placing etc. of Brady's material); Eade, 1967a: 26 (N.Z. refs as *P. murrhyna*); Haake, 1980: 10, pl. 2, fig. 5; Larsen, 1982: pl. 6, fig. 7; Lewis, 1979: 25, table 5 (off Southern Hawkes Bay: "Rare, at only a few stations on slope.").

Pyrgo notalna Saidova, 1975

Saidova, 1975 : 150, pl. XLIII, fig. 3, pl. CI, fig. 5 ("Ob" Stn 358, 1418 m).

Pyrgo pisum (Schlumberger, 1891)

Schlumberger, 1891: 569, text-fig. 31, pl. 11, figs 81–83 (*Biloculina*); Eade, 1967a: 26 (N.Z. refs, note on syn.); Lewis, 1979: 25–26, table 5 (off Southern Hawkes Bay: "A large number of specimens from the North Madden Bank show that this is a very variable species. There appears to be continuous variation between forms recorded by Vella (1957) as *Biloculina pisum, B. anomala, B. guerreri* and *Pyrgo* aff. *ezo*.".

Pyrgo ringens (Lamarck, 1804)

Lamarck, 1804: 351 (*Miliolites*); Lamarck, 1807: pl. XVII, fig. 1; Eade, 1967a: 26 (N.Z. refs); Boltovskoy & Wright, 1976: 102, 144; Boltovskoy *et al.*, 1980: 44–45 (descr., etc.), pl. 26, figs 7–9.

Pyrgo sarsi (Schlumberger, 1891)

Schlumberger, 1891: 553, pl. 9, figs 55–59 (*Biloculina*); Eade, 1967a: 26 (N.Z. refs); Quilty, 1974: 48 (refs), pl. 2, fig. 37; Loeblich & Tappan, 1987: pl. 351, figs 7–8.

Pyrgo serrata (Bailey, 1862)

Bailey [1861] 1862: 350, pl. 8, fig. E (*Biloculina*); Eade, 1967a: 26 (N.Z. refs); Schnitker, 1971: pl. 3, fig. 4.

Pyrgo subpisum Parr, 1950

Parr, 1950: 297–298 (from BANZARE Stn 39, Antarctic, 66°10'S, 49°41'E, 300 m), (?) = *Biloculina vespertilio* Schlumberger of Wiesner (1931: pl. XVI, fig. 188), pl. 7, figs 5–6; Thompson, 1975 thesis: 73 (descr., N.Z.), pl. 6, figs 6–7; Gordon & Ballantine, 1977: 95 (listed from Leigh region after Thompson, 1975 thesis).

Pyrgo tasmanensis Vella, 1957

Vella, 1957: 30, pl. 7, figs 141–142; Eade, 1967a: 26 (listed).

Pyrgo vellai Saidova, 1975

Saidova, 1975: 151, pl. XLIII, fig. 10 ("Ob" Stn 74, 180 m).

Pyrgo vespertilio (Schlumberger, 1891)

Schlumberger, 1891: 561, text-figs 20–22, pl. 10, figs 74–76 (*Biloculina*); Chapman, 1909: 315 (N.Z.), pl. 13, fig. 4; Andersen, 1961: 1–208, pl. 8, figs 5a-b; Eade, 1967a: 26; Quilty, 1974: 48–49, pl. 2, fig. 38; Chave, 1987: 58, pl. 3, fig. 7.

Genus **Pyrogoella** Cushman & White, 1936

Pyrgoella sphaera (d'Orbigny, 1839)

d'Orbigny, 1839c: 66, 82, pl. VIII, figs 13–16 (*Biloculina*); Brady, 1884: 141, pl. II fig. 4 (*Biloculina*); Wiesner, 1931: 107, pl. XV, fig. 177 (*Miliolinella*); Parr, 1950: 299 (refs); Cushman, 1955: 185–186 (type species, generic descr.), 461 (in key), key pl. 47, figs 2–4; Barker, 1960: 4 (generic placing), pl. 2(II); Andersen, 1961: 1–208, pl. 9, figs 7a-b, 8a-b; Eade, 1967a: 26 (N.Z. refs); Thompson, 1975 thesis: 73–74 (descr., N.Z.), pl. 7, fig. 1; Boltovskoy & Wright, 1976: 243; Lewis, 1979: 26, table 5 (off Southern Hawkes Bay: "Rare, on upper slope."); Loeblich & Tappan, 1987: 343 (generic descr., etc.), pl. 351, figs 1–4.

Pyrgoella sphaeroidina Saidova, 1975

Saidova, 1975: 161, pl. XLV, figs 6–7 (distrib. incl. New Zealand).

Genus **Triloculina** d'Orbigny, 1826

Triloculina bertheliniana (Brady, 1884)

Brady, 1884: 166, pl. CXIV, fig. 2 (*Miliolina*); Cushman, 1921: 457 (refs etc.); Parr, 1932: 10, fig. 13 (*Triloculina*); Collins, 1974: 17–18 (Port Phillip); Hayward & Grace, 1981: 48, 49 (first N.Z. record, off Cuvier Is, "... of a single juvenile specimen, presumably carried down to New Zealand as a juvenile in warm currents."), 52, fig. 5b; Hayward, 1982b: 61, 63 (off Little Barrier Is).

Triloculina brevidentata Cushman, 1944

Cushman, 1944: 16, pl. 2, fig. 25; Hulme, 1964: 325; Eade, 1967a: 27; Todd & Low, 1981: 24 (in key), 2 figs.

Triloculina brongniartii d'Orbigny, 1826

d'Orbigny, 1826: 300, Modèles No. 23; Heron-Allen & Earland, 1922: 70 (N.Z. as *Miliolina*); Eade, 1967a: 27; Luczkowska, 1972: 366 (referred to *Adelosina*).

Triloculina chrysostoma (Chapman, 1909)

Chapman, 1909: 322, pl. 13, figs 8–10, pl. 14, figs 1 & 4 (*Miliolina*); Heron-Allen & Earland, 1922: 64–65 (N.Z.); Vella, 1957: 9, 14, 28, pl. 5, figs 97–99 (*Triloculina*); Eade, 1967a: 27.

Triloculina gracilis d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 181–182, 214, pl. XI, figs 10–12; Heron-Allen & Earland, 1922: 67 (*Miliolina*); Eade, 1967: 27.

Triloculina idae Vella, 1957

Vella, 1957: 9, 14, 28–29, pl. 7, figs 132–134; Eade, 1967a: 27 (listed); Luczkowska, 1972: 365 (referred to new genus *Sinuloculina*).

Triloculina insignis (Brady, 1881)

Brady, 1881: 45 (*Miliolina*); Brady, 1884: 165, pl. IV, figs 8a-b; Andersen, 1961: 1–208, pl. 6, figs 1a-c, 2 (*Triloculina*); Eade, 1967a: 27 (N.Z. refs); Luczkowska, 1972: 366 (transferred from *Miliolina*).

Triloculina linneiana d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 172, 212, pl. IX, figs 11–13; Eade, 1967a: 21 (N.Z. refs); Luczkowska, 1972: 366 (referred to *Adelosina*); Chave, 1987: 59, pl. 5, fig. 5.

Triloculina oblonga (Montagu, 1803)

Montagu, 1803: 522, pl. XIV, fig. 9 (*Vermiculum*); Cushman, 1929: 57, pl. XIII, figs 4–5 (*Triloculina*); Parr, 1932: 10, pl. 1, figs 15a-c; Galhano, 1963: 37–38 (refs), pl. IV, fig. 3; Eade, 1967a: 27 (N.Z. refs); Albani, 1968a: 17, fig. 44; Albani, 1968b: 100 (distrib. etc.); Resig, 1969: pl. 1, fig. 6; Kameswara Rao, 1969: 593 (descr., distrib., refs), pl. III, figs 23a-b; Colom, 1974: 203, figs 59p-r; Collins, 1974: 18; Boltovskoy & Wright, 1976: 103; Phillips, 1977: 12–52, pl. 5, fig. 7; Albani, 1979 : 21 (descr.), fig 22.3; Boltovskoy *et al.*, 1980: 52 (descr., etc.), pl. 33, figs 11–13; Todd & Low, 1981: 23 (in key), 3 figs; Chave, 1987: 60, pl. 5, fig. 4.

Triloculina rotunda d'Orbigny, 1826

d'Orbigny, 1826: 299, Modèles No. 4; Eade, 1967a: 27 (N.Z. refs); Luczkowska, 1972: 365 (referred to new genus *Sinuloculina*); Colom, 1974: 204, figs 59n-o; Quilty, 1974: 59, pl. 2, figs 78–79; Poag & Tresslar, 1981: 62 (refs), pl. 15, figs 7–9.

Triloculina tricarinata d'Orbigny, 1826

d'Orbigny, 1826: 299, no. 7, Modèles No. 94; Cushman, 1929: 56, pl. XIII, fig. 3; Barker, 1960: pl. 3, fig. 17; Andersen, 1961: pl. 7, figs 1a-c; Eade, 1967a: 27 (N.Z. refs); Gibson, 1967: 18 (Tongaporutuan Stage); Albani, 1968a: 17, fig. 47; Albani, 1968b: 101 (distrib.); Kameswara Rao, 1969: 592–593 (descr., distrib., refs), pl. III, fig. 22; Haake, 1971: 188 (ultrastructure of surface), pl. 1, figs 5–7; Schnitker, 1971: pl. 3, fig. 10; Boltovskoy & Wright, 1976: 63, 230; Hayward & Buzas, 1979: 37 (as *T. tricarnata* [sic]); Hayward, 1982b: 63 (Hauraki Gulf nearshore sedi-

ments); Larsen, 1982: pl. 7, fig. 4; Chave, 1987: 60, pl. 5, fig. 6.

Triloculina trigonula (Lamarck, 1804)

Lamarck, 1804: 351, pl. XVII, fig. 4 (no. 3) [1807] (*Miliolites*) d'Orbigny, 1826 : 299, No. 1, pl. XVI, figs 5–9, Modéles No. 93 (*Triloculina*); Brady, 1884 : 164, pl. III, figs 15–16 (*Miliolina*); Cushman, 1929: 56, pl. XII, figs 10–11, pl. XIII, figs 1–2; Cushman, 1955: 184 (type species, generic descr.), 184 (in key), text pl. 14, fig. 11, key pl. 15, figs 1–3; Barker, 1960: 6, pl. 3 (III), figs 15–16 (status etc.); Andersen, 1961: pl. 6, figs 3a-c; Galhano, 1963: 37 (refs), pl. IV, fig. 1; Eade, 1967a: 27 (N.Z. refs); Albani, 1968a: 18, fig. 48; Albani, 1968b: 101 (distrib.); Kameswara Rao, 1969: 592 (descr., distrib., refs), pl. III, figs 21a-b; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 2, fig. 17; Haynes, 1973: 79 (diag., descr., distrib., refs), pl. 9, figs 1–2, pl. 32, fig. 5; Colom, 1974: 204, figs 56j-l; Collins, 1974: 17 (Australia); Quilty, 1974: 59–60 (refs), pl. 2, figs 80–81; Boltovskoy & Wright, 1976: 144, 252; Albani, 1979: 21 (descr.), fig. 22.7; Hayward & Buzas, 1979: 37, pl. 3, fig. 39; Lewis, 1979: 26, table 5 (off Southern Hawkes Bay: "On Madden Banks only"); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Todd & Low, 1981: 23 (in key), 2 figs; Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments); Larsen, 1982: pl. 7, fig. 5; Chave, 1987: 60, pl. 5, fig. 7.

Triloculina cf. trigonula (Lamarck, 1804). Hornibrook 1952

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait, as *T.* cf. *trigonula* (Lamarck, 1804), *q.v.*); Eade, 1967a: 27 (listed).

Triloculina cf. trigonula (Lamarck 1804). Vella, 1957

Vella, 1957: 9 (Cook Strait, as *T.* cf. *trigonula* (Lamarck, 1804), *q.v.*); Eade, 1967a: 27 (listed).

Triloculina valvularis Reuss, 1851

Reuss, 1851b : 85, pl. 7, fig. 56; Eade, 1967a : 27 (N.Z. refs).

Genus **Triloculinella** Riccio, 1950

Triloculinella hornibrooki (Vella, 1957)

Vella, 1957: 9, 21, pl. 7, figs 127–129 (*Quinquinella*); Kustanowich, 1965 : 52; Kennett, 1966: 36 (in Kapitean stage, Upper Miocene); Eade, 1967a: 28; Lewis, 1979: 26, table 5 (off Southern Hawkes Bay: "Rare, occurs at only two stations ..."); Hayward, 1981b: 131 (Bay of Islands).

Genus **Triloculinellus** Saidova, 1975

Triloculinellus politus Saidova, 1975

Saidova, 1975: 159, pl. XLV, fig. 4, pl. CI, fig. 5 (distrib. incl. New Zealand).

Subfamily SIGMOILINITINAE
Genus **Nummoculina** Steinmann, 1881

Nummoculina contraria (d'Orbigny, 1846)

d'Orbigny, 1846: 266, pl. 16, figs 4–6 (*Biloculina*); Mestayer, 1916: 128 (N.Z., in *Planispirina*); Cushman, 1955: 179 (type species, generic descr.), pl. 14, fig. 4, key pl. 14, figs 12–13; Eade, 1967a: 28; Larsen, 1982: pl. 7, fig. 10; Loeblich & Tappan, 1987: 347 (generic descr., etc.), pl. 385, figs 17–23.

Nummoculina irregularis (d'Orbigny, 1839)

d'Orbigny, 1839c: 67, 82, pl. VIII, figs 20–21 (*Biloculina*); Eade, 1967a: 28 (N.Z. refs).

Genus **Sigmoilina** Schlumberger, 1887

Sigmoilina edwardsi (Schlumberger, 1887)

Schlumberger, 1887: 483, text-fig. 8, pl. VII, figs 17–18 (*Planispira (Sigmoilina)*); Heron-Allen & Earland, 1922: 71 (N.Z. as *Sigmoilina*); Cushman, 1932: 45–46 (descr., refs etc.), pl. 11, figs 9a-c, table 13; Cushman, 1946: 39–40 (descr., refs etc.), pl. 6, figs 11–13; Cushman, 1955: 179 (generic descr.); Eade, 1967a: 26.

Sigmoilina laevigata Saidova, 1975

Saidova, 1975: 15–154, pl. XLIV, fig. 5, pl. CI, fig. 9 ("Ob" Stn 74, 186 m).

Sigmoilina ovata Sidebottom, 1904

Sidebottom, 1904: 6, text-fig. 1, pl. II, figs 12–13; Heron-Allen & Earland, 1915: 584, pl. XLV, figs 16–18; Sidebottom, 1918: 9 (remarks etc.), pl. II, figs 3-4; Heron-Allen & Earland, 1922: 70–71 (N.Z.); Cushman, 1946: 41 (descr., refs etc.), pl. 6, fig. 22; Eade, 1967a: 26; Boltovskoy & Wright, 1976: 267.

Sigmoilina sigmoidea (Brady, 1884)

Brady, 1884: 197, pl. II, figs 1–3, 194, fig. 5c (*Planispirina*); Cushman, 1921: 448–449; Cushman, 1946: 38–39 (descr., refs etc.), pl. 6, figs. 8–10; Eade, 1967a: 26 (N.Z. refs).

Genus **Spirosigmoilina** Parr, 1942

Spirosigmoilina tenuis (Czjzek, 1848)

Czjzek, 1848: 149, Pl. XIII, figs 31–34 (*Quinqueloculina*); Heron-Allen & Earland, 1922: 63–64 (N.Z. as *Spiroloculina*); Cushman, 1946: 32–33 (descr., syn. etc.), pl. 5, figs 13–15 (*Sigmoilina*); Cushman, 1955: 183 (generic descr.); Eade, 1967a: 26; Bandy & Chierici, 1966: 269–270, fig. 10 (depth/temperature correlation); Schnitker, 1971: pl. 3, fig. 7; Thompson, 1975 thesis: 74 (descr., N.Z., as *Sigmoilina*), pl. 7, figs 2–4; Hayward, 1981a: 90 (Tutukaka Harbour).

Spirosigmoilina cf. tenuis (Czjzek, 1848). Vella, 1957

Vella, 1957: 9 (Cook Strait, as *Massilina* cf. *tenuis* (Czjzek, 1848), *q.v.*); Eade, 1967a: 26 (listed in *Sigmoilina*).

Spirosigmoilina sp. Hayward, 1982

Hayward, 1982b: 63 (off Little Barrier Is).

Subfamily SIGMOILOPSINAE
Genus **Sigmoilopsis** Finlay, 1947

Sigmoilopsis celata (Costa, 1855)

Costa, 1855: 126, pl. 1, fig. 14 (*Spiroloculina*); Eade, 1967a: 26 (N.Z. refs).

Sigmoilopsis finlayi Vella, 1957

Vella, 1957: 8, 14, 20, pl. 4, figs 75–76; Eade, 1967a: 26 (listed); Thompson, 1975 thesis: 74 (descr., etc. incl. *S. wanganuiensis* Vella), pl. 7, figs 5–7; Hayward & Grace, 1981: 52 (off Cuvier Is).

Sigmoilopsis schlumbergeri (Silvestri, 1904)

Silvestri, 1904a: 267 (*Sigmoilina*); Brady, 1884: 197, pl. VIII, figs 1–4 (as *Planispirina celata*, not of Costa); Cushman, 1921: 449–450 (refs etc. as *Sigmoilina*); Phleger & Parker, 1951: 8, pl. 4, fig. 6; Phleger *et al.*, 1958: 28, pl. 5, figs 15–16; Barker, 1960: 16, pl. 8 (VIII), figs 1–4 (in *Sigmoilopsis*, generic placings); Andersen, 1961: pl. 7, figs 7a-b; Eade, 1967a: 27 (N.Z. refs, notes on syn.); Gibson, 1967: 15, pl. 2, figs 30, 37; Hornibrook, 1968: 69, fig. 12; Eade, 1970: 35, table II (present day ecol. of Upper Miocene occurrence); Lewis, 1979: 26, table 5 (off Southern Hawkes Bay : "Common on mid slope, rare on lower slope."); Albani, 1979: 21 (features), fig. 21.1; Hayward & Buzas, 1979: 37; Haake, 1980: 10, pl. 2, fig. 6; Hornibrook *et al.*, 1989: 110, 117 (table 2(5) : first appearance), 119 (table 3(1): last occurrence), fig. 21:5.

Sigmoilopsis wanganuiensis Vella, 1957

Vella, 1957: 8, 20, pl. 4, figs 67–70; Eade, 1967a: 27 (listed); Lewis, 1979: 26, table 5 (off Southern Hawkes Bay: "Abundant on Motukura Bank, rare elsewhere.").

Subfamily TUBINELLINAE
Genus **Parrina** Cushman, 1931

Parrina bradyi (Millett, 1898)

Millett, 1898a: 261–262, pl. V, figs 6a-b (*Nubecularia bradyi*, new name for *N. inflata* Brady, 1884: 135, pl. I, figs 5–8, not of Terquem, 1876); Cushman, 1955: 200 (type species, generic descr.), pl. 15, fig. 19, key pl. 17, figs 16–17; Barker, 1960: 2, pl. 1 (I), figs 5–6 (status etc.); Eade, 1967a: 28 (N.Z. refs); Adams *et al.*, 1980: 8 (type); Loeblich & Tappan, 1987: 351 (generic descr., etc.), pl. 358.

Genus **Tubinella** Rhumbler, 1906

Tubinella chapmani Cushman, 1924

Cushman, 1924: 55, pl. 19, figs 5–6 (incl. *Articulina funalis* of Chapman, 1909: 323, pl. 14, fig 3, not of Brady, 1884, *q.v.*); Eade, 1967a: 28.

Tubinella funalis (Brady, 1884)

Brady, 1884: 185, pl. XIII, figs 6–11 (*Articulina*); Rhumbler, 1906: 26, pl. II, fig. 3 (*Tubinella*); Heron-Allen & Earland, 1922: 72; Wiesner, 1931: 109, pl. I, fig. 6, pl. XV, fig. 183, pl. XVI, figs 184–185 (*Tubinellina*); Barker, 1960: 26 (generic placing etc.), pl. 13 (XIII), figs 6–11; Eade, 1967a: 28.

Tubinella inornata (Brady, 1884)

Brady, 1884: 186, pl. XIII, figs 3–5 (*Articulina funalis* var. *inornata*); Heron-Allen & Earland, 1922: 72 (N.Z. refs); Cushman, 1955: 182 (type species, generic descr.), pl. 14, fig. 7, key pl. 14, figs 16–17; Barker, 1960: 26 (generic placing), pl. 13 (XIII), figs 3–5; Eade, 1967a: 28.

Suborder LAGENINA
Superfamily NODOSARIACEA
Family NODOSARIIDAE
Subfamily NODOSARIINAE

Genus **Dentalina** Risso, 1826

Dentalina advena (Cushman, 1923)

Cushman, 1923: 79, pl. 13, fig. 12 (*Nodosaria*); Cushman, 1955: 215 (generic descr.); Eade, 1967a: 29 (N.Z. refs); Quilty, 1974: 62, pl. 3, fig. 89.

Dentalina cf. caudata d'Orbigny, 1926. Lewis, 1979

Lewis, 1979: 27, table 5 (off Southern Hawkes Bay, as *D.* cf. *caudata* d;Orbigny, 1926: 254, no. 37: "Rare on Motukura Bank and upper slope.").

Dentalina aff. caudata d'Orbigny, 1926. Vella, 1957

Vella, 1957: 9 (Cook Strait, as *D.* cf. *caudata* d'Orbigny, 1826: 254, no. 37); Eade, 1967a: 29 (listed as *D.* aff. *caudata*).

Dentalina communiensis Saidova, 1975

Saidova, 1975: 172, pl. XLVIII, fig. 6 ("Ob Stn 358, 1418 m).

Dentalina communis (d'Orbigny, 1826)

d'Orbigny, 1826: 254, no. 35 (*Nodosaria (Dentalina)*); Parker & Jones, 1865: 342, pl. 13, fig. 10; Brady, 1884 : 504, pl. LXII, figs. 19–22; Cushman, 1921: 192–193 (refs etc.), pl. 34, fig. 7; Eade, 1967a: 29 (N.Z. refs); Schnitker, 1971: pl. 3, fig. 20; Boltovskoy *et al.*, 1980: 26 (descr., etc.), pl. 10, figs 19–20; Hayward, 1981a: 90 (Tutukaka Harbour); Todd & Low, 1981: 33 (in key), 1 fig.; Larsen, 1982: pl. 8, fig. 4.

Dentalina cf. communis d'Orbigny, 1826. Hulme, 1964

Hulme, 1964: 326 (Manukau Harbour, as *D.* cf. *communis* d'Orbigny, 1826, *q.v.*); Eade, 1967a: 29 (listed).

Dentalina elegans d'Orbigny, 1846

d'Orbigny, 1846: 45, pl. I, figs 52–56; Sherborn, 1955: 64; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments).

Dentalina emaciata Reuss, 1851

Reuss, 1851b: 63, pl. 3, fig. 9; Brady, 1884: 502, pl. LXII, figs 25–26 (as *Nodosaria (Dentalina) consobrina* var. *emaciata*); Cushman, 1921: 195 (refs etc.), pl. 34, fig. 8, pl. 35, fig. 1; Eade, 1967a: 29 (N.Z. refs); Albani, 1968a: 23, fig. 79; Albani, 1970: 75, pl. 10, fig. 7; Thompson, 1975 thesis: 75 (descr., N.Z.), pl. 8, fig. 5; Hayward, 1979b: 184 (*Zostera* pool community, N.Z., as *D. emciata* [sic]).

Dentalina farcimen Reuss, 1863

Reuss, 1863d: 146, pl. 1, fig. 18; Eade, 1967a: 29 (N.Z. refs).

Dentalina filiformis (d'Orbigny, 1826)

d'Orbigny, 1826: 253, Modèles No. 14 (*Nodosaria*); Parker, Jones & Brady, 1871: 145–179, 238–266, pl. 9, fig. 48; Brady, 1884: 500, pl. LXIII, figs 3–5 (*Nodosaria*); Barker, 1960: 132, pl. 63 (LXIII), figs 3–5; Andersen, 1961: pl. 17, fig. 4; Eade, 1967a: 29 (N.Z. refs); Colom, 1974: 109, fig. 13c-d; Quilty, 1974: 63, pl. 3, fig. 90; Thompson, 1975 thesis: 75 (descr., N.Z.), pl. 8, fig. 6; Hayward & Buzas, 1979: 50 (Miocene); Larsen, 1982: pl. 8, fig. 5.

Dentalina spp. aff. D. filiformis (d'Orbigny, 1826). Lewis, 1979

Lewis, 1979: 27, table 5 (off Southern Hawkes Bay, as *D.* spp. aff. *filiformis* d'Orbigny, *q.v.*: "A few specimens at many stations"; cf. also Brady, 1884: 500, pl. LXIII, figs 3–5).

Dentalina guttifera d'Orbigny, 1846

d'Orbigny, 1846 : 49, pl. II, figs 11–13; Brady, 1884: 497, pl. LXII, figs 10–12 (as *Nodosaria pyrula*, not of d'Orbigny, *fide* Parr, 1945: 201); Collins, 1974: 19 (Australia); Thompson, 1975 thesis: 75–76 (descr.), pl. 8, figs 7–8; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis); Larsen, 1982: pl. 8, fig. 6.

Dentalina mucronata Neugeboren, 1856

Neugeboren, 1856: 83, pl. 3, figs 8–11; Brady, 1884: 506, pl. LXII, figs 27–31 (*Nodosaria*); Cushman, 1921: 195–196 (refs etc.); Galhano, 1963: 47 (refs), pl. V, fig. 6; Eade, 1967a: 29 (N.Z. refs); Colom, 1974: 110, figs 13f-g.

Dentalina notalnella Saidova, 1975

Saidova, 1975: 172–173, pl. XLVIII, fig. 9 ("Ob" Stn 354, 266 m).

Dentalina obliquensis Saidova, 1975

Saidova, 1975: 173, pl. XLVIII, fig. 12 ("Ob" Stn 358, 1418 m).

Dentalina soluta Reuss, 1851

Reuss, 1851b: 60, pl. 3, figs 4a-b; Brady, 1884: 503, pl. LXII, figs 13–16, pl. XVIV, fig. 28; Cushman, 1921: 192 (refs etc.), pl. 34, figs 6; Eade, 1967a: 29 (N.Z. refs); Hayward & Buzas, 1979: 50 (Miocene).

Dentalina subemaciata Parr, 1950

Parr, 1950: 329 (BANZARE Stns 113, 115, off Tasmania), pl. XII, fig. 1; Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank and at some places on upper and mid slope, rare on lower slope.").

Dentalina subsoluta (Cushman, 1923)

Cushman, 1923: 74, pl. 13, fig. 1 (*Nodosaria*) (incl. *N. soluta* of Brady, 1884, not of Reuss, 1851); Eade,

1967a: 30 (refs); Quilty, 1974: 65, pl. 3, fig. 95; Thompson, 1975 thesis: 76 (descr., N.Z.), pl. 9, figs 1–2; Lewis 1979: 27, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank, rare on outer shelf and upper slope.").

Dentalina sp. Hayward & Grace, 1981
Hayward & Grace, 1981: 52 (off Cuvier Is).

Genus **Nodosaria** Lamarck, 1816

Nodosaria calomorpha Reuss, 1866
Reuss, 1866: 129, pl. I, figs 15–19; Heron-Allen & Earland, 1922: 168 (N.Z.); Eade, 1967a: 28; Kameswara Rao, 1970: 259 (descr., distrib., refs), pl. IV, fig. 32; Lewis, 1979: 26 (off Southern Hawkes Bay as *Nodosaris* [sic] : "A few specimens at many stations on slope" — referred to Brady, 1884: pl. LXI, figs 23–27; see also Barker, 1960: 128, pl. 61 (LXI), figs 23–27); Hayward, 1981a: 91 (Tutukaka Harbour).

Nodosaria catenulata Brady, 1884
Brady, 1884: 515, pl. LXIII, figs 32–34; Cushman, 1913: 57, pl. 25, fig. 3; Cushman, 1921: 198–199, pl. 35, fig. 7; Heron-Allen & Earland, 1922: 172 (N.Z.); Eade, 1967a: 28.

Nodosaria comata (Batsch, 1791)
Batsch, 1791: 2, pl. I, fig. 2 (*Nautilus*); Brady, 1884: 509, pl. LXIV, figs 1–5; Heron-Allen & Earland, 1922: 171 (N.Z., as *Nodosaria*); Barker, 1960: 134, pl. 64 [LXIV], figs 1–5 (as *Rectoglandulina comatula* (Cushman, 1923)), discuss., etc.); Eade, 1967a: 28.

Nodosaria flintii Cushman, 1923
Cushman, 1923: 85, pl. 14, fig. 1 (incl. *N. obliqua* of Brady, 1884, as listed by Murray, 1895: 610, not of Linnaeus, 1758, *q.v.*); Eade, 1967a: 28.

Nodosaria gracilis Neugeboren, 1852
Neugeboren, 1852: 51, pl. I, figs 27–29; Heron-Allen & Earland, 1922: 169 (N.Z.); Eade, 1967a: 28.

Nodosaria obliqua (Linnaeus, 1758)
Linnaeus, 1758: 711 (*Nautilus*); Brady, 1884: 513, pl. LXIV, figs 20–22 (*Nodosaria*); Cushman, 1913: 59, pl. 25, fig. 5; Cushman, 1921: 211 (refs etc.), pl. 38, fig. 1; Heron-Allen & Earland, 1930: 171 (refs); Eade, 1967a: 28 (N.Z. refs).

Nodosaria pellita Heron-Allen & Earland, 1922
Heron-Allen & Earland, 1922: 173, pl. VI, figs 28–29; Eade, 1967a: 28 (listed).

Nodosaria pyrula d'Orbigny, 1826
d'Orbigny, 1826: 253, Modèles No. 13; Brady, 1884: 497, pl. LXII, figs 1–2; Cushman, 1913: 49, pl. XXVI, figs 1–2; Cushman, 1921: 187 (refs etc.), pl. 33, figs 3–5; Heron-Allen & Earland, 1930: 170, pl. V, fig. 71; Andersen, 1961: 69–70, pl. 16, fig. 1 (as "*N.*" *pyrula* of d'Orbigny, 1798.

Nodosaria radicula (Linnaeus, 1758)
Linnaeus, 1758: 711 (*Nautilus*); Brady, 1884 : 495, pl. LXI, figs 29–31; Cushman, 1921: 190 (refs), pl. 34, fig. 4; Nuttall, 1927: 228 ("Challenger" figured specimens, locality details, Brady pl. LXI, figs 28 & 31, N.Z.); Cushman, 1955: 215 (type species, generic descr.); Eade, 1967a: 28 (N.Z. refs); Kameswara Rao, 1970: 259 (descr., etc.), pl. IV, fig. 33.

Nodosaria radicula var. glanduliniformis Dervieux, 1893
Dervieux, 1893: 599, pl. 5, figs 3–7 (incl. *N. radicula* of Brady, 1884); Barker, 1960: 128, pl. 61, figs 28–31; Eade, 1967a: 28 (N.Z. refs).

Nodosaria raphanistrum (Linnaeus, 1758)
Linnaeus, 1758: 710 (*Nautilus*); Heron-Allen & Earland, 1922: 171 (N.Z., as *Nodosaria*); Eade, 1967a: 29.

Nodosaria simplex Silvestri, 1872
Silvestri, 1872 : 95, pl. 11, figs 268–272; Brady, 1884: 496, pl. LXII, figs 4–6; Cushman, 1913: 49, pl. 28, fig. 5; Cushman, 1921: 186 (refs etc.); Nuttall, 1927: 228 ("Challenger" figured material localities); Lewis, 1979: 27, table 5 (off Southern Hawkes Bay : "Rare, on upper slope." — referred to Brady 1884: pl. LXII, fig. 4; see also Barker, 1960: 130).

Nodosaria subradicula Schwager, 1866
Schwager, 1866: 222, pl. 5, fig. 50; Chapman, 1909: 340, pl. 16, fig. 2; Eade, 1967a: 29.

Nodosaria subtertenuata Schwager, 1866
Schwager, 1866: 235, pl. 6, fig. 74; Brady, 1884: 507, pl. LXII, figs 7–8; Cushman, 1921: 213 (descr., etc.), pl. 36, fig. 1; Heron-Allen & Earland, 1922: 170; Eade, 1967a: 29.

Nodosaria vertebralis (Batsch, 1791)
Batsch, 1791: 3, No. 6, pl. 11, figs 6a-b (*Nautilus (Orthoceras)*); Brady, 1884: 514 (*Nodosaria*), pl. LXIII, fig. 35, pl. LXIV, figs 11–14; Cushman, 1913: 60, pl. 32, fig. 1; Cushman, 1921: 211–212, pl. 38, figs 2–3, pl. 40, fig. 2; Eade, 1967a: 29 (N.Z. refs); Thompson,

1975 thesis: 76 (descr., N.Z. as *Dentalina*), pl. 9, fig. 5.

Genus **Pandaglandulina** Loeblich & Tappan 1955

Pandaglandulina funis Saidova, 1975
Saidova, 1975: 176, pl. XLIX, fig. 12 ("Ob" Stn 358, 1418 m).

Genus **Pseudonodosaria** Boomgaart, 1949

Pseudonodosaria rotundata (Reuss, 1850)
Reuss, 1850: 366, pl. 46, fig. 2 (*Glandulina*); Brady, 1884: 491, pl. LXI, figs 17–18 (*Nodosaria (Glandulina)*); Cushman, 1913: 47, pl. 28, fig. 6; Eade, 1967a: 32 (N.Z. refs); Albani, 1968a: 24, fig. 82; Albani, 1968b: 104 (refs); Albani, 1979: 28 (features), fig. 50.1.

Pseudonodosaria torrida (Cushman, 1923)
Cushman, 1923: 65 (*Nodosaria laevigata* (d'Orbigny, 1846: 24, pl. I, figs 4–5 (*Glandulina*) var. *torrida*); Barker, 1960: 128, pl. LXI, figs 20–22 (*Rectoglandulina torrida*); Thompson, 1975 thesis: 79, pl. 12, fig. 2.

Subfamily LINGULININAE
Genus **Lingulina** d'Orbigny, 1826

Lingulina biloculi Wright, 1911
Wright, 1911: 12, pl. 2, fig. 10 (as *L. carinata* var. *biloculi*); Heron-Allen & Earland, 1913a: 94, pl. VIII, figs 5–7; Hulme, 1964: 326; Loeblich & Tappan, 1961: 220 (possibly referable to new genus *Entolingulina*); Eade, 1967a: 33.

Lingulina carinata d'Orbigny, 1826
d'Orbigny, 1826: 257, Modèles No. 26; Heron-Allen & Earland, 1930b: 171 (refs etc.); Cushman, 1955: 218 (type species, generic descr.), pl. 16, fig. 3; Eade, 1967a 33 (N.Z. refs).

Lingulina grandis Cushman, 1917
Cushman, 1917: 656; Cushman, 1919: 614; Cushman, 1921: 215 (descr., etc.), pl. 43, figs 1a-b; Eade, 1967a: 33.

Subfamily FRONDICULARIINAE
Genus **Frondicularia** Defrance, 1824

Frondicularia annularis d'Orbigny, 1846
d'Orbigny, 1846: 59, pl. II, figs 44–47; Heron-Allen & Earland, 1922: 175 (N.Z.); Sherborn, 1955: 115 (refs); Cushman, 1955: 219 (generic descr.); Eade, 1967a: 30.

Frondicularia bradyi (Silvestri, 1903)
Silvestri, 1903: 48 (*Lingulonodosaria bradii*); Brady, 1884: 517, pl. LXV, fig. 16 (in part as *Lingulina carinata*); Eade, 1967a: 30 (note on syn. re Cushman, 1919: 613).

Frondicularia cf. **californica** Cushman & McCulloch, 1950. Kustanowich, 1965
Kustanowich, 1965: 52 (as *F.* cf. *californica* Cushman & McCulloch, 1950: 328, pl. 43, figs 5–8); Eade, 1967a: 30 (listed).

Frondicularia compta Brady, 1879
Brady, 1879b: 271, pl. VIII, fig. 6; Brady, 1884: 520, pl. LXV, fig. 19; Cushman, 1919: 618; Eade, 1967a: 30 (ref.); Adams *et al.*, 1980: 6 (type).

Frondicularia inaequalis Costa, 1855
Costa, 1855b: 372, pl. 3, fig. 3; Brady, 1884: 521, pl. LXVI, figs 8–12; Heron-Allen & Earland, 1922: 175 (N.Z. refs); Eade, 1967a: 30.

Frondicularia kiensis Barker, 1960
Barker, 1960: 139, pl. 65 (LXV), fig. 18 (new name for *F. bradyi* Cushman, 1933: 82, not of Silvestri, 1903: 48, as *F. bradii*); Heron-Allen & Earland, 1922: 174 (N.Z. as *Frondicularia spathulata* Brady, 1879); Eade, 1967a: 30 (refs to syn.).

Frondicularia reussi Karrer, 1862
Karrer, 1862: 441, pl. 1, fig. 1; Chapman, 1906: 95, pl. 3, fig. 7; Flügel, 1961: 74 (type); Eade, 1967a: 30.

Frondicularia scottii Heron-Allen & Earland, 1922
Heron-Allen & Earland, 1922: 175, pl. 4, figs 30–32; Eade, 1967a: 30 (listed).

Subfamily PLECTOFRONDICULARIINAE

Genus **Proxifrons** Vella, 1963

Proxifrons advena (Cushman, 1923)
Cushman, 1923: 141, pl. 20, figs 1–2 (*Frondicularia*); Eade, 1967a: 32 (N.Z. refs, notes on syn.).

Family VAGINULINIDAE
Subfamily LENTICULININAE

Genus **Lenticulina** Lamarck, 1804

Lenticulina antarcticus Parr, 1950

Parr, 1950: 323, pl. XI, figs 11a-b (*Lenticulina (Robulus)*); Cushman, 1955: 214 (generic descr.); Vella, 1957: 9 (Cook Strait, as *Robulus*); Eade, 1967a: 32 (in *Robulus*); Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments).

Lenticulina articulata (Reuss, 1863)

Reuss, 1863a: 53, pl. 5, fig. 62, pl. 6, fig. 63 (*Cristellaria*); Brady, 1884: 547, pl. LXIX, figs 10–12; Cushman, 1913: 65, pl. 31, fig. 1; Cushman, 1921: 222, pl. 57, figs 2–4; Eade, 1967a: 31 (*Lenticulina*, N.Z. refs).

Lenticulina asymetricus (Saidova, 1975)

Saidova, 1975: 193–194, pl. LI, fig. 8, pl. CIV, fig. 2 ("Ob" Stn 358, 1418 m).

Lenticulina australis (Parr, 1950)

Parr, 1950: 322, pl. XI, figs 7–8 (*Lenticula (Robulus)*); Vella, 1957: 9 (*Robulus*); Eade, 1967a: 32; Collins, 1974: 23 (*Lenticulina*); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments).

Lenticulina calcar (Linnaeus, 1767)

Linnaeus, 1767: 1162, No. 272 (*Nautilus*); Brady, 1884: 551–552, pl. LXX, figs 9–15 (*Cristellaria*); Cushman, 1913: 72, pl. 32, fig. 4; Cushman, 1921: 231–232 (refs & syn. etc.), pl. 45, figs 2a-b; Cushman, 1933: 7–8 (descr., etc., refs & syn.), pl. 2, figs 3a-b; Cushman, 1955 : 213 (generic descr.), key pl. 20, fig. 4; Barker, 1960: 146, pl. 70, figs 9–12; Andersen, 1961: 48–49 (diag., remarks etc.), pl. 11, figs 1-bb, 2a-b; Eade, 1967a: 32 (N.Z. refs, as *Robulus*); Kameswara Rao, 1969: 596 (descr., distrib., refs), pl. III, fig. 30; Colom, 1974: 95–96, figs 11j-k; Lewis, 1979: 28, table 5 (off Southern Hawkes Bay : "Rare, on upper slope only."), — referred to Brady, 1884: pl. LXX, figs 11–12); Hornibrook *et al.*, 1989: 117 (table 2(1): first appearance), 119 (table 3(1): last occurrence).

Lenticulina convergens (Bornemann, 1855)

Bornemann, 1855: 327, pl. XIII, figs 16–17 (*Cristellaria*); Brady, 1884: 546, pl. LXIX, figs 6–7; Cushman, 1913: 68, pl. 34, fig. 3; Cushman, 1921: 228, pl. 44, figs 4a-b; Heron-Allen & Earland, 1922: 178 (N.Z.); Eade, 1967a: 31.

Lenticulina costata (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 47, pl. 4, figs g-h (*Nautilus*); Brady, 1884: 555, pl. LXXI, fig. 8; Cushman, 1913: 75, pl. 34, fig. 4; Cushman, 1921: 239–240 (refs etc.), pl. 46, fig. 4, pl. 47, fig. 1; Eade, 1967a: 32 (N.Z. refs as *Robulus*); Albani, 1979: 26 (features, as *Lenticulina costata*), fig. 39.1.

Lenticulina cultrata (Montfort, 1808)

Montfort, 1808: 215 (*Robulus*); Brady, 1884: 550, pl. LXX, figs 4–6 (*Cristellaria*); Cushman, 1913: 64, pl. 29, fig. 4; Cushman, 1921: 220 (refs); Cushman, 1955: 213 (see under *Robulus* as type of genus); Hedley *et al.*, 1965: 15, pl. 4, fig. 15; Albani, 1968b: 22, fig. 7; Eade, 1967a: 32 (N.Z. refs, in *Robulus*); Gordon & Ballantine, 1976: 96 (listed from Leigh region after Thompson, 1975 thesis: 78, pl. 11, figs 5–6); Lewis, 1979: 28, table 4 (off Southern Hawke's Bay, as *L. cultratus* [sic], "Occurs at most stations ..."); Albani, 1979: 26 (features), fig. 39.2; Boltovskoy *et al.*, 1980: 48–49 (descr., etc. as *R. rotulatus* (Lamarck) f. *cultrata*), pl. 31, figs 1–2.

Lenticulina denticulifera (Cushman, 1913)

Cushman, 1913: 75, pl. 37, fig. 1 (*Cristellaria*); Brady, 1884: 550, pl. LXX, figs 7–8 (as *C. cultrata* Montfort, dentate variety); Cushman, 1919: 616 (N.Z.); Cushman, 1921: 238 (descr., etc.); Eade, 1967a: 31.

Lenticulina gibba (d'Orbigny, 1826)

d'Orbigny, 1826: 292, Modèles No. 17 (*Cristellaria*); d'Orbigny, 1839a: 62, pl. VII, figs 20–21; Brady, 1884: 546, pl. LXIX, figs 8–9; Cushman, 1913: 69, pl. 35, fig. 1; Cushman, 1921: 228, pl. 45, fig. 1; Cushman, 1933: 6–7 (descr., etc as *Robulus*), pl. 2, figs 2a-b, 6 & 7; Hulme, 1964: 326 (refs); Eade, 1967a: 31 (N.Z. refs, note on syn.); Collins, 1974: 22 (Australia); Quilty, 1974: 73, pl. 4, fig. 112; Hayward & Buzas, 1979: 63; Lewis, 1979: 28, table 5 (off Southern Hawkes Bay : "Rare, on outer shelf and upper slope."); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward & Grace, 1981: 53 (off Cuvier Is); Larsen, 1982 : pl. 8, fig. 14.

Lenticulina cf. **gibba** (d'Orbigny, 1826). Hornibrook, 1951

Hornibrook *in* Knox, 1951: 43 (off Banks Peninsula, as *L.* cf. *gibba* (d'Orbigny 1826, *q.v.*); Eade, 1967a: 31 (listed).

Lenticulina cf. **gibba** (d'Orbigny, 1826). Hulme, 1964

Hulme, 1964: 326 (Manukau Harbour, as *L.* cf. *gibba* (d'Orbigny, 1826), *q.v.*); Eade, 1967a: 31 (listed).

Lenticulina iota (Cushman, 1923)

Cushman, 1923: 111, pl. 29, fig. 2, pl. 30, fig. 1

(*Cristellaria*); Vella, 1957: 9 (as *Robulus*); Eade, 1967a: 31 (*Lenticulina*); Gibson, 1967: 1–70, pl. 4, figs 64–65; Hayward & Buzas, 1979: 63; Larsen, 1982: pl. 8, fig. 15.

Lenticulina limbosus (Reuss, 1863)

Reuss, 1863c: 55, pl. 6, figs 69a-b (*Robulina*); Cushman, 1933: 3–4 (descr., etc.), pl. 1, figs 4–6, pl. 2, figs 5a-b, table 2; Cushman & McCulloch, 1950: 297, pl. 39, figs 1–2 (*Robulus*); Kustanowich, 1965: 52 (*Robulus*); Eade, 1967a: 32; Albani, 1968b: 22, fig. 73; Albani, 1970: 75 (first Australian record, as *Lenticulina*); Albani, 1979: 26 (features, descr. as *L. limbosa*), fig. 39.3; Hamsa & Gandhi, 1983: 163 (diag., refs), fig. 1c.

Lenticulina loculosa (Stache, 1865)

Stache, 1865: 244, pl. 22, fig. 23 (*Cristellaria (Robulina) loculosa*); Hornibrook, 1961: 37, pl. 4, fig. 63 (distrib., stratigraphic range (Lower Oligocene–Upper Pliocene, refs & syn.); Lewis, 1979: 28, table 5 (off Southern Hawkes Bay : "Rare, outer shelf to mid slope.").

Lenticulina mamilligera (Karrer, 1865)

Karrer, 1865: 76, pl. 16, fig. 5 (*Cristellaria*); Chapman, 1906: 98; Flügel, 1961: 71 (type); Hornibrook, 1965: 532 (status of type); Eade, 1967a: 31; Gibson, 1967: 1–70, pl. 4, fig. 67; Hornibrook, 1968a: 63, fig. 10; Hornibrook, 1971: 8, 17 (descr., etc.), pl. 2, fig. 21 (topotype); Hayward & Buzas, 1979: 63, pl. 20, fig. 247.

Lenticulina orbicularis (d'Orbigny, 1826)

d'Orbigny, 1826: 288, pl. 15, figs 8–9 (*Robulina*); Brady, 1884: 549, pl. LXIX, fig. 17 (*Cristellaria*); Cushman, 1913: 67, pl. 36, figs 4–5; Galhano, 1963: 43, pl. 4, fig. 15; Eade, 1967a: 32 (N.Z. refs, as *Robulus*); Albani, 1968b: 22, fig. 71; Colom, 1974: 97, figs 11a-e; Albani, 1979: 26 (features as *Lenticulina*), fig. 39.4; Boltovskoy *et al.*, 1980: 48 (descr., etc.), pl. 30, figs 15–17; Haake, 1980: 11, pl. 2, fig. 9.

Lenticulina peregrina (Schwager, 1866)

Schwager, 1866 : 245, pl. 7, fig. 89 (*Cristellaria*); Chapman, 1909: 243 (as *C. variabilis*); Mestayer, 1916: 129 (*Lenticulina*); Parker & Phleger, 1951: 9, pl. 4, fig. 20 (not fig. 19 *fide* Andersen, 1961: 46, pl. 10, fig 7a-b); Barker, 1960: 144, pl. LXVII, figs 11–16; Eade, 1967a: 31 (N.Z. refs); Murray, 1971: 88–89 (diag. features etc.), pl. 35, figs 3–5; Thompson, 1975 thesis: 78, pl. 11, fig. 7; Lewis, 1979: 28, table 5 (off Southern Hawke's Bay: "Common and living ..."); Larsen, 1982: pl. 8, fig. 16.

Lenticulina aff. peregrina (Schwager, 1866). Vella, 1957

Vella, 1957: 9 (Cook Strait, as *L.* aff. *peregrina* (Schwager, 1866), *q.v.*); Eade, 1967a: 31 (listed).

Lenticulina perennus (Saidova, 1975)

Saidova, 1975: 196–197, pl. LII, fig. 10, pl. CIV, fig. 13 (distrib. incl. New Zealand).

Lenticulina rotulatus (Lamarck, 1804)

Lamarck, 1804: 188; Lamarck, 1806: pl. 62, fig. 11 (*Lenticulites*); Brady, 1884: 547, pl. LXIX, figs 13a-b (*Cristellaria*); Cushman, 1913: 66, pl. 35, figs 3; Cushman, 1921: 223; Eade, 1967a: 32 (N.Z. refs); Boltovskoy *et al.*, 1980: 48 (descr., etc.), pl. 30, figs 18–20.

Lenticulina cf. **rotulatus** (Lamarck, 1804). Kustanowich, 1965

Kustanowich, 1965: 52 (table 3, no. 35) from NZOI Stns A326, A327, Milford Sound, as *Robulus* cf. *rotulatus* (Lamarck, 1804), *q.v.*); Eade, 1967a: 32 (listed).

Lenticulina cf. **subcarinata** (Cushman, 1917). Hornibrook, 1952

Hornibrook, 1952: 185 (as *Robulus* cf. *subcarinata* (Cushman, 1917: 657 (as *Cristellaria orbicularis* var. *subcarinata* — see also Cushman, 1921: 225–226, pl. 44, fig. 1); Eade, 1967a: 32 (listed).

Lenticulina subgibba Parr, 1950

Parr, 1950: 321, pl. XI, figs 1–2a-b; Heron-Allen & Earland, 1922: 179; Hedley *et al.*, 1965: 16, text-fig. 1, pl. 3, fig. 2; Eade, 1967a: 31 (N.Z. refs, note on syn.); Albani, 1970: 76, pl. 10, fig. 8 (*Vagulinopsis*); Collins, 1974: 23; Thompson, 1975 thesis: 78, pl. 11, fig. 8; Lewis, 1979: 28, table 5 (off Southern Hawke's Bay : "Rare, on outer shelf and upper slope.").

Lenticulina suborbicularis Parr, 1950

Parr, 1950: 321–322, pl. XI, figs 5–6 (in subgenus *Robulus*); Eade, 1967a: 32 (as *Robulus*, N.Z. refs, notes on syn.); Lewis, 1979: 28, table 5 (off Southern Hawkes Bay: "Rare, on bank and on inner shelf."); Hayward & Grace, 1981: 53 (off Cuvier Is).

Lenticulina tasmanica Parr, 1950

Parr, 1950: 321, pl. XI, figs 3–4 (*L. (Robulus)*); Heron-Allen & Earland, 1922: 179 (as *Cristellaria articulata*); Hedley *et al.*, 1965 : 16, pl. 5, fig. 16; Eade, 1967a: 32 (as *Robulus*, N.Z. refs, note on syn.); Thompson, 1975 thesis: 78, pl. 12, figs 1 & 3; Lewis, 1979: 28, table 5 (off Southern Hawkes Bay : "Rare at isolated stations on inner shelf and on mid slope."); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward,

1981b: 133 (Bay of Islands); Hayward & Grace, 1981: 53 (off Cuvier Is).

Lenticulina thalmanni (Hessland, 1943)
Hessland, 1943: 265, pl. 2, fig. 16; Eade, 1967a: 33 (note on syn.); Boltovskoy & Wright, 1976: 230, 243.

Lenticulina tropicus (Saidova, 1975)
Saidova, 1975: 197, pl. LII, fig. 11, pl. CV, fig. 1 ("Ob" Stn 358, 1418 m).

Lenticulina vortex (Fichtel & Moll, 1798)
Fichtel & Moll, 1798: 33, pl. 2, figs d-i (*Nautilus*); Brady, 1884: 548, pl. LXIX, figs 14–16 (*Cristellaria*); Cushman, 1913: 68, pl. 32, fig. 3; Cushman, 1921: 227 (refs, distrib. etc.); Cushman, 1933: 5–6 (descr., refs etc.), pl. 2, figs 1a-b, table 4; Eade, 1967a: 33 (N.Z. refs).

Lenticulina cf. **vortex** (Fichtel & Moll 1798), Hornibrook, 1951
Hornibrook *in* Knox, 1951: 43 (off Banks Peninsula, as *R.* cf. *vortex* (Fichtel & Moll, 1798), *q.v.*); Eade, 1967a: 33 (listed).

Lenticulina spp. Lewis, 1979
Lewis, 1979: 13 (table 5), 28 (off Southern Hawkes Bay: "Many species of *Lenticulina* are very variable and it was found difficult to assign many specimens to particular species. Therefore all specimens of *Lenticulina* were counted collectively and the presence of some conspicuous species was noted. These species are ... " — *L. calcar* (Linnaeus), *L. cultratis* [sic, = *cultrata*] Montfort, *L. gibba* (d'Orbigny), *L. loculosa* (Stache), *L. peregrina* (Schwager), *L. subgibba* Parr, *L. suborbicularis* (Parr), *L. tasmanica* (Parr), *q.v.*).

Genus **Marginulinopsis** Silvestri, 1904

Marginulinopsis bradyi (Goës, 1894)
Goës, 1894: 64, pl. 11, figs 643–645 (*Cristellaria*) (incl. *Marginulina costata* of Brady, 1884: 555, pl. LXXI, fig. 8, not of Batsch, 1791); cf. Cushman, 1921: 243, pl. 48, figs 1a-b; Barker, 1960: 136, pl. 65, figs 11–13 (*Marginulinopsis*); Eade, 1967a: 32; Albani, 1968a: 22, fig. 75; Albani, 1970: 76; Lewis, 1979: 28, table 5 (off Southern Hawkes Bay: "Rare, on banks" — "Specimens appear to be referable to *Marginulina*, but may be within the range of variation of *Marginulinopsis bradyi*"); Loeblich & Tappan, 1987: 406, pl. 446, figs 20–21 (type species).

Genus **Saracenaria** Defrance, 1824

Saracenaria acutauricularis (Fichtel & Moll, 1798)
Fichtel & Moll, 1798: 102, pl. XVIII, figs g-i (*Nautilus*); Heron-Allen & Earland, 1922: 178 (N.Z. as *Cristellaria*); Eade, 1967a: 33.

Saracenaria italica Defrance, 1824
Defrance, 1824: 176; Brady, 1884: 544, pl. LXVIII, figs 17–18, 20–23 (*Cristellaria*); Chapman, 1906: 96; Cushman, 1913: 78, pl. 33, fig. 3; Cushman, 1919: 617 (N.Z.); Cushman, 1921: 254 (refs etc.), pl. 51, fig. 2; Heron-Allen & Earland, 1922: 178 (N.Z.); Cushman, 1923: 125, pl. XXXV, figs 2, 5–7; Parr, 1950: 323; Cushman, 1955: 218 (type species, generic descr.), pl. 16, fig. 2, key pl. 21, figs 8–9; Barker, 1960: 144, pl. LXVIII, figs 17–18, 20–23; Eade, 1967a: 33; Colom, 1974: 98, fig. 12u; Collins, 1974: 23 (Australia, refs); Thompson, 1975 thesis: 79, pl. 12, figs 6–7; Loeblich & Tappan, 1987: 407, pl. 448, figs 13–14, 18 (type species); Hornibrook *et al.*, 1989: 99, fig. 22.13.

Saracenaria latifrons (Brady, 1884)
Brady, 1884: 544, pl. LXVIII, fig. 19, pl. CXIII, figs 11a-b (*Cristellaria*); Cushman, 1913: 78, pl. 38, fig. 2; Cushman, 1921: 254; Parr, 1950: 324 (incl. Cushman & Hobson, 1935: 57, pl. VIII, fig. 11 (as *S. schenkii*); Galhano, 1963: 50 (refs); Eade, 1967a: 33 (N.Z. refs); Gibson, 1967: pl. 4, fig. 69; Colom, 1974: 98–99, fig. 12v; Collins, 1974: 23 (Australia); Hayward & Buzas, 1979: 73, pl. 27, fig. 331; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay : "Common Motukura Bank, rare on upper slope" — referred to Brady, 1884, pl. CXIII, fig. 11; see also Barker, 1960: 234, pl. 113, fig. 11 ("Challenger" Stn 166, off New Zealand).

Subfamily MARGINULININAE
Genus **Amphicoryna** Schlumberger, 1881

Amphicoryna hirsuta (d'Orbigny, 1826)
d'Orbigny, 1826: 252, Modèles No. 7 (*Nodosaria*); Parker, Jones & Brady, 1871: 154, pl. IX, fig. 45; Brady, 1884: 507, pl. LXIII, figs 12–16; Cushman, 1921: 213–214 (refs etc.), pl. 38, figs 5a-b, 6; Thalmann, 1950a: 221–225; Parr, 1950: 328 (remarks); Cushman, 1955: 218 (generic descr.); Eade, 1967a: 29 (*Amphicoryna*, N.Z. refs); Collins, 1974: 19 (Australia); Thompson, 1975 thesis: 74 (descr., N.Z.), pl. 8, fig. 1; Hayward & Buzas, 1979: 38 (Miocene); Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank, rare elsewhere").

Amiphicoryna proxima (Silvestri, 1872)
Silvestri, 1872: 63, pl. 6, figs 138–147 (*Nodosaria*);

Cushman, 1919: 611; Eade, 1967a: 29; Albani, 1968a: 22.

Amphicoryna scalaris (Batsch, 1791)

Batsch, 1791: 1, 4, pl. 2, figs 4a,c (*Nautilus (Orthoceras)*); Brady, 1884: 510, pl. LXIII, figs 28–31 (*Nodosaria*); Cushman, 1913: 58, pl. 24, fig. 7; Cushman, 1921: 199–200, pl. 35, fig. 6; Eade, 1967a: 29 (*Amphicoryna*, N.Z. refs); Albani, 1968a: 22, fig. 74; Albani, 1968: 102 (generic placing, distrib. etc.), pl. 8, figs 2–3; cf. Murray, 1971: 76–77 (diagnostic features etc.), pl. 29, figs 1–4; Boltovskoy & Wright, 1976: 130; Hayward & Buzas, 1979: 38 (Miocene); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.) (*Amphicoryne*); Hayward, 1979c: 214 (early Miocene); Boltovskoy *et al.*, 1980: 15–16 (descr., etc.), pl. 1, figs 10–12; Larsen, 1982: pl. 7, figs 12–13.

Amphicoryna separans (Brady, 1884)

Brady, 1884: 511, pl. LXIV, figs 16–19 (*Nodosaria scalaris* var. *separans*); Cushman, 1921: 200 (descr., etc.); Eade, 1967a: 29; Thompson, 1975 thesis: 75 (descr., N.Z.), pl. 8, figs 2–3; Lewis 1979: 27, table 5 (off Southern Hawkes Bay: "Rare, on outer shelf and upper slope" — "All of Brady's figured specimens are from the Pacific, and most of these are from New Zealand. Those recorded as *A. scalaris* by Barker (1960) are immature specimens of *A. separans*."); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is, as *Amphicoryne* [*sic*]); Barker, 1960: 136, pl. 64, figs 16–19 (*Amphicoryna*).

Genus **Astacolus** Montfort, 1808

Astacolus australis (Chapman, 1941)

Chapman, 1941: 158, pl. 9, fig. 1 (*Planularia*); Cushman, 1955: 213 (*Astacolus* as possible syn. of *Robulus*); Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 63 (off Little Barrier Is).

Astacolus crepidulus (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 107, pl. 19, figs g-i (*Nautilus*); Brady, 1884: 542, pl. LXVII, figs 17, 19–20, pl. LXVIII, figs 1–2, (*Cristellaria*); Cushman, 1913: 70, pl. 29, figs 5–6, pl. 31, figs 2–5; Cushman, 1921: 248–249, pl. 50, figs 4–5; Eade, 1967a: 29 (*Astacolus*, N.Z. refs); Murray, 1971: 77 (diag. features etc.), pl. 29, figs 5–6; Schnitker, 1971: 169–215, pl. 3, fig. 19; Boltovskoy *et al.*, 1980: 16 (descr., etc.), pl. 2, figs 1–2; Hayward, 1981a: 90 (Tutukaka Harbour); Hayward & Grace, 1981: 52 (off Cuvier Is); Larsen, 1982: pl. 8, fig. 1; Loeblich & Tappan, 1987: 410, pl. 450, figs 7–10 (as type species etc.).

Astacolus cf. **crepidulus** (Fichtel & Moll, 1798) Vella, 1957

Vella, 1957: 9 (Cook Strait, as *A.* cf. *crepidulus* (Fichtel & Moll, 1798), *q.v.*); Eade, 1967a: 29 (listed).

Astacolus cymboides (d'Orbigny, 1846)

d'Orbigny, 1846: 85, pl. III, figs 30–31 (*Cristellaria*); Heron-Allen & Earland, 1922: 178 (N.Z. refs); Eade, 1967a: 29.

Astacolus latus (Cornuel, 1848)

Cornuel, 1848: 252, pl. 1, figs 34–37 (*Marginulina*); Chapman, 1909: 343, pl. 16, fig. 4 (*Cristellaria*); Eade, 1967a: 29.

Astacolus neolatus Vella, 1957

Vella, 1957: 9, 14, 30, pl. 7, figs 143, 146–148 (incl. *Cristellaria lata* (Cornuel, 1848) of Brady, 1884: 539, pl. 6, figs 18a-b); Eade, 1967a: 29 (listed); Thompson, 1975 thesis: 75; Hayward & Buzas, 1979: 41 (Miocene); Hayward & Grace, 1981: 52 (off Cuvier Is).

Astacolus aff. **neolatus** Vella, 1957. Hornibrook, 1961

Hornibrook, 1961: 39 (as *A.* aff. *neolatus* Vella, 1957, *q.v.*); Vella, 1957: 30 (as *A. australis* Cushman, 1941); Eade, 1967a: 29.

Astacolus parri Saidova, 1975

Saidova, 1975: 184, pl. L, fig. 6 ("Ob" Stn 354, 266 m).

Astacolus profundus Saidova, 1975

Saidova, 1975: 183–184, pl. L, fig. 9 (distrib., incl. New Zealand).

Astacolus reniformis (d'Orbigny, 1846)

d'Orbigny, 1846: 88, pl. 3, figs 39–40 (*Cristellaria*); Brady, 1884: 539, pls LXX, figs 3a-b; Cushman, 1913: 65, pl. 30, fig 4, pl. 33, fig. 1; Eade, 1967a: 29 (*Astacolus*, N.Z. refs).

Astacolus tesnersinus Saidova, 1975

Saidova, 1975: 182, pl. L, fig. 5 ("Ob" Stn 354, 266 m).

Astacolus vellai Saidova, 1975

Saidova, 1975 : 184–185, pl. L, fig. 10 ("Ob" Stn 74, 180 m).

Astacolus sp. Lewis, 1979

Lewis, 1979: 27 (off Southern Hawkes Bay: "Common on Motukura Bank, rare on upper slope" — "... tends towards shape of *Saracenaria;* resembles *Lenticulina altifrons* (Parr) ...").

Genus **Marginulina** d'Orbigny, 1826

Marginulina augensiensis Saidova, 1975

Saidova, 1975: 178–179, pl. XLIX, fig. 16 (distrib., incl. New Zealand).

Marginulina costata (Batsch, 1791)

Batsch, 1791: 2, pl. 1, figs 1a-g (*Nautilus (Orthoceras)*); Brady, 1884: 528, pl. LXV, figs 10–13 (*Marginula*); Cushman, 1921: 256–257 (descr., refs & syn. etc.), pl. 41, figs 5–8; Eade, 1967a: 31 (N.Z. refs); Lewis, 1979: 28, table 5 (off Southern Hawkes Bay).

Marginulina glabra d'Orbigny, 1826

d'Orbigny, 1826: 5, Modèles, No. 55; Brady, 1885: 527, pl. LXV, figs 5–6; Flint, 1899: 313, pl. LX, fig. 1; Heron-Allen & Earland, 1911a: 323 (refs); Cushman, 1913: 79, pl. 23, fig. 3; Sidebottom, 1918: 138, pl. IV, figs 26-31, pl. V, figs 1(?), 2–3; Cushman, 1921: 254–255 (refs etc.), pl. 41, fig. 1; Cushman, 1923: 127, pl. XXXVI, figs 1–4, 6; Parr, 1950: 325; Cushman, 1955: 214 (type species, generic descr.), pl. 16, fig. 5; Eade, 1967a: 31 (N.Z. refs); Lewis, 1979: 28, table 5 (off Southern Hawkes Bay: "Rare, at only two stations on upper and lower slope." — referred to Loeblich & Tappan, 1964: fig. 406, no. 10); Larsen, 1982: pl. 9, fig. 1.

Marginulina gummi Saidova, 1975

Saidova, 1975: 179, pl. LXIX, fig. 17 ("Ob" Stn 358, 1418 m).

Marginulina musai Saidova, 1975

Saidova, 197: 179–180, pl. XLIX, fig. 18 (distrib., incl. New Zealand).

Marginulina schloenbachi (Reuss, 1863)

Reuss, 1863a: 65, pl. 6, figs 14–15 (*Cristellaria*); Brady, 1884: 539, pl. LXVII, fig. 7; Cushman, 1913: 77, pl. 36, fig. 6; Eade, 1967a: 31 (*Marginulina*, N.Z. refs).

Marginulina tenuis Bornemann, 1855

Bornemann, 1855: 326, pl. 13, fig. 14; Brady, 1884: 535, pl. LXVI, figs 21–23 (*Cristellaria*); Cushman, 1921: 250 (descr., etc.), pl. 50, fig. 2; Barker, 1960: 140, pl. 66, fig. 2 ("Challenger" Stn 166, off New Zealand); Eade, 1967a: 32 (N.Z. refs); Lewis, 1979: 28, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank, rare on upper slope." — referred to Brady, 1884: pl. LXVI, fig. 21).

Genus **Vaginulinopsis** Silvestri, 1904

Vaginulinopsis tasmanica Parr, 1950

Parr, 1950: 324, pl. XI, figs 13–14; Cushman, 1955: 215 (*Vaginulinopsis* as possible syn. of *Marginula*); Kustanowich, 1965: 52; Eade, 1967a: 33.

Subfamily VAGINULININAE

Genus **Planularia** Defrance, 1824

Planularia compressa (d'Orbigny, 1846)

d'Orbigny, 1846: 86, pl. 3, figs 32–33 (*Cristellaria*); Brady, 1884: 538, pl. CIV, figs 15–16; Chapman, 1909: 343, pl. 16, fig. 5; Cushman, 1921: 247 (descr., etc.); Cushman, 1955: 244 (generic descr.); Eade, 1967a: 32.

Planularia magnifica Thalmann var. **falciformis** Thalmann, 1937

Thalmann, 1937: 342 (incl. *Cristellaria compressa* d'Orbigny of Brady, 1884: 538 and Murray, 1895: 605); Eade, 1967a: 32.

Planularia tricarinella (Reuss, 1863)

Reuss, 1863a: 68, pl. 7, fig. 9 (*Cristellaria*); Brady, 1884: 540, pl. LXVIII, figs 3–4; Cushman, 1913: 72, pl. 34, figs 1–2; Chapman, 1915: 24 (as *P. australis*); Cushman, 1921: 230 (distrib., incl. N.Z.), pl. 50, figs 3a-b; Hedley *et al.*, 1965: 17, pl. 4, figs 13a-b (*P. tricarinella*); Eade, 1967a: 32 (N.Z. refs); Thompson, 1975 thesis: 78, pl. 12, figs 4–5 (as *P. australis* Chapman, 1915); Lewis, 1979: 28, table 5 (off Southern Hawkes Bay: "Rare, on outer shelf and upper slope.").

Planularia cf. **tricarinella** (Reuss, 1863) (Hornibrook (1952)

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait oyster beds) (*Astacolus*); Eade, 1967a: 32 (listed).

Planularia tricarinella var. spinipes (Cushman, 1913)

Cushman, 1913: 72, pl. 33, fig. 2 (*Cristellaria*); Cushman, 1921: 230–231; Eade, 1967a: 32 (N.Z. refs, note on syn.).

Genus **Vaginulina** d'Orbigny, 1826

Vaginulina bruckenthali Neugeboren, 1856

Neugeboren, 1856: 98, pl. 5, fig. 10; not of Brady, 1884: 532, pl. LXVI, figs 18–19 (*fide* Cushman, 1921: 260) = *Vaginulina bradyi* Cushman, 1917: 661; Heron-Allen & Earland, 1922: 176 (N.Z.); Eade, 1967a: 33.

Vaginulina elegantissima Saidova, 1975

Saidova, 1975: 174–175, pl. XLXI, fig. 7 (distrib., incl. New Zealand).

Vaginulina cf. inflata Parr, 1950. Hulme, 1964

Hulme, 1964: 326 (Manukau Harbour, as *V.* cf. *inflata* Parr, 1950: 327, pl. XI, figs 21a-b, 22 (BANZARE Stn 30, Antarctic); Hulme, 1964: 326; Eade, 1967a: 33 (listed); Thompson, 1975 thesis: 79, pl. 12, fig. 8 (as *V. inflata* Parr); Hayward, 1981a: 92 (Tutukaka Harbour).

Vaginulina legumen (Linnaeus, 1758)

Linnaeus, 1758 : 711, no. 248 (*Nautilus*); d'Orbigny, 1826: 257, Modèles No. 2 (*Vaginulina*); Brady, 1884: 530, pl. LXVI, figs 13–15 (*Vaginulina*); Cushman, 1913 : 80, pl. 39, fig. 4; Cushman, 1921: 257 (refs etc.), pl. 41, fig. 3; Cushman, 1955: 218 (type species, generic descr.), key pl. 20, fig. 10; Galhano, 1963: 50 (refs etc.), pl. V, fig. 3; Eade, 1967a: 33 (N.Z. refs).

Vaginulina ovalis Saidova, 1975

Saidova, 1975: 175, pl. XLIX, fig. 8 (distrib., incl. New Zealand).

Vaginulina recta var. **parallela** Halkyard, 1919

Halkyard, 1919: 82, pl. 5, figs 5–6; Heron-Allen & Earland, 1922: 176; Eade, 1967a: 33.

Vaginulina spinigera Brady, 1881

Brady, 1881: 63; Brady, 1884: 531, pl. LXVII, figs 13–14; Murray, 1895: 610; Cushman, 1921: 259 (descr., etc.), pl. 42, fig. 1; Eade, 1967a: 33; Lewis, 1970: frontispiece (fig. from NZOI Stn C488, off Cape Palliser, as *Vaginulopsis*); Dawson, 1979: 22 (listed).

Vaginulina vertebralis Parr, 1932

Parr, 1932b: 221, pl. XXII, fig. 42; Hulme, 1964: 326; Eade, 1967a: 33; Albani, 1968b: 104 (distrib.), pl. 8, fig. 7; Collins, 1974: 23; Albani, 1979: 28 (features), fig. 47.1; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward, 1981a: 92 (Tutukaka Harbour).

Subfamily LAGENIDAE
Genus **Lagena** Walker & Jacob, 1798

Lagena acuticosta Reuss, 1862

Reuss, 1862: 305, pl. 1, fig. 4; Brady, 1884: 464, pl. LVII, figs 31–32, pl. LVIII, figs 20 (?), 21; Cushman, 1921: 180–181 (refs etc.); Cushman, 1933: 34–35 (descr., detailed refs), pl. 8, figs 9–10 & 12, table 21; Sherborn, 1955: 162 (refs); Eade, 1967a: 30 (N.Z. refs); Albani, 1968a: 24, fig. 81; Albani, 1968b: 102–103 (descr., distrib.); Schnitker, 1971: 169–215, pl. 4, fig. 1; Colom, 1974: 99, fig. 13; Albani, 1979: 29 (descr.), fig. 51.1; Hayward & Buzas, 1979: 61, pl. 19, fig. 235 (Miocene).

Lagena alticostata Cushman, 1913

Cushman, 1913: 23, pl. IX, fig. 5 (as *L. sulcata* (Walker & Jacob, 1798) var. *alticostata*); Cushman, 1934: 116, pl. 13, figs 1, 6; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.).

Lagena aspera Reuss, 1862

Reuss, 1862: 305, pl. 1, fig. 5; Sherborn, 1955: 163 (refs); Eade, 1967a: 30 (N.Z. refs); Quilty, 1974: 66, pl. 3, fig. 97; Boltovskoy & Wright, 1976: 144; Boltovskoy *et al.*, 1980 : 36 (descr., etc.), pl. 19, figs 1–3.

Lagena clavata (d'Orbigny, 1846)

d'Orbigny, 1846: 24, pl. 1, figs 2–3 (*Oolina*); Brady, 1884: 456; Cushman, 1921: 174; Sherborn, 1955: 164; Murray, 1971: 81 (diag.), pl. 1, figs 1–3; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Boltovskoy *et al.*, 1980: 36 (descr., etc.), pl. 19, figs 8–9; Todd & Low, 1981: 24 (in key), 1 fig.

Lagena crenata Parker & Jones, 1865

Parker & Jones, 1865: 420, pl. XVIII, figs 4a-b; Brady, 1884: 467, pl. CVII, figs 15, 21; Heron-Allen & Earland, 1922: 149; Heron-Allen & Earland, 1930: 164, pl. III, figs 41–42; Sherborn, 1955: 164 (refs); Eade, 1967a: 30; Collins, 1974: 20 (Australia); Albani, 1979: 29 (descr.), fig. 51.3; Hayward, 1981a: 91 (Tutukaka Harbour); Albani & Yassini, 1989: 377 (descr.), figs 2F–G.

Lagena dentaliniformis Bagg, 1912

Bagg, 1912: 45, pl. 13, fig 1–2; Vella, 1957: 9; Eade, 1967a: 30.

Lagena distoma Parker & Jones, 1864

Parker & Jones (MS) *in* Brady, 1864: 467, pl. 48, fig. 6; Parker & Jones, 1860: 278, pl. XI, fig. 24 (as *Lagena laevis* (Montagu) var. *striata*); Mestayer, 1916: 129; Eade, 1967a: 30; Colom, 1974: 99, fig. 13n; Hayward & Buzas, 1979: 61, pl. 19, fig. 23b (Miocene); Boltovskoy *et al.*, 1980: 36 (descr., etc.), pl. 19, figs 13–17; Wynn Jones, 1984: 125–126 (to new genus *Phialinea*), pl. 5, figs 24–26.

Lagena distomargaritifera Parker & Jones, 1865

Parker & Jones, 1865: 357, pl. XVIII, figs 6a-b;

Brady, 1884: 458, pl. LVIII, fig. 16; Parr, 1932a: 11, pl. I, figs 16–17; Barker, 1960: 117, pl. 58 (LVIII), fig. 16; Eade, 1967a: 30 (as *L. distoma-margaritifera*); Albani, 1968a: 24, fig. 87; Albani, 1968b: 103 (descr., distrib. etc., on *L. distoma margaritifera*), pl. 8, figs 4–5; Collins, 1974: 21 (Australia); Thompson, 1975 thesis: 76 (descr.), pl. 9, fig. 6; Albani, 1979: 29 (descr.), fig. 51.4; Albani & Yassini, 1989: 381–383 (descr., transf. to *Procerolagena* Puri, 1954 as *P. distoma margaritifera*) figs 3B–C.

Lagena elongata (Ehrenberg, 1844)

Ehrenberg, 1844b: 274, pl. XXV, fig. 1 (*Miliola*); Seguenza, 1862a: 51, pl. I, fig. 36 (as *Lagena cylindracea*); Brady, 1884: 457, pl. LVI, figs 27 & 29; Cushman, 1913: 12, pl. 1, fig. 5; Cushman & McCulloch, 1950: 338, pl. 44, fig. 14; Parr, 1950: 299 (remarks, refs); Barker, 1960: 116, pl. 56 (LVI), figs 27–29; Eade, 1967a: 30 (N.Z. refs); Collins, 1974: 21 (Australia); Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Rare, occurs at several stations on slope."); Albani, 1979: 29 (descr.), fig. 51.6; Hayward & Buzas, 1979: 61 (Miocene), pl. 19, fig. 239; Albani & Yassini, 1989: 383 (descr., etc., transf. to *Procerolagena*), fig. 3H.

Lagena flatulenta Loeblich & Tappan, 1953

Loeblich & Tappan, 1953: 60, pl. 11, figs 9–10; Hulme, 1964: 326; Eade, 1967a: 30; Albani, 1968a: 24, fig. 86; Albani, 1968b: 103 (remarks); Collins, 1974: 22; Albani, 1979: 29 (descr.), fig. 51.7; Patterson & Richardson, 1988: 243 (to new genus *Pygmaeoseistron*); Albani & Yassini, 1989: 377–378 (descr., etc.), fig. 2L.

Lagena foveolata Reuss, 1863

Reuss, 1863b: 322, pl. 5, fig. 65; Eade, 1967a: 30 (N.Z. refs).

Lagena gracilis gracilis Williamson, 1848

Williamson, 1848: 13, pl. I, fig. 5; Brady, 1884: 464, pl. LVIII, figs 19, 22–24; Cushman, 1913: 24, pl. 8, figs. 5–6; Cushman, 1933a: 33 (descr., refs), pl. 8, figs 5–7, table 20; Cushman, 1933b: 1–79, pls; Barker, 1960: 119 (generic placing etc.), pl. 58 (LVIII), figs 19, 22–24; Eade, 1967a: (N.Z. refs); Murray, 1971: 80–81 (diag. features etc.), pl. 31, figs 4–6; Collins, 1974: 21 (Australia); Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Fairly common on outer shelf and slope."); Hayward & Buzas, 1979: 61 (Miocene), pl. 19, fig. 237; Boltovskoy *et al.*, 1980: 37 (descr., etc.), pl. 19, figs 18–19; Wynn Jones, 1984: 131, pl. 7, fig. 2.

Lagena gracillima (Seguenza, 1862)

Seguenza, 1862a: 51, pl. 1, fig. 37 (*Amphorina*); Brady, 1884: 456, pl. LVI, figs 21–22, 24–26; Cushman, 1913: 11, pl. 1, fig. 4; Cushman, 1921 : 175 (refs); Nuttall, 1927: 225 ("Challenger" figured specimen, localities); Parr, 1950: 300 (remarks); Barker, 1960: 116 (placing etc.), pl. 56 (LVI), figs 21–22, 24–26; Eade, 1967a: 30 (N.Z. refs); Albani, 1968a: 24, fig. 85; Colom, 1974: 99, fig. 13m; Albani, 1979: 29 (descr.), fig. 51.8; Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Rare, on inner shelf only."); Larsen, 1982: pl. 8, fig. 8; Albani & Yassini, 1989: 384 (descr., etc., transf. to *Procerolagena*), fig. 3J.

Lagena hertwigiana Brady var. **undulata** Sidebottom, 1912

Sidebottom, 1912: 397, pl. 16, figs 26–28; Sidebottom, 1913: 178; Eade, 1967a: 30.

Lagena hispida Reuss, 1858

Reuss, 1858: 434; Brady, 1884: 459, pl. LVII, figs 1–4, pl. LIX, figs 2 & 5; Cushman, 1913: 13, pl. 4, figs 4–5, pl. 5, fig. 1; Cushman, 1921: 176 (refs etc.); Eade, 1967a: 30 (N.Z. refs); Quilty, 1974: 67, pl. 3, fig. 99; Thompson, 1975 thesis: 76 (incl. *L. hispidula* Cushman), pl. 9, figs 7–8; Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Rare, on upper slope and Motukura Bank."); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Larsen, 1982: pl. 8, figs 9–10.

Lagena hispidula Cushman, 1913

Cushman, 1913: 14, pl. V, figs 2–3; Heron-Allen & Earland, 1932: 364, pl. 10, fig. 6; Earland, 1934: 152–153, pl. 6, figs 58–60; Parr, 1950: 300 (refs); cf. Andersen, 1961: 74, pl. 16, fig. 9; Thompson, 1975 thesis: 76 (incl. in *L. hispida*, N.Z.); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Boltovskoy *et al.*, 1980: 37 (descr.), pl. 19, figs 20–22; Wynn Jones, 1984: 132, pl. 7, fig. 4; Patterson & Richardson, 1988: 243 (designated type speces of new genus *Pygmaeoseistron*); Albani & Yassini, 1989: 378 (descr.), fig. 2T.

Lagena interrupta Williamson, 1848

Williamson, 1848: 14, pl. 1, fig. 7 (*Lagena striata* (Montagu) var. a. *interrupta*); Cushman, 1933: 33, pl. 8, figs 4a-b; Murray, 1971: 83 (diag.), pl. 33, figs 1–5; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); cf. Boltovskoy *et al.*, 1980: 37, pl. 20, figs1–3.

Lagena cf. **koreana** McCulloch, 1977. Hayward, 1981

Hayward, 1981a: Tutukaka Harbour, as *L.* cf. *koreana* McCulloch, 1977: 38, pl. 53, fig. 10; Hayward & Grace, 1981: 53 (off Cuvier Is); cf. also McCulloch, 1981: 92, pl. 35, figs 1–2.

Lagena laevicostata Cushman & Gray, 1946

Cushman & Gray, 1946: 68 (*L. sulcata* (Walker & Jacob) var. *laevicostata*, Pliocene, California), pl. 12, figs 13–14; Cushman & McCulloch, 1950: 361, pl. 48, figs 8–10; cf. Andersen, 1961: 75, pl. 16, fig. 7; Feyling-Hanssen *et al.*, 1971: 210, pl. 4, figs 4–5, pl. 16, figs 7–9; Thompson, 1975 thesis : 77, pl. 10, figs 3–6 (as *L. sulcata* var. *laevicostata*); Hayward, 1981a: 91 (Tutukaka Harbour).

Lagena laevis (Montagu, 1803)

Montagu, 1803 : 524 (*Vermiculum*); Williamson, 1848 : 12, pl. 1, figs 1–2 (*Lagena*); Brady, 1884 : 455, pl. LVI, figs 7–8; Cushman, 1913: 5, pl. 1, fig. 3, pl. 38, fig. 5; Heron-Allen & Earland, 1913a: 77, pl. VI, fig. 5; Cushman, 1933: 19–20, pl. 4, figs 5a-b; Barker, 1960: pl. 56, figs 7–9, pl. 57, figs 14, 16–17; cf. Andersen, 1961: 76, pl. 16, fig. 13; Eade, 1967a: 30 (N.Z. refs); Murray, 1971: 82–83 (diag. features etc.), pl. 32, fig 6–7; Schnitker, 1971: 169–215, pl. 4, fig. 2; Haynes, 1973: 84–85 (diag., descr., distrib., refs etc.), pl. 12, fig. 2; Quilty, 1974: 68 (refs), pl. 3, figs 101–102; Boltovskoy & Wright, 1976: 144; Hayward & Buzas, 1979: 62; Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Moderately common on banks and slope."); Boltovskoy *et al.*, 1980: 37 (descr., etc.), pl. 20, figs 4–10; Todd & Low, 1981: 24 (in key), 1 fig.; Larsen, 1982: pl. 8, fig. 11.

Lagena cf. **laevis** (Montagu, 1803). Vella, 1957

Vella, 1957: 9 (Cook Strait, as *L.* cf. *laevis* (Montagu, 1803), *q.v.*); Eade, 1967: 30 (listed).

Lagena laevis var. **distoma** Silvestri, 1900

Silvestri, 1900b: 244, pl. 6, figs 74–75; Eade, 1967a: 30 (ref.).

Lagena aff. **laevis** (Montagu, 1803). Lewis, 1979

Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Rare, on outer shelf and slope." — referred to Brady, 1884: pl. LVII, fig. 14 — see also Barker, 1960: 118, pl. 57 (LVII), fig. 14).

Lagena lyellii (Seguenza, 1862)

Seguenza, 1862a: 52, pl. 1, fig. 40 (*Amphorina*); Brady *et al.*, 1870: 292, pl. XI, fig. 7; Eade, 1967a: 30 (N.Z. refs); Boltovskoy *et al.*, 1980: 38 (descr., etc., as *L. sulcata* forma *lyellii*), pl. 20, figs 15–17; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward & Grace, 1981: 53 (off Cuvier Is).

Lagena paradoxa Sidebottom, 1912

Sidebottom, 1912: 395, pl. 16, figs 22–23 (*L. foveolata* var. *paradoxa*); Sidebottom, 1913: 177, pl. 15, fig. 32; Cushman, 1933: 29 (descr., etc.), pl. 7, figs 9–10, table 19; Eade, 1967a: 30; Wynn Jones, 1984: 132, pl. 7, figs 7–9.

Lagena perlucida (Montagu, 1803)

Montagu, 1803 : 525, pl. XIV, fig. 3 (*Vermiculum*); Cushman, 1923: 46, pl. VIII, figs 12–13 (*Lagena*); Heron-Allen & Earland, 1930: 165 (name status); Cushman, 1931: 8, pl. III, fig. 6; Cushman, 1933: 20, pl. IV, figs 6–8; Cushman, 1947: pl. XXI, figs 18a-b; Cushman & McCulloch, 1950: 342, pl. 46, figs 1–2 (*Lagena*); Carvalho & Chermont, 1952: 86 (descr., distrib.), pl. I, figs 20a-b; Cushman, 1955: 221 (generic descr.), key pl. 21, fig. 18; Barker, 1960: 116, pl. LVIII, fig. 14 (as *L.* sp. aff. *laevis*); Albani, 1968a: 24, fig. 89; Thompson, 1975 thesis: 77, pl. 9, figs 3–4.

Lagena pliocenica Cushman & Gray, 1946 var. **discrepans** Cushman & Gray, 1946

Cushman & Gray, 1946: 19, pl. 3, figs 35–38; Cushman & McCulloch, 1950: 344, pl. 46, fig. 9; Thompson 1975 thesis: 77, pl. 10, figs 1–2; cf. Patterson & Richardson, 1988: 247 (ref. to new genus *Exsculptina*).

Lagena plumigera Brady, 1881

Brady, 1881: 62; Brady, 1884: 465, pl. LVIII, figs 18, 25, 27; Heron-Allen & Earland, 1922: 147; Eade, 1967a: 30; Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Rare, outer shelf and upper slope.") — (referred to Brady, 1884: pl. LVIII, figs 18 (cf. Barker, 1960: 119, re status), 25, 27 (cf. Barker, 1960: 120)).

Lagena protea Chaster, 1892

Chaster, 1892: 62, pl. 1, fig. 14; Sidebottom, 1913: 203; Eade, 1967a: 30; Adams *et al.*, 1980: 7 (type).

Lagena semistriata Williamson, 1848

Williamson 1848: 14, pl. I, figs 9–10 (*L. striata* (Walker) var. *semistriata*); Brady, 1884: 465, pl. LVII, figs 14, 16–17; Cushman, 1921: 179; Cushman, 1923: 50, pl. IX, fig. 15; Cushman, 1933: 32, pl. 8, figs 1a-b; Eade, 1967a: 31 (N.Z. refs); Murray, 1971: 85 (diag. features etc.), pl. 33, figs 4–8; Haynes, 1973: 87–88 (diag., descr., distrib., refs etc.), pl. 12, fig. 6, pl. 13, fig. 4; Colom, 1974: 109, fig. 13p; Murray, 1979: 38 (descr.), fig. 11E; Wynn Jones, 1984: 133, pl. 7, fig. 12.

Lagena sphaerula Silvestri, 1902

Silvestri, 1902: 162, text-figs 68–70; Heron-Allen & Earland, 1922: 144 (N.Z.); Eade, 1967a: 31.

Lagena spumosa Millett, 1902

Millett, 1902: 9, pl. I, figs 9a-b; Sidebottom, 1913: 179, pl. 16, fig. 4; Eade, 1967a: 31.

Lagena stelligera Brady, 1881

Brady, 1881: 60; Brady, 1884: 466, pl. LVII, figs 35–36; Eade, 1967a: 31 (N.Z. refs).

Lagena stelligera var. **eccentrica** Sidebottom, 1912

Sidebottom, 1912: 392, pl. 16, figs 5–6; Eade, 1967a: 31 (N.Z. refs).

Lagena striata (d'Orbigny, 1839)

d'Orbigny, 1839c: 21, 80, pl. V, fig. 12 (*Oolina*); Brady, 1884: 460, pl. LVII, figs 22, 24 (*Lagena*), 28; Cushman, 1913: 19, pl. 7, figs 4–5; Cushman, 1933: 32, pl. 8, figs 11–13; Feyling-Hanssen, 1964 : 293, pl. 12, figs 4–5; Eade, 1967a: 31 (N.Z. refs); Albani, 1968b: 103 (distrib.); Kameswara Rao, 1970: 261 (descr., refs), pl. IV, fig. 39; Schnitker, 1971: pl. 4, fig. 3; cf. Haynes, 1973: 89; Collins, 1974: 20 (Australia, refs); Quilty, 1974: 69 (refs), pl. 3, fig. 105; Gordon & Ballantine, 1976: 96 (listed from Leigh region after Thompson, 1975 as *Lagena* cf. *striata* Cushman & McCulloch); Boltovskoy & Wright, 1976: 251; Hayward & Buzas, 1979: 62, pl. 19, fig. 240; Albani, 1979: 30 (descr.), fig. 51.11; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Lewis, 1979: 27, table 5 (off Southern Hawkes Bay: "Common from inner shelf to mid slope."); Boltovskoy *et al.*, 1980: 37–38 (descr., etc.), pl. 20, figs 11–14; Todd & Low, 1981: 25 (in key), 1 fig.; Larsen, 1982: pl. 8, fig. 12.

Lagena cf. **striata** (d'Orbigny, 1839). Cushman & McCulloch, 1950.

Cushman & McCulloch, 1950: 350, pl. 47, figs 1–4 (as *L.* cf. *striata* d'Orbigny, 1839: 21, pl. 5, fig. 12 (*Oolina*); Chapman, 1906: 91 (*Lagena*); Barker, 1960: 118, pl. LVII, figs 19, 22, 24, 28; Feyling-Hanssen *et al.*, 1971: 210, pl. 16, fig. 5; Gregory, 1971: 196, pl. VII, fig. 5; Eade, 1967a: 31; Thompson, 1975 thesis: 77, pl. 11, figs 3–4,

Lagena substriata Williamson, 1848

Williamson, 1848: 15, pl. I, fig. 12; Cushman, 1923: 56, pl. X, fig. 11; Hulme, 1964: 327; Eade, 1967a: 31; Murray, 1971: 86–87 (diag. features etc.), pl. 34, figs 1–4; Haynes, 1973: 89–90 (diag., descr., distrib., remarks, refs & syn.), pl. 12, fig. 11, pl. 13, figs 6 & 11; Hayward & Buzas, 1979: 62, pl. 19, fig. 238.

Lagena sulcata (Walker & Jacob, 1798)

Walker & Jacob *in* Kanmacher [Adam], 1798: 634, pl. XIV, fig. 5 (*Serpula (Lagena)*); Brady, 1884: 462, pl. LVII, figs 23, 26, 33–34; Cushman, 1913: 22, pl. 9, fig. 2 (*Lagena*); Cushman, 1923: 58, pl. 11, fig. 1; Heron-Allen & Earland, 1930: 165 (refs etc.); Cushman, 1955: 221 (type species, generic descr.); Barker, 1960: pl. 57, figs 33–34; Eade, 1967a: 31 (N.Z. refs); Albani, 1968a: 24, fig. 90; Albani, 1968b: 103; Murray, 1971: 86–87 (diag. features etc.), pl. 34, figs 5–8; Haynes, 1973: 90–92 (diag., descr., remarks, distrib., refs & syn.), pl. 12, fig. 9, pl. 13, fig. 10; Collins, 1974: 20 (refs); Quilty, 1974: 69–70 (refs), pl. 3, fig. 106; Albani, 1979: 30 (descr.), fig. 51.14; Hayward & Buzas, 1979: 62; Lewis, 1979: 28, table 5 (off Southern Hawkes Bay: "Rare, on Motukura Bank and slope.").

Lagena sulcata var. **spicata** Cushman & McCulloch, 1950

Cushman & McCulloch, 1950: 360, pl. 48, figs 3–7 (new name for *L. sulcata* var. *apiculata* Cushman, 1913, not of Reuss, 1851); Cushman, 1921: 180; Eade, 1967a: 31; Thompson, 1975 thesis: 77, pl. 10, fig. 7, pl. 11, figs 1–2; Hayward, 1981a: 91 (Tutukaka Harbour, as *L. sulcata spicata*); Hayward & Grace, 1981: 53 (off Cuvier Is).

Lagena sulcata cf. var. **spicata** Cushman & McCulloch, 1950. (Vella, 1957)

Cushman & McCulloch, 1950: 360, pl. 48, figs 3–7; Vella, 1957: 9 (as "*Lagena* cf. *apiculata* Cushman"); Eade, 1967a: 31 (listed).

Lagena cf. **sulcata spirata** Bandy, 1949. Hayward, 1981

Hayward, 1981a: 91 (Tutukaka Harbour, as *L.* cf. *sulcata spirata* Bandy, 1949: 57, pl. 7, fig. 18, incl. Brady, 1884 (in part): pl. 57, fig. 23 (as *L. sulcata* (Walker & Jacob); Cushman, 1923: 57, pl. 2 [II], fig. 1).

Lagena tubulata Sidebottom, 1912

Sidebottom, 1912: 385, pl. 15, figs 3–5 (*L. hispida* var. *tabulata*); Sidebottom, 1913: 168, pl. 15, fig. 16; Eade, 1967a: 31.

Lagena trigonoorbignyana Balkwill & Millett, 1884

Balkwill & Millett, 1884: 81, pl. 3, fig. 10; Hayward, 1981a: 84 (first N.Z. record: "A rare species known from New Zealand by this single specimen."), 91, fig. 5h.

Lagena sp. Hayward, 1979

Hayward, 1979b: 185 (*Zostera* pool community, N.Z.).

Lagena sp. Hayward & Grace, 1981

Hayward & Grace, 1981: 53 (off Cuvier Is).

Lagena sp. Hayward, 1981

Hayward, 1981a: 91 (Tutukaka Harbour).

Lagena sp. Hayward, 1981
Hayward, 1981b: 133 (Bay of Islands).

Lagena sp. Hayward, 1982
Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments, off Little Barrier Is).

Lagena spp. Lewis, 1979
Lewis, 1979: 13 (table 5), 27 (off Southern Hawkes Bay: "It was found difficult to group specimens of *Lagena* into well defined species, so they were counted collectively and the presence of some conspicuous forms was noted. These forms are ... "*L. elongata* (Ehrenberg), *L. gracilis* Williamson, *L. gracillima* (Seguenza), *L. hispida* Reuss, *L. laevis* (Montagu), *L.* aff. *laevis* (Montagu), *L. plumigera* Brady, *L. striata* (d'Orbigny) and *L. suleata* (Walker & Jacobs), *q.v.*).

Family POLYMORPHINIDAE
Subfamily FALSOGUTTULININAE

Genus **Lingulosigmomorphina** Saidova, 1975

Lingulosigmomorphina sanata Saidova, 1975
Saidova, 1975: 202, pl. CV, fig. 6 ("Ob" Stn 358, 1418 m).

Subfamily POLYMORPHININAE

Genus **Globulina** d'Orbigny, 1839

Globulina gibba (d'Orbigny, 1826)
d'Orbigny, 1826: 226, Modèles No. 20 (*Polymorphina (Globulina)*); Brady, 1884: 561 (*Polymorphina*), pl. LXXI, figs 12a-b; Cushman, 1913: 85, pl. 41, fig. 4; Cushman, 1921: 267; Cushman & Ozawa, 1930: 60, pl. XVI, figs 1–4; Parr & Collins, 1937: 199 (Australian stratigraphic ranges), pl. XII, fig. 12; Dorreen, 1948: 289, pl. 37, fig. 1; Parr, 1950: 332; Cushman, 1955: 226 (type species, generic descr.), pl. 18, fig. 12, key pl. 22, figs 8 & 10; Eade, 1967a : 33 (N.Z. refs); Murray, 1971: 5, 90–91 (diag. features etc.), pl. 36, figs 1–3; Quilty, 1974: 79 (refs), pl. 4, fig. 127; Hayward & Buzas, 1979: 59; Todd & Low, 1981: 29 (in key), 3 figs; Larsen, 1982: pl. 9, fig. 7; Loeblich & Tappan, 1987: 419, pl. 457, figs 6–7 (type species).

Globulina inaequalis Reuss, 1850
Reuss, 1850: 377, pl. 48, fig. 9; Eade, 1967a: 33 (N.Z. refs); cf. Haynes, 1973: 99–100; Hayward, 1981: 91 (Tutukaka Harbour).

Globulina minuta (Roemer, 1838)
Roemer, 1838: 386, pl. 3, fig. 35 (*Polymorphina (Globulina)*); Eade, 1967a: 33 (N.Z. refs, note on syn.); Hayward & Grace, 1981: 53 (off Cuvier Is).

Globulina rotundata (Bornemann, 1855)
Bornemann, 1855: 346, pl. 18, fig. 3 (*Guttulina*); Cushman, 1913: 88, pl. 40, fig. 1; Heron-Allen & Earland, 1922: 182–183 (N.Z. as *Polymorphina*); Eade, 1967a: 33.

Genus **Guttulina** d'Orbigny, 1839

Guttulina australis d'Orbigny, 1839
d'Orbigny, 1839c: 60–61, pl. I, figs 1–4; Cushman, 1955: 224 (generic descr.); Hulme, 1964: 329 (ref.); Eade, 1967a: 33; (?) Boltovskoy *et al.*, 1980: 34 (in *Globulina* d'Orbigny, 1839), pl. 17, figs 5–7; Hayward & Grace, 1981: 53 (off Cuvier Is).

Guttulina austriaca d'Orbigny, 1846
d'Orbigny, 1846: 223, pl. 12, figs 23–25; Cushman & Ozawa, 1930: 29, pl. 4, figs 3–5; Eade, 1967a: 33 (N.Z. refs, note on syn.); Hayward & Buzas, 1979: 59.

Guttulina bartschi Cushman & Ozawa, 1930
Cushman & Ozawa, 1930: 23, pl. fig. 10; Kennett, 1966a: 36–37 (N.Z. Upper Miocene, remarks etc.); Eade, 1967a: 33 (listed); Hayward & Grace, 1981: 53 (off Cuvier Is).

Guttulina irregularis (d'Orbigny, 1846)
d'Orbigny, 1846: 226, pl. 13, figs 9–10 (*Globulina*); Cushman & Ozawa, 1930: 25, pl. 3, figs 3–4, pl. 7, figs 1–2 (*Guttulina*); Parr & Collins, 1937: 192, pl. XII, fig. 2 (Australian and N.Z. stratigraphic ranges); Eade, 1967a: 33 (ref.); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Guttulina lactea (Walker & Jacob, 1798)
Walker & Jacob *in* Kanmacher [Adams], 1798: 634, pl. 24, fig. 4 (*Serpula*); Brady, 1884: 559, pl. LXXI, fig. 11 (*Polymorphina*); Cushman, 1913: 84, pl. 34, fig. 8; Cushman, 1921: 265–266; Cushman & Ozawa, 1930: 43–44, pl. X, figs 1–4; Cushman & Parker, 1931: 9, pl. III, figs 10–11; Parr & Collins, 1937: 192, pl. XII, fig. 8; Carvalho & Chermont, 1952: 87, pl. I, fig. 6; Eade, 1967a: 34 (N.Z. refs); Albani, 1968a: 20, fig. 62; Albani, 1968b: 104 (distrib.); Schnitker, 1971: 169–215, pl. 4, fig. 10; Quilty, 1974: 80–81 (refs), pl. 4, fig.

131; Albani, 1979: 25 (features), fig. 37.1; Todd & Low, 1981: 28 (in key), 3 figs.

Guttulina problema (d'Orbigny, 1826)

d'Orbigny, 1826: 266, no. 14 (*Polymorphina*); Brady, 1884: 568, pl. LXXII, fig. 20, pl. LXXIII, fig. 1; Cushman, 1921: 264, pl. 54, figs 3–4; Cushman & Ozawa, 1930: 19, pl. 2, figs 1–6, pl. 3, fig. 1; Parr & Collins, 1937: 191, pl. XII, fig. 1 (Australian and N.Z. stratigraphic ranges); Cushman, 1955: 224 (generic descr.), pl. 18, fig. 5, key pl. 22, fig. 5; Eade, 1967a: 34 (N.Z. refs, note on syn.); Colom, 1974: 114, figs 15g-h; Albani, 1979: 25 (features), fig. 37.3; Hayward & Buzas, 1979: 59.

Guttulina regina (Brady, Parker & Jones, 1870)

Brady *et al.*, 1870: 241, pl. 14, figs 32-b (*Polymorphina*); Brady, 1884: 571, pl. LXXIII, figs 11–13; Cushman, 1913: 91, pl. XLI, figs 6–7; Cushman, 1919: 619 (N.Z.); Cushman, 1921: 263–264 (distrib., etc.); Cushman & Ozawa, 1930: 34, pl. 6, figs 1–2 (*Guttulina*); Parr & Collins, 1937: 193 (Australian and N.Z. stratigraphic ranges), text-figs 1–7, pl. XII, fig. 5; Parr, 1950: 332; Eade, 1967a: 34; Albani, 1968a: 21, fig. 65; Albani, 1968b: 104–105 (distrib.), pl. 8, figs 14–15; Collins, 1974: 24 (Port Phillip, Vic., refs); Quilty, 1974: 81, pl. 4, figs 132–134; Albani, 1979: 25 (features), fig. 37.4; Hayward & Grace, 1981: 53 (off Cuvier Is).

Guttulina spicaeformis (Roemer, 1838)

Roemer, 1838: 386, pl. 3, fig. 31 (*Polymorphina*); Cushman & Ozawa, 1930: 31, pl. 5, figs 1–2 (*Guttulina*); Andersen, 1961: pl. 17, fig. 16; Eade, 1967a: 34.

Guttulina vellai Saidova, 1975

Saidova, 1975: 206, pl. LIV, fig. 9 ("Ob" Stn 358, 1418 m).

Guttulina yabei Cushman & Ozawa, 1929

Cushman & Ozawa, 1929: 68, pl. XIII, fig. 2, pl. XIV, fig. 6; Brady, 1884: 569, pl. LXXIII, figs 2–3 (as *Polymorphina oblonga*, not of d'Orbigny); Cushman & Ozawa, 1930: 30, pl. IV, figs 6–7; Parr & Collins, 1937: 192, pl. XIII, figs 4a-c (Australian and N.Z. stratigraphic ranges); Parr, 1950: 332 (remarks); Vella, 1957: 9; Barker, 1960: 152, pl. LXXIII, figs 2–3; McKenzie, 1962: 124 (Australian occurrences); Eade, 1967a: 34; cf. Collins, 1974: 25–26 (new subspecies of *yabei* from Australia); Quilty, 1974: 82, pl. 4, fig. 136; Thompson, 1975 thesis: 79, pl. 13, figs 1–2.

Genus **Polymorphinella** Cushman & Hanzawa, 1936

Polymorphinella executa Saidova, 1975

Saidova, 1975: 176–177, pl. XLIX, fig. 14 ("Ob" Stn 354, 266 m); Cushman, 1955: 229 (generic descr.).

Genus **Pseudopolymorphina** Cushman & Ozawa, 1928

Pseudopolymorphina ligua (Roemer, 1838)

Roemer, 1838: 385, pl. 3, fig. 25 (*Polymorphina*); Cushman, 1955: 228 (generic descr.); Eade, 1967a: 34 (N.Z. refs); Albani, 1968a: 20, fig. 63; Albani, 1968b: 105; Albani, 1979: 25 (features), fig. 36.1; Tappan & Loeblich, 1982: pl. 49, fig. 7.

Pseudopolymorphina ovalis Cushman & Ozawa, 1930

Cushman & Ozawa, 1930: 103, pl. 27, fig. 1, pl. 29, fig. 6 (new name for *P. ovata* d'Orbigny, 1846: 233, pl. XIII, figs 1–3, not of 1826, see also Heron-Allen & Earland, 1922: 181, N.Z.); Eade, 1967a: 34.

Pseudopolymorphina aff. **ovalis** Cushman & Ozawa, 1930. Vella 1957.

Vella, 1957: 10, 14 (Cook Strait, as *P.* aff. *ovalis* Cushman & Ozawa, 1930, *q.v.*); Eade, 1967a: 34 (listed).

Pseudopolymorphina tortuosa Vella, 1957

Vella, 1957: 9, 30–31, pl. 8, figs 152–153 (incl. *P. doanei* (Galloway & Wissler) of Parr & Collins, 1937); Hedley *et al.*, 1965: 20; Eade, 1967a: 34.

Genus **Pyrulina** d'Orbigny, 1839

Pyrulina angusta (Egger, 1857)

Egger, 1857: 290, pl. 13, figs 13–15 (*Polymorphina (Globulina)*); Cushman, 1955: 228; Eade, 1967a: 34 (N.Z. refs); Boltovskoy & Wright, 1976: 121; Loeblich & Tappan, 1987: 421, pl. 457, figs 8–9, 19–21.

Pyrulina cylindroides (Roemer, 1838)

Roemer, 1838: 385, pl. 3, fig. 26 (*Polymorphina*); Parr & Collins, 1937: 198 (Australian and N.Z. stratigraphic ranges), pl. XIII, figs 7a-c (*Pyrulina*); Eade, 1967a: 34; Larsen, 1982: pl. 9, fig. 9.

Genus **Sigmoidella** Cushman & Ozawa, 1928

Sigmoidella elegantissima (Parker & Jones, 1865)

Parker & Jones, 1865: 438, table 10 (*Polymorphina*);

Parker & Jones *in* Brady, Parker & Jones, 1870 [1871]: 231, pl. XL, figs 15b-c [not a]; Brady, 1884: 566, pl. LXII, figs 12–15; Cushman, 1913: 90, pl. 38, fig. 1; Cushman, 1921: 267–268, pl. 54, figs 1–2; Cushman & Ozawa, 1930: 140, pl. XXXIX, fig. 1 (*Sigmoidella*); Parr & Collins, 1937: 206 (Australian and N.Z. stratigraphic ranges), pl. XIV, fig. 9; Parr, 1950: 335; Vella, 1957: 8, 10 (Cook Strait); Hedley *et al.*, 1965: 20, pl. 6, fig. 20; Eade, 1967a: 34 (N.Z. refs); Albani, 1968a: 20, fig. 61; Albani, 1968b: 105; Quilty, 1974: 85–86 (refs), pl. 4, fig. 142; Thompson, 1975 thesis: 79, pl. 13, figs 3–4; Hayward & Buzas, 1979: 74; Albani, 1979: 25 (features), fig. 35.1; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1981b: 133 (Bay of Islands); Tappan & Loeblich, 1982: 527–552, pl. 49, fig. 8; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Sigmoidella kagaensis Cushman & Ozawa, 1928

Cushman & Ozawa, 1928: 19, pl. V, fig. 14; Parr & Collins, 1937: 207 (Australian and N.Z. stratigraphic ranges), pl. XIV, fig. 10; Cushman, 1955: 229 (type species, generic descr.), pl. 18, fig. 7; Vella, 1957: 10 (Cook Strait); Eade, 1967a: 34; Collins, 1974: 25 (Victoria); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1981b: 133 (Bay of Islands); Loeblich & Tappan, 1987: 421, pl. 49, figs 3–7 (type species).

Sigmoidella novozealandica Parr & Collins, 1937

Parr & Collins, 1937: 208, pl. XV, figs 8a-c; Eade, 1967a: 34 (listed).

Sigmoidella cf. **novozealandica** Parr & Collins, 1937. Vella, 1957.

Vella, 1957: 10, 31 (Cook Strait, as *S.* cf. *novozealandica* Parr & Collins, 1937, *q.v.*); Eade, 1967a: 34 (listed).

Sigmoidella pacifica Cushman & Ozawa, 1928

Cushman & Ozawa, 1928: 19, pl. 2, fig. 13; Cushman & Ozawa, 1930: 50, pl. 37, figs 3–5 (*Guttulina (Sigmoidina)*); Eade, 1967a: 34; Boltovskoy & Wright, 1976: 104.

Sigmoidella cf. **pacifica** Cushman & Ozawa, 1928. (Hornibrook, 1952)

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait oyster-beds, as *Guttulina* cf. *pacifica* (Cushman & Ozawa, 1928, *q.v.*); Eade, 1967a: 34 (listed).

Genus **Sigmoidina** Cushman & Ozawa, 1928

Sigmoidina silvestrii Cushman & Ozawa, 1930

Cushman & Ozawa, 1930: 51, pl. 37, figs 6–7 (in subgenus *Sigmoidina*); Parr & Collins, 1937: 197, pl. XII, fig. 11; Cushman, 1955: 224 (*Sigmoidina* incl. in *Guttulina*); Vella, 1957: 9, 14; Eade, 1967a: 34; Collins, 1974: 25 (Victoria); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981: 91 (Tutukaka, in *Guttulina*); Hayward, 1982b: 65 (off Little Barrier Is, in *Sigmoidina*).

Genus **Sigmomorphina** Cushman & Ozawa, 1928

Sigmomorphina lacrimosa Vella, 1957

Vella, 1957: 10, 31, pl. 8, figs 149–151; Cushman, 1955: 229 (generic descr.); Eade, 1967a : 34 (listed); Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Only on Madden Banks"); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 65 (Hauraki Gulf nearshore sediments).

Sigmomorphina rhomboidalis Vella, 1957

Vella, 1957: 10, 14, 31, pl. 8, fig. 154; cf. Kennett, 1966: 37; Eade, 1967a: 34 (listed).

Subfamily RAMULININAE

Genus **Ramulina** Jones, 1875

Ramulina globulifera Brady, 1879

Brady, 1879b: 272–273, pl. VIII, figs 32–33; Brady, 1884: 587–588, pl. LXXVI, figs 22–28; Cushman, 1913: 110, pl. 39, fig. 1; Heron-Allen & Earland, 1922: 186; Ellis & Messina, 1940: refs 1884–1937; Cushman, 1955: 230 (generic descr.), key pl. 22, fig. 23; Barker, 1960: 158, pl. LXXVI, figs 22–28; Andersen, 1961: pl. 17, fig. 14; Eade, 1967a: 34 (N.Z. refs); Albani, 1968a: 20, fig. 53; Thompson, 1975 thesis, 80: pl. 13, fig. 5; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank, rare on upper slope."); Albani, 1979: 24 (features), fig. 34.1; Adams *et al.*, 1980: 10 (types).

Ramulina laevis Jones, 1875

Jones (MS) *in* Wright, 1875: 88, pl. 3, fig. 19; Chapman, 1906: 99; Ellis & Messina, 1940: refs 1896–1933; Cushman, 1955: 230 (type species, generic descr.); Eade, 1967a: 34; Loeblich & Tappan, 1987: 424, pl. 461, figs 7–8 (type species).

(?) **Ramulina** sp. Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 187, 2 text-figs; Eade, 1967a: 34 (listed).

Family ELLIPSOLAGENIDAE
Subfamily OOLININAE

Genus **Oolina** d'Orbigny, 1839

Oolina ampulladistoma (Jones, 1872)
Jones, 1872: 63, pl. 19, fig. 52 (*Lagena vulgaris* var. *ampulla-distoma*); Heron-Allen & Earland, 1922: 145 (N.Z. as *Lagena*); Cushman, 1955: 221 (*Oolina* incl. in *Lagena* Walker & Jacob, 1798); Eade, 1967a: 35.

Oolina apiculata Reuss, 1851
Reuss, 1851a: 22, pl. 1, fig. 1; Brady, 1884: 453, pl. LVI, fig. 4, 15–18 (*Lagena*); Cushman, 1913: 13; Cushman, 1921: 176, pl. 52, fig. 6; Eade, 1967a: 35 (N.Z. refs); Quilty, 1974: 92, pl. 4, fig. 157; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Lewis, 1979: 29, table 5 (off Southern Hawkes Bay, as *O. apicularis* [sic]: "Rare, on outer shelf" — referred to Brady, 1884: 453, pl. LVI, fig. 15; see also Barker, 1960: 160, pl. 56, fig. 15).

Oolina borealis Loeblich & Tappan, 1954
Loeblich & Tappan, 1954: 384 (new name for *Lagena costata* (Williamson, 1858: 9, pl. 1, fig. 18, as *Entosolenia*), not of Egger, 1857; Hulme, 1964: 328 (ref., as *O. costata* (Williamson, 1858); Eade, 1967a: 35 (N.Z. refs); Haynes, 1973: 105–106 (diag., descr., remarks, distrib., refs), pl. 14, fig. 6; Collins, 1974: 26 (Australia); Boltovskoy & Wright, 1976: 102; Boltovskoy *et al.*, 1980: 41 (descr., etc.), pl. 23, figs 7–8; Hayward & Grace, 1981: 53 (off Cuvier Is); Todd & Low, 1981: 26 (in key), 3 figs; Hayward, 1981a: 91 (Tutukaka Harbour).

Oolina botelliformis (Brady, 1881)
Brady, 1881: 60 (*Lagena*); Brady, 1884: 454–455, pl. LVI, fig. 6; Cushman, 1928: 8, pl. 1, fig. 10; Heron-Allen & Earland, 1922: 143 (New Zealand); Barker, 1960: 114, pl. 56, fig. 6; Eade, 1967a: 35; Hayward & Buzas, 1974: 67, pl. 23, fig. 282; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Rare, on lower slope").

Oolina desmophora (Jones, 1872)
Jones, 1872: 54, pl. 19, figs 23–24 (*Lagena vulgaris* var. *desmophora*); Cushman, 1919: 609 (*Lagena*); Eade, 1967a: 35.

Oolina felsinea (Fornasini, 1894)
Fornasini, 1894: 17 (*Lagena*); Brady, 1884: 452, pl. LVI, fig. 4 (as *Lagena apiculata* (Reuss)); Barker, 1960: 114, pl. 56, fig. 4 (identity); Thalmann, 1960: 385 (listed as "species inquirendae sive dubia"); Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Rare on lower slope.").

Oolina globosa globosa (Montagu, 1803)
Montagu, 1803: 523, pl. I, fig. 8 (*Vermiculum*); Brady, 1884: 452–453, pl. LVI, figs 1–3 (*Lagena*); Rhumbler, 1906: 63 (Chatham Is record as *Lagena*); Chapman, 1909: 333; Cushman, 1913: 3, pl. 4, fig. 2 (*Lagena*); Cushman, 1921: 173 (refs); Cushman, 1923: 20, pl. 4, figs 1–2; Parr, 1950: 302 (incl. Wiesner, 1931: 119, pl. XVIII, fig. 24 (as *Lagena (Entosolenia) globosa* var. *caudigera*), fig. 215 (as *L. (E.) ovata* var. *caudigera*)); Barker, 1960: pl. 56, figs 1–3 (*Oolina*); Eade, 1967a: 35 (N.Z. refs); Albani, 1968a: 24, fig. 92; Albani, 1968b: 105 (range); Quilty, 1974: 92–93 (refs), pl. 4, fig. 58; Thompson, 1975 thesis: 80; Albani, 1979: 31 (features), fig. 53.2; Hayward & Buzas, 1979: 68, pl. 23, figs 284–285; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Ubiquitous but rare."); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Boltovskoy *et al.*, 1980: 41 (descr., etc.), pl. 23, figs 13–14; Todd & Low, 1981: 25 (in key), 2 figs; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward 1981a: 91 (Tutukaka Harbour); Hayward, 1982b: 64 (off Little Barrier Is); Larsen, 1982: pl. 9, fig. 11; Wynn Jones, 1984: 101, pl. 1, figs 10–11; Albani & Yassini, 1989: 386, figs 3P–Q; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Oolina globosa globosa var. **lineatopunctata** (Heron-Allen & Earland, 1922)
Heron-Allen & Earland, 1922: 142, pl. 5, figs 12–14 (*Lagena*); Eade, 1967a: 35 (listed).

Oolina hexagona (Williamson, 1848)
Williamson, 1848: 20, pl. II, fig. 23 (*Entosolenia squamosa* (Montagu) var. *hexagona*); Williamson, 1858: 13, pl. 1, fig. 32; Cushman, 1913: 17, pl. 6, figs 2–3 (*Lagena*); Cushman, 1923: 24, pl. 4, fig. 6; Wiesner, 1931: 120, pl. LVIII, figs 32–33 (as *Lagena (Entosolenia) scalariformis;* not *E. squamosa* (Montagu) var. *scalariformis* of Williamson); Parr, 1950: 304; Loeblich & Tappan, 1953: 69, pl. 14, figs 1–2; Barker, 1960: pl. 58, figs 32–33 (*Oolina*, taxon. notes); Andersen, 1961: pl. 20, figs 19a-b; Hulme, 1964: 327 (refs); Eade, 1967a: 35 (N.Z. refs); Murray, 1971: 5, 92–93 (diag. features etc.), pl. 37, figs 1–3; Haynes, 1973: 107–108 (diag., descr., distrib., refs & syn.), pl. 14, figs 12–13, pl. 15, figs 3 & 6; Collins, 1974: 27; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 80, pl. 14, figs 1–3; Albani, 1978: 379, fig. 7N; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Rare, on shelf,

upper slope and banks"); Albani, 1979: 32 (features), fig. 53.3; Hayward & Buzas, 1979: 68, pl. 23, fig. 286; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Boltovskoy *et al.*, 1980: 41 (descr., etc.), pl. 23, figs 15–17; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1982b: 64 (off Little Barrier Is); Larsen, 1982: pl. 9, fig. 12; Wynn Jones, 1984: 102, pl. 1, figs 17–18; Albani & Yassini, 1989: 386–387 (descr.), fig. 3N.

Oolina lineata (Williamson, 1848)

Williamson, 1848: 18, pl. 2, fig. 18 (*Entosolenia*); Rhumbler, 1906: 64 (Chatham Is record as *Lagena*), pl. 5, fig. 55; Loeblich & Tappan, 1953: 70, pl. 13, figs 11–13; Hulme, 1964: 328 (ref.); Eade, 1967a: 35 (N.Z. refs); Albani, 1968a: 24, fig. 94; Haynes, 1973: 109–110 (descr., remarks, etc., refs), pl. 14, figs 8–10; Boltovskoy & Wright, 1976: 144; Albani, 1979: 32 (features), fig. 53.4; Boltovskoy *et al.*, 1980: 41 (descr., etc.), pl. 23, figs 18–21; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Albani & Yassini, 1989: 387 (descr.), figs 4C–D.

Oolina melo d'Orbigny, 1839

d'Orbigny, 1839c: 20, 80, pl. V, fig. 9; Williamson, 1848: 19, pl. II, fig. 20 (as *Entosolenia squamosa* (Montagu) var. *catenulata*); Heron-Allen & Earland, 1932: 370, pl. X, figs 25–27 (in *Lagena*); Parr, 1950: 303 (in *Oolina*); Loeblich & Tappan, 1953: 71, pl. 14, figs 1–2; Barker, 1960: 120, pl. 58, figs 28–31 re. Brady's (1884) identif.); Hulme, 1964: 327 (refs); Eade, 1967a: 35 (N.Z. refs); Albani, 1968a: 24, fig. 93; Murray, 1968a: 83–96, Murray, 1971: 5, 92–93, 95 (diag. features, etc.), pl. 37, figs 4–6; Schnitker, 1971: 169–215, pl. 4, fig. 13; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 3, fig. 1; Gregory, 1973: 193–204, fig. 3.9 (N.Z. mangrove swamp ecol.); Topping, 1973 thesis: 25, pl. 6, fig. 2; Collins, 1974: 26 (Australia); Gordon & Ballantine, 1976: 96 (listed from Leigh region after Thompson, 1975 thesis: 80, pl. 14, figs 5–6); Boltovskoy & Wright, 1976: 144; Albani, 1979: 32 (features), fig. 53.5; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Common on inner shelf, moderately common on outer shelf and rare on upper slope."); Murray, 1979: 40 (descr.), fig. 11F; Boltovskoy *et al.*, 1980: 41–42 (descr., etc.), pl. 24, figs 1–5; Hayward & Grace, 1981: 53 (off Cuvier Is); Todd & Low, 1981: 26 (in key), 1 fig; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is); Larsen, 1982: 1–26, pl. 9, fig. 13; Albani & Yassini, 1989: 387 (descr.), fig. 4A; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Oolina aff. **melo** d'Orbigny, 1839. Hayward, 1979

Hayward, 1979b: 185 (*Zostera* pool community, N.Z. as *O.* aff. *melo* d'Orbigny, 1839, *q.v.*).

Oolina ovum (Ehrenberg, 1843)

Ehrenberg, 1843: 166 (*Miliola*); Brady, 1884: 454, pl. LVI, fig. 5 (*Lagena*); Barker, 1960: 114, pl. 56, fig. 5; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on lower slope.").

Oolina squamosa (Montagu, 1803)

Montagu, 1803: 526, pl. XIV, fig. 2 (*Vermiculum*); Williamson, 1858: 12, pl. I, fig. 29 (*Entosolenia*); Rhumbler, 1906: 64 (Chatham Is record as *Lagena*); Cushman, 1913: 16, pl. 6, fig. 1 (*Lagena*); Cushman, 1923: 51, pl. X, figs 3–4; Parr, 1950: 303; Loeblich & Tappan, 1953: 73, pl. 13, figs 9–10; Eade, 1967a: 35 (N.Z. refs); Haynes, 1973: 110–111 (diag., descr., remarks, distrib., refs & syn.), pl. 14, fig. 14, pl. 15, figs 4–5; Hayward & Buzas, 1979: 68, pl. 23, fig. 292; Boltovskoy *et al.*, 1980: 42 (descr., etc.), pl. 24, figs 6–8; Larsen, 1982: pl. 10, fig. 2; Wynn Jones, 1984: 102, pl. 1, figs 20–21.

Oolina striatopunctata (Parker & Jones, 1865)

Parker & Jones, 1865: 350 (*Lagena sulcata* var. *striatopunctata*); Eade, 1967a: 35 (N.Z. refs).

Oolina tasmanica Parr, 1950

Parr, 1950: 303, pl. VIII, fig. 4; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Oolina variata (Brady, 1881)

Brady, 1881: 61 (*Lagena*); Sidebottom, 1913: 170; Eade, 1967a: 35; Collins, 1974: 27.

Oolina williamsoni (Alcock, 1865)

Alcock, 1865: 193 (*Entosolenia*); Heron-Allen & Earland, 1922: 146 (N.Z. as *Lagena*); Eade, 1967a: 35; Murray, 1968: 83–96; Murray, 1971: 5, 94–95, pl. 38, figs 4–6 (diag. features etc.); Haynes, 1973: 111–112 (diag., descr., remarks, distrib., refs), pl. 14, figs 15–17, pl. 15, figs 1–2, 7.

Oolina sp. Thompson, 1975

Thompson, 1975 thesis: 80, pl. 13, figs 6–8 (cf. *O. variata* (Brady), *q.v.*, mid to outer shelf, northern N.Z.).

Oolina spp. Lewis, 1979

Lewis, 1979: 14 (table 5), 29 (Southern Hawkes Bay: "...it was found difficult to assign many specimens to recognised species. Those species that definitely occur ..." are : *O. apicularis* [sic, = *apiculata*],

O. botelliformis, O. felsinea, O. globosa, O. hexagona, O. melo, O. ovum, q.v. " Most specimens on the shelf are *O. melo*, those on the slope are referred to many species.")

Oolina sp. Hayward, 1981
Hayward, 1981a: 91 (Tutukaka Harbour).

Oolina spp. Hayward & Grace, 1981
Hayward & Grace, 1981: 53 (off Cuvier Is).

Oolina spp. Hayward, 1982
Hayward, 1982b: 64 (off Little Barrier Is).

Subfamily ELLIPSOLAGENINAE
Genus **Fissurina** Reuss, 1850

Fissurina acuta Reuss, 1863
Reuss, 1863b: 340, pl. 7, figs 90–91; Cushman, 1955: 267 (*Fissurina* incl. in *Entosolenia* Williamson, 1848); Eade, 1967a: 35 (N.Z. refs).

Fissurina alveolata alveolata (Brady, 1884)
Brady, 1884: 487–488, pl. XL, figs 30, 32 (*Lagena*); Sidebottom, 1913: 202, pl. 28, figs 11–12; Cushman, 1913: 33, pl. 18, fig. 1; Parr, 1950: 307; Barker, 1960: pl. 60, figs 30 & 32 (*Fissurina*); Eade, 1967a: 35; Hayward & Buzas, 1979: 56; Wynn Jones, 1984: 106, pl. 2, figs 15–16; Loeblich & Tappan, 1987: 428, pl. 465, figs 5–9.

Fissurina alveolata var. **separans** (Sidebottom, 1912)
Sidebottom, 1912: 425, pl. 21, fig. 5 (*Lagena*); Sidebottom, 1913: 203; Eade, 1967a: 35.

Fissurina annectens (Burrows & Holland, 1895)
Burrows & Holland *in* Jones, Parker & Brady, 1895: 203, pl. 7, fig. 11 (*Lagena*) (incl. *L. quadricostulata* of Brady, 1884); Chapman, 1909: 338 (as *Lagena fasciata*); Heron-Allen & Earland, 1922: 155; Parr, 1950: 308–309 (remarks); Barker, 1960: 122, pl. LIX, fig. 15 (*Fissurina*); Eade, 1967a: 35 (N.Z. refs, notes on syn.); Feyling-Hanssen *et al.*, 1971: 228; Quilty, 1974: 89, pl. 4, fig. 150; Thompson, 1975 thesis: 81, pl. 14, figs 7–8; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Ubiquitous but rare at any station" — referred to Brady, 1884: pl. LIX, fig. 15; see also Barker, 1960: 122, pl. 59, fig. 15, identity etc.).

Fissurina auriculata (Brady, 1881)
Brady, 1881: 61 (*Lagena*); Brady, 1884: 487, pl. 60, fig. 31 (not 29 & 33); Barker, 1960: pl. 60, fig. 29 (*Fissurina*); Eade, 1967a: 36 (N.Z. refs); Hayward & Buzas, 1979: 56 (Miocene); Boltovskoy *et al.*, 1980: 31 (descr., etc.), pl. 14, figs 18–20.

Fissurina baccata (Heron-Allen & Earland, 1922)
Heron-Allen & Earland, 1922: 162, pl. VI, figs 15–16 (N.Z. as *Lagena orbignyana* var. *baccata*); Eade, 1967: 37 (listed as *Fissurina orbignyana* var. *baccata*); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Fissurina biancae Seguenza, 1862
Seguenza, 1862a: 57, pl. 1, figs 48–50; Eade, 1967a: 36 (ref.); Hayward & Buzas, 1979: 56 (Miocene).

Fissurina bicarinata Terquem, 1882
Terquem, 1882: 31, pl. 1 (9), figs 24 a-b; Balkwill & Millett, 1884: 82, pl. 2, fig. 4 (*Lagena*); Brady, 1884: 485; Eade, 1967a: 36 (N.Z. refs).

Fissurina bicarinata var. **villosa** (Heron-Allen & Earland, 1922)
Heron-Allen & Earland, 1922: 161, pl. VI, figs 10–12 (*Lagena*); Eade, 1967a: 36 (listed).

Fissurina biumbonata McCulloch, 1977
McCulloch, 1977: 93, pl. 68, fig. 7; Hayward & Grace, 1981: 50 (first N.Z. records, off Cuvier Is; "... occasionally encountered in nearshore sediments around northern New Zealand ..."), 53, fig. 5d; Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments).

Fissurina castrensis (Schwager, 1866)
Schwager, 1866: 208, pl. V, fig. 22 (*Lagena*); Heron-Allen & Earland, 1922: 164 (N.Z.); Eade, 1967a: 36.

Fissurina claricurta McCulloch, 1977
McCulloch, 1977: 95, pl. 58, fig. 16; Hayward, 1981a: 83 (first N.Z. record; "... probably been lumped with *F. lucida* in the past), 90, fig. 5d; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Fissurina clathrata (Brady, 1884)
Brady, 1884: 485–486, pl. LX, fig. 4 (*Lagena*); Chapman, 1909: 338, pl. XV, fig. 11 (as *Lagena orbignyana* (Seguenza, 1862) var. *clathrata*); Heron-Allen & Earland, 1922: 165 (N.Z. remarks); Parr, 1950: 310 (*Fissurina*); Eade, 1967a: 36 (N.Z. refs); Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, at many stations from inner shelf to mid-slope." — referred to Brady, 1884: pl. LX, fig. 4; see also Barker, 1960: 124, pl. 60, fig. 4).

Fissurina aff. clathrata (Brady, 1884). Hayward, 1979

Hayward, 1979b: 184 (*Zostera* pool community, N.Z., as *F.* aff. *clathrata* (Brady, 1884), *q.v.*).

Fissurina clypeatomarginata (Jones, 1872 var. **crassa** (Sidebottom, 1912)

Sidebottom, 1912: 425, pl. 21, fig. 7 (*Lagena*); Heron-Allen & Earland, 1922: 165 (N.Z.); Eade, 1967a: 36; McCulloch, 1977: 103 (in new genus *Lagenosolenia*).

Fissurina contusa Parr, 1945

Parr, 1945: 203, pl. IX, fig. 6; Collins, 1974: 27; Hayward, 1981a: 83 (first N.Z. record; "... one of the most abundant *Fissurina* species in near-shore sediments around northern New Zealand."), 90, fig. 5e.

Fissurina contusa colomboensis McCulloch, 1977

McCulloch, 1977: 97, pl. 64, fig. 5; Hayward & Grace, 1981: 53 (off Cuvier Is).

Fissurina crebra (Matthes, 1939)

Matthes, 1939: 72 (*Lagena*); Brady, 1884: 446, pl. LIX, figs 6a, b(?) (as *L. acuta* (Reuss, 1858: 434 (as *Fissurina*)); Earland, 1934: 156 (as *Lagena marginata* var. *spinifera* nov.); Barker, 1960: 122, pl. 59, fig. 6 (identity etc.); Lewis, 1979: 30, table 5 (off Southern Hawkes Bay : "Rare on upper slope.").

Fissurina aff. cucullata Silvestri, 1902

Silvestri, 1902: 146; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on upper slope" — referred to Brady, 1884: pl. LXIX, fig. 25 as *Lagena orbignyana* (Seguenza)); see also Barker, 1960: 124, pl. 59, fig. 25 (identity etc.).

Fissurina danica (Madsen, 1895)

Madsen, 1895: 196, pl. O, fig. 4 (*Lagena*); Heron-Allen & Earland, 1922: 166 (N.Z.); Eade, 1967a: 36.

Fissurina danica var. **pendulum** (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 166, pl. VI, figs 13–14 (*Lagena*); Eade, 1967a: 36 (listed).

Fissurina earlandi Parr, 1950

Parr, 1950: 306, pl. VIII, figs 8a-b (incl. *Lagena marginata* of Chapman, 1916, not of Walker & Boys, 1784, and *L. biancae* of Heron-Allen & Earland, 1922, not of Seguenza, 1862); Vella, 1957: 9; Eade, 1967a: 36; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Ubiquitous but rare"). cf. Boltovskoy *et al.*, 1980: 31–32, pl. 15, figs 7–10.

Fissurina enderbiensis (Chapman, 1909)

Chapman, 1909: 399, pl. 16, fig. 1 (*Lagena*); Vella, 1957: 9 (Cook Strait); Eade, 1967a: 36.

Fissurina evoluta McCulloch, 1977

McCulloch, 1977: 104–105, pl. 58, figs 11–12 & 18; Hayward & Grace, 1981: 50 (first N.Z. records, off Cuvier Is; "... commonly encountered in small numbers in nearshore sediments around northern New Zealand"), 53, fig. 5e; Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands).

Fissurina exsculpta (Brady, 1881)

Brady, 1881: 61 (*Lagena*); Brady, 1884: 467, pl. LVIII, fig. 1, pl. LXI, fig. 5 (*Lagena*); Parr, 1950: 308 (*Fissurina*); Barker, 1960: 119, 127, pl. 58, fig. 1, pl. 61, fig. 5; Eade, 1967a: 36.

Fissurina fasciata (Egger, 1857)

Egger, 1857: 270, pl. 17, figs 12–15 (*Oolina*); Sidebottom, 1906: 6, pl. I, figs 13–16; Eade, 1967a: 36 (N.Z. refs); Collins, 1974: 29 (Australia).

Fissurina fasciata var. **carinata** (Sidebottom, 1906)

Sidebottom, 1906: 7, pl. 1, fig. 17 (*Lagena*); Sidebottom, 1913: 184, pl. 16, figs 14–16; Eade, 1967a: 36; Albani, 1968a: 25, fig. 96; Albani, 1968b: 105, pl. 8, fig. 17; Thompson, 1975 thesis: 81, pl. 15, figs 1–3; Albani, 1979: 31 (features, as *F. fasciata carinata*), fig. 52.1.

Fissurina fasciata var. **faba** (Balkwill & Millett, 1884)

Balkwill & Millett, 1884: 81, pl. 2, fig. 10 (*Lagena*); Heron-Allen & Earland, 1922: 155 (N.Z.); Eade, 1967a: 36.

Fissurina fimbriata fimbriata (Brady, 1881)

Brady, 1881: 61 (*Lagena*); Brady, 1884: 486, pl. LX, figs 26–28; Heron-Allen & Earland, 1922 : 166 (N.Z.); Wiesner, 1931: 122, pl. XIX, fig. 232 (*Lagena (Entosolenia)*); Parr, 1950: 307 (*Fissurina*); Barker, 1960: 126, pl. 60, figs 26–28; Eade, 1967a: 36; Wynn Jones, 1984: 109, pl. 2, figs 3–4.

Fissurina fimbriata fimbriata var. **occulosa** (Sidebottom, 1912)

Sidebottom, 1912: 423, pl. 20, figs 27–28 (*Lagena*); Sidebottom, 1913: 202; Eade, 1967a: 36.

Fissurina formosa (Schwager, 1866)

Schwager, 1866: 206, pl. 4, figs 19 a & d (*Lagena*); Cushman, 1913: 41, pl. 11, fig. 6; Sidebottom, 1913: 191, pl. 17, figs 3–4; Cushman, 1921: 183–284; Eade, 1967a: 36.

Fissurina aff. formosa (Schwager, 1866). Vella, 1957

Vella, 1957: 9 (Cook Strait, as *F.* aff. *formosa* (Schwager, 1866, *q.v.*); Eade, 1967a: 36 (listed).

Fissurina kerguelensis Parr, 1950

Parr, 1950: 305; Brady, 1884: 446, 474, pl. LIX, figs 8–9 (as *Lagena staphyllearia* (Schwager, 1866, *q.v.*), 485, pl. LX, figs 1 & 2 [not 3] (as *Lagena castrensis*, not of Schwager, 1866: 208, *q.v.*);); Barker, 1960: 122, pl. 59, figs 8–9; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Ubiquitous but rare").

Fissurina lacunata (Burrows & Holland, 1895)

Burrows & Holland *in* Jones, Parker & Brady, 1895: 205, pl. 7, figs 12 a-b (*Lagena*); Parr, 1950: 310; Eade, 1967a: 36 (N.Z. refs); Albani, 1968a: 25, fig. 101; Albani, 1968b: 105–106 (descr., distrib.), pl. 8, fig. 16; Schnitker, 1971: pl. 4, fig. 14; Collins, 1974: 27; Albani, 1979: 31 (features), fig. 52.2.

Fissurina laevigata Reuss, 1850

Reuss, 1850: 366, pl. 46, fig. 1; Brady, 1884: 473, pl. CXIV, figs 8a-b (*Lagena*); Cushman, 1913: 7, pl. 2, fig. 1; Cushman, 1923: 28, pl. 5, figs 1–2; Galloway, 1933: 253, pl. 22, fig. 22; Ellis & Messina, 1940: (refs 1856–1933); Barker, 1960: pl. 114, fig. 8 (*Fissurina*); Eade, 1967a: 36 (N.Z. refs); Hayward & Buzas, 1979: 57; Lewis, 1979: 12, table 5 (off Southern Hawkes Bay: "Rare, on slope."); Boltovskoy *et al.*, 1980: 32 (descr., etc.), pl. 15, figs 14–16; Todd & Low, 1981: 26 (in key), 2 figs; Loeblich & Tappan, 1987: 428, pl. 465 (type species).

Fissurina cf. **laevigata** Reuss, 1850. Hayward, 1982

Hayward, 1982b: 64 (off little Barrier Is, as *F. laevigata* Reuss, 1850, *q.v.*).

Fissurina lagenoides (Williamson, 1858)

Williamson, 1858: 11, pl. 1, figs 25–26 (*Entosolenia marginata* Walker & Boys var. *lagenoides*); Brady, 1884: 479, pl. LX, figs 6, 8–9, 12; Cushman, 1913: 39, pl. 16, fig. 2 (*Lagena*); Cushman, 1923: 30, pl. 5, figs 6–8; Barker, 1960: pl. 60, figs 6, 9 & 12; Eade, 1967a: 36 (N.Z. refs); Hayward & Buzas, 1979: 57, pl. 16, fig. 205 (Miocene).

Fissurina lagenoides var. **nuda** Chapman, 1909

Chapman, 1909: 338, pl. 15, fig. 9 (*Lagena*); Eade, 1967a: 36 (listed).

Fissurina lagenoides var. **tenuistriata** (Brady, 1881)

Brady, 1881: 61 (*Lagena tubulifera* var. *tenuistriata*); Eade, 1967a: 36 (N.Z. refs).

Fissurina cf. **lagenoides** (Williamson, 1858). Hulme, 1964

Hulme, 1964: 328 (Manukau Harbour, as *F.* cf. *lagenoides* (Williamson, 1858), *q.v.*, refs); Eade, 1967a: 36 (listed).

Fissurina lucida (Williamson, 1848)

Williamson, 1848: 17–18, pl. 2, fig. 17 (*Entosolenia marginata* (Montagu) var. *lucida*); Williamson, 1858: 10, pl. 1, figs 22–23; Sidebottom, 1906: 1, pl. I, figs 9–12 (*Lagena*); Sidebottom, 1913: 183, pl. 16, fig. 9; Mestayer, 1916: 129; Loeblich & Tappan, 1953 : 76, pl. 14, fig. 4; Vella, 1957: 9 (Cook Strait); Feyling-Hanssen, 1964: 315, pl. 15, fig. 21; Eade, 1967a: 36 (N.Z. refs); Murray, 1971: 5, 7, 96–97 (diag. features etc.), pl. 39, figs 1–3; Schnitker, 1971: 198 (ref.), pl. 4, fig. 15; Haynes, 1973: 95–97 (diag., descr., remarks, describ., refs etc.), text-figs 20, nos 3–4, pl. 14, figs 1–2; Collins, 1974: 27 (Australia); Thompson, 1975 thesis: 81, pl. 15, figs 1–3; Albani, 1978: 379, fig. 8F; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay : "Ubiquitous, fairly common on shelf."); Albani, 1979: 31 (features), fig. 52.3; Murray, 1979: 40 (characters), figs 11G–H; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Boltovskoy *et al.*, 1980: 32 (descr., etc.), pl. 15, figs 17–20; Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments); Buzas & Severin, 1982: 31, pl. 5, fig. 3 (refs); Albani & Yassini, 1989: 397 (descr.), fig. 4E; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Fissurina malcolmsonii (Wright, 1911)

Wright, 1911a: 4, pl. 1, figs 1–2 (*Lagena laevigata* var. *malcolmsonii*); Heron-Allen & Earland, 1922: 155 (N.Z.); Eade, 1967a: 36; Hayward, 1981a: 90 (Tutukaka Harbour).

Fissurina marginata (Walker & Boys, 1784)

Walker & Boys, 1784: 2, pl. I, fig. 7 (*Serpula (Lagena)*); Montagu, 1803: 524 (*Vermiculum*); Brady, 1884: 476, pl. LIX, figs 21–23 (but cf. *Fissurina wiesneri* Barker, 1960, *q.v.*); Cushman, 1923: 35, pl. 6, fig. 29 (*Lagena*); Parr, 1950: 305 (*Fissurina*); Eade, 1967a: 36 (N.Z. refs); Murray, 1971: 7, 96–97 (diag. features etc.), pl. 39, figs 4–6; Haynes, 1974: 97–98 (diag., descr., remarks etc.), text-figs 20, nos 7–8; Collins, 1974: 28; Quilty, 1974: 90, pl. 4, fig. 153; Boltovskoy & Wright, 1976: 40, 41; Albani, 1978: 379, fig. 8C; Albani, 1979: 31 (features), fig. 52.4; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Hayward & Buzas, 1979: 57 (Miocene), pl. 16, fig. 207; Murray, 1979: 40, figs 11I–J; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka

Harbour); Todd & Low, 1981: 26 (in key), 3 figs; Larsen, 1982: pl. 10, fig. 9; Loeblich & Tappan, 1987: 428, pl. 465; Albani & Yassini, 1989: 397 (descr.), fig. 6E; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Fissurina cf. **marginata** Walker & Boys, 1784. Hayward, 1981

Hayward, 1981b: 132 (Bay of Islands, as *F.* cf. *marginata* Montagu, *q.v.*); Hayward, 1982b: 64 (off Little Barrier Is).

Fissurina marginata var. **elegans** (Sidebottom, 1912)

Sidebottom, 1912: 409, pl. 18, fig. 12 (*Lagena*); Sidebottom, 1913: 188; Eade, 1967a: 36.

Fissurina marginata var. **striolata** (Sidebottom, 1912)

Sidebottom, 1912: 409, pl. 18, fig. 12 (*Lagena*); Sidebottom, 1913: 188; Eade, 1967a: 36.

Fissurina marginatoperforata (Seguenza, 1880)

Seguenza, 1880: 332, pl. 17, fig. 34 (*Lagena*); Eade, 1967a: 36 (N.Z. refs); Albani, 1978: 380; Albani, 1979: 31 (features), fig. 52.5; Albani & Yassini, 1989: 398 (descr.), figs 6F–G.

Fissurina orbignyana Seguenza, 1862

Seguenza, 1862a: 66, pl. II, figs 19–20; Brady, 1884: 484-485, pl. LIX, figs 1, 18, 20, 24–26; Rhumbler, 1906: 63 (Chatham Is record as *Lagena*), pl. 5, fig. 54; Cushman, 1923: 39 (*Lagena*); Barker, 1960: pl. 59, fig. 26 (*Fissurina*); Eade, 1967a: 37 (N.Z. refs); Murray, 1971: 7, 98–99 (diag. features etc.), pl. 40, fig 1–5; Collins, 1974: 27; Hayward & Buzas, 1979: 57, pl. 16, fig. 210; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments).

Fissurina orbignyana var. **selseyensis** (Heron-Allen & Earland, 1909)

Heron-Allen & Earland, 1909b: 426, pl. 17, figs 1–2 (*Lagena*); Heron-Allen & Earland, 1922: 162; Eade, 1967a: 37.

Fissurina orbignyana var. **unicostata** (Sidebottom, 1912)

Sidebottom, 1912: 417, pl. 19, fig. 22 (*Lagena*); Sidebottom, 1913: 195; Eade, 1967a: 37.

Fissurina orbignyana var. **variabilis** (Wright, 1891)

Wright, 1891: 482, pl. 20, fig. 9 (*Lagena*); Sidebottom, 1913: 196; Eade, 1967a: 37.

Fissurina orbignyana var. **walleriana** (Wright, 1891)

Wright, 1891: 481, pl. 20, fig. 8 (*Lagena*); Heron-Allen & Earland, 1922: 162; Eade, 1967a: 37.

Fissurina aff. **orbignyana** Seguenza, 1862. Lewis 1979

Lewis, 1979: 30, table 5 (off Southern Hawkes Bay : "Rare, on lower slope" — referred to Brady, 1884: pl. LIX, fig. 18 (as *Lagena*); see also Barker, 1960: 124, pl. 59 (LIX), fig. 18 (identity)).

Fissurina ornata (Williamson, 1858)

Williamson, 1858: 11, pl. 1, fig. 24 (*Entosolenia marginata* var. *ornata*); Heron-Allen & Earland, 1922: 159 (N.Z. as *Lagena*); Eade, 1967a: 37.

Fissurina pulchella (Brady, 1867)

Brady, 1867: 70 (*Lagena*); Brady, 1870: 294, pl. XII, fig. 1; Heron-Allen & Earland, 1922: 165 (N.Z.); Eade, 1967a: 37; Boltovskoy *et al.*, 1980: 32 (descr., etc.), pl. 16, figs 1-4.

Fissurina pulchella var. **hexagona** (Heron-Allen & Earland, 1916)

Heron-Allen & Earland, 1916a: 254, pl. 41, fig. 27 (*Lagena*); Heron-Allen & Earland, 1922: 165 (N.Z.); Eade, 1967a: 37; Adams *et al.*, 1980: 7 (type).

Fissurina quadrata (Williamson, 1858)

Williamson, 1858: 11, pl. 1, figs 27–28 (*Entosolenia marginata* var. *quadrata*); Chapman, 1909: 339 (*Lagena*); Sidebottom, 1913: 185 (*Fissurina*); Cushman, 1913: 35 (*Lagena*), pl. 14, fig. 9; Cushman, 1923: 47, pl. 9, figs 5-6; Barker, 1960: pl. 59, fig. 3 (*Fissurina*); Eade, 1967a: 37 (N.Z. refs); Quilty, 1974: 90, pl. 4, fig. 154; Thompson, 1975 thesis: 81, pl. 15, fig. 6; Hayward & Buzas, 1979: 57.

Fissurina quadrata var. **carinata** (Chapman, 1909)

Chapman, 1909: 339, pl. 15, fig. 12 (*Lagena*); Eade, 1967a 37 (listed).

Fissurina quadrirevertens (McCulloch, 1977)

McCulloch, 1977: 71, pl. 62, fig. 24 (*Lageno-solenia*); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 84 (" ... a common species in nearshore sediments around northern New Zealand"), 90, fig. 5f.

Fissurina reniformis (Sidebottom, 1913)

Sidebottom, 1913: 204, pl. 18, fig. 14 (*Lagena*); Heron-Allen & Earland, 1922: 155 (N.Z.); Eade, 1967a: 37.

Fissurina revertens (Heron-Allen & Earland, 1922)
Heron-Allen & Earland, 1922: 380, pl. XI, figs 26–28 (*Lagena*); Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: " Ubiquitous but rare").

Fissurina rizzae Seguenza, 1862
Seguenza, 1862a: 72, pl. 2, fig. 50; Ellis & Messina, 1940 (type descr. & fig.); Eade, 1967a: 37 (N.Z. refs).

Fissurina scarabaeus (Heron-Allen & Earland, 1922)
Heron-Allen & Earland, 1922: 164, pl. VI, figs 20–23 (*Lagena*); Eade, 1967a: 37 (listed).

Fissurina semialata (Balkwill & Millett, 1884)
Balkwill & Millett, 1884: 81, pl. 2, fig. 9 (*Lagena quadrata* (Williamson) var. *semi-alata*); Hayward, 1981a: 84 (first N.Z. record; "... moderately common around northern New Zealand"), 90, fig. 5g; Hayward, 1982b: 64 (Hauraki Gulf nearshore sediments).

Fissurina semimarginata (Reuss, 1870)
Reuss, 1870: 469 (*Lagena marginata* Williamson var. *semimarginata*); Schlicht, 1870: 11, pl. 4, figs 4–6; Brady, 1884: 446, pl. CIX, fig. 17; Loeblich & Tappan, 1953: 78, pl. 14, fig. 3 (*Fissurina*); Barker, 1960: pl. LIX, figs 17 & 19; Eade, 1967a: 37 (N.Z. refs); Collins, 1974: 29; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 81, pl. 15, figs 8–9); Boltovskoy *et al.*, 1980: 33 (descr., etc.), pl. 16, figs 8–10; Albani & Yassini, 1989: 398 (descr.), figs 6M–N.

Fissurina seminiformis (Schwager, 1866)
Schwager, 1866: 208, pl. 5, fig. 21 (*Lagena*); Eade, 1967a: 37 (N.Z. refs).

Fissurina squamosoalata (Brady, 1881)
Brady, 1881: 61 (*Lagena*); Sidebottom, 1913: 193, pl. 18, fig. 20; Eade, 1967a: 37.

Fissurina squamosomarginata (Parker & Jones, 1865)
Parker & Jones, 1865: 356, pl. 18, fig. 2 (*Lagena*); Eade, 1967a: 37 (N.Z. refs); Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on mid-slope — referred to Brady, 1884: 481, pl. LX, fig. 24 (as *Lagena squamoso-marginata*) see also Barker, 1960: 126, pl. 60, fig. 24).

Fissurina staphyllearia Schwager, 1866
Schwager, 1866: 209, pl. 5, fig. 24; Brady, 1884: 474, pl. LIX, figs 8–11; Cushman, 1913: 31, pl. 17, fig. 3; Galloway & Morrey, 1929: 23, pl. 2, fig. 18; Eade, 1967a: 37 (N.Z. refs).

Fissurina cf. **striolata** (Sidebottom, 1912). Hayward & Grace, 1981
Hayward & Grace, 1981: 53 (off Cuvier Is as *F.* cf. *striolata* (Sidebottom, 1912: 408 (as *L. marginata* (Walker & Boys, 1784) var. *striolata*); Hayward, 1981a: 90 (Tutukaka Harbour).

Fissurina submarginata (Boomgart, 1949)
Boomgart, 1949: 107 (*Entosolenia*); Brady, 1884: 476–477, pl. LIX, fig. 22 (as *Lagena marginata* Montagu); Barker, 1960: 124, pl. 59 (LIX), fig. 22; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on upper slope.").

Fissurina unguiculata (Brady, 1884)
Brady, 1884: 474, pl. LIX, fig. 12 (*Lagena*); Barker, 1960: 122, pl. 59, fig. 12; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on upper slope.").

Fissurina wiesneri Barker, 1960
Barker, 1960: 124, pl. 59 (LIX), fig. 23 (new name for *Lagena marginata* (Walker & Boys) of Brady, 1884: 476-477, pl. LIX, fig. 23 ("Challenger" Stn 168, off East Cape, 1100 fm), and for *L. marginata* var. *carinata* of Wiesner, 1931: 121 (not *L. quadrata* var. *carinata* Chapman, 1909 nor *Fissurina carinata* Reuss, 1863); Eade, 1967a: 37; Larsen, 1982: pl. 11, fig. 2.

Fissurina yokoyamae (Millett, 1895)
Millett, 1895: 656 (*Lagena*); Heron-Allen & Earland, 1922: 163, pl. VI, figs 17–18 (as *L. orbignyana* var. *yokoyamae*); Eade, 1967a: 37.

Fissurina sp. Cassie, 1961
Cassie, 1961: 21, 51 (Campbell Is).

Fissurina spp. Gregory, 1973
Gregory, 1973: table 2 (N.Z. mangrove swamp ecol.).

Fissurina sp. A. Thompson, 1975
Thompson, 1975 thesis: 82, pl. 16, figs 1–2; Gordon & Ballantine, 1977: 96 (listed from Leigh region).

Fissurina sp. B. Thompson, 1975
Thompson, 1975 thesis: 82, pl. 16, figs 3–5.

Fissurina sp. C. Thompson, 1975
Thompson, 1975 thesis: 82, pl. 16, figs 6–7.

Fissurina sp. D. Thompson, 1975
Thompson, 1975 thesis: 82, pl. 18, fig. 8, pl. 17, fig. 1.

Fissurina sp. E. Thompson, 1975
Thompson, 1975 thesis: 82, pl. 16, fig. 8, pl. 17, figs 2-4.

Fissurina sp. Hayward, 1979
Hayward, 1979b: 184 (*Zostera* pool community, N.Z.).

Fissurina spp. Hayward & Grace, 1981
Hayward & Grace, 1981: 53 (off Cuvier Is).

Fissurina spp. Hayward, 1981
Hayward, 1981a: 90 (Tutukaka Bay).

Fissurina spp. Hayward, 1981
Hayward, 1981b: 132 (Bay of Islands).

Subfamily PARAFISSURININAE
Genus **Parafissurina** Parr, 1947

Parafissurina curta Parr, 1950
Parr, 1950: 318, pl. X, figs 6a-b, 7 (BANZARE Stn 42 and others, Antarctic); Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on slope.").

Parafissurina inaequilateralis (Wright, 1886)
Wright, 1886: 321, pl. 26, fig. 10 (*Lagena marginata* var. *inaequilateralis*); Heron-Allen & Earland, 1922: 157 (N.Z.); Eade, 1967a: 37.

Parafissurina quadrata Parr, 1950
Parr, 1950: 316–317, pl. IX, figs 20a-b (BANZARE Stn 115, off Tasmania); Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on lower slope.").

Parafissurina schlichti (Silvestri, 1902)
Silvestri, 1902: 142, text-figs 9–11 (*Fissurina*); Chapman, 1909: 337, pl. 15, fig. 7 (*Lagena*); Heron-Allen & Earland, 1922: 156 (N.Z.); Parr, 1950: 317 (BANZARE Stn 115, off Tasmania), pl. X, fig. 5; Eade, 1967a: 37.

Parafissurina sublata Parr, 1950
Parr, 1950: 319, pl. X, figs 11a-b (BANZARE Stn 113, off Tasmania); Vella, 1957: 9; Eade, 1967a: 37.

Parafissurina unguis (Heron-Allen & Earland, 1913)
Heron-Allen & Earland, 1913a: 86, pl. 7, figs 1–3 (*Lagena*); Heron-Allen & Earland, 1922: 157 (N.Z.); Eade, 1967a: 37.

Parafissurina ventricosa (Silvestri, 1904)
Silvestri, 1904b: 10, fig. 6 (*Lagena*); Sidebottom, 1913: 206 (as *Lagena marginata* var. *ventricosa*); Eade, 1967a: 37; Lewis, 1979: 30, table 5 (off Southern Hawkes Bay: "Rare, on lower slope" — referred to Loeblich & Tappan, 1964: fig. 425, no. 9); Loeblich & Tappan, 1987: 429, pl. 466, figs 5–9 (type species).

Parafissurina spp. Lewis, 1979
Lewis, 1979: 14 (table 5), 30 (off Southern Hawkes Bay : "Some specimens of *Parafissurina* could not be assigned to known species. Those species that were recognised are ... "— *P. curta* Parr, *P. quadrata* Parr and *P. ventricosa* (Silvestri), *q.v.*).

Parafissurina sp. Hayward, 1981
Hayward, 1981a: 91 (Tutukaka Harbour); Cushman, 1955: 281 (type species, generic descr.), pl. 23, fig. 10.

Family GLANDULINIDAE
Subfamily GLANDULININAE

Genus **Glandulina** d'Orbigny, 1839

Glandulina laevigata (d'Orbigny, 1826)
d'Orbigny, 1826: 252, no. 1, pl. 10, figs 1–3 (*Nodosaria (Glandulina)*); Brady, 1884: 490, pl. LXI, figs 20–22; Cushman, 1913: 47, pl. 24, figs 1–2; Cushman, 1921 : 185–186, pl. 33, fig. 1; Chapman & Parr, 1926: 392, pl. XXI, fig. 7b (*Polymorphina*); Cushman & Ozawa, 1930: 143, pl. XL, figs 1a-b (*Glandulina*); Parr & Collins, 1937: 208–209, pl. XIII, figs 6a & c; Loeblich & Tappan, 1953: 81, pl. 16, figs 2–5; Cushman, 1955: 228 (type species,, generic descr.), pl. 18, fig. 14, key pl. 22, fig. 13; Andersen, 1961: pl. 17, fig. 13; Eade, 1967a: 34 (N.Z. refs); Colom, 1974: 115, fig. 182; Quilty, 1974: 88 (refs), pl. 4, fig. 139; Boltovskoy & Wright, 1976: 243; Larsen, 1982: pl. 9, fig. 10; Taylor *et al.*, 1985: 20 (descr., etc.), pl. 1, figs 1-4; Loeblich & Tappan, 1987: 432-433, pl. 468, figs 1–5 (type species).

Genus **Laryngosigma** Loeblich & Tappan, 1953

Laryngosigma hyalascidia Loeblich & Tappan, 1953
Loeblich & Tappan, 1953: 13 (table 1), 83–84, pl. 15, figs 6–8; Loeblich & Tappan, 1964: fig. 421, no. 9; Lewis, 1979 : 29, table 5 (off Southern Hawkes Bay: "Rare, at single station on inner shelf.").

Laryngosigma williamsoni (Terquem, 1878)
Terquem, 1878: 37 (*Polymorphina williamsoni*, new name for *P. lactea* var. *oblonga* Williamson, 1858, not

P. oblonga of d'Orbigny, 1846, nor *P. (Globulina) oblonga* Roemer, 1838); Cushman, 1923: 147, pl. 40, figs 7–8; Cushman & Ozawa, 1930: 138, pl. 38, figs 3–4; Parr, 1932a: 12, pl. 1, fig. 20; Heron-Allen & Earland, 1932: 393, pl. 12, figs 26–28; Parr & Collins, 1937: 205 (Australian and N.Z. stratigraphic ranges), pl. XV, fig. 5; Cushman, 1944: 23, pl. 3, fig. 21; Loeblich & Tappan, 1953: 13 (table 1), 84–85 (descr., etc, refs & syn.), pl. 16, fig. 1 (*Laryngosigma*); Eade, 1967a: 35 (N.Z. refs); Collins, 1974: 26 (refs); Todd & Low, 1981: 27 (in key), 2 figs.

Subfamily ENTOLINGULININAE
Genus **Entolingulina** Loeblich & Tappan, 1961

Entolingulina sp. Lewis, 1979

Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Only at deepest station [2469 m]"; Loeblich & Tappan, 1961: 220 (generic diag., remarks, included species etc.).

Genus **Entomorphinoides** McCulloch, 1977

Entomorphinoides cf. **karenae** McCulloch, 1977. Hayward, 1982

Hayward, 1982b: 57 (first N.Z. record, off Little Barrier Is, as *E.* cf. *karenae* McCulloch, 1977: 211, pl. 92, fig. 28, off Cortes Bank, California), 64, fig. 5f.

Subfamily SEABROOKIINAE
Genus **Seabrookia** Brady, 1890

Seabrookia earlandi Wright, 1891

Wright, 1891: 477, pl. XX, figs 6–7; Heron-Allen & Earland, 1913a: 72, pl. V, figs 10–12; Heron-Allen & Earland, 1922: 141 (N.Z.); Eade, 1967a: 35; Lewis, 1979: 29, table 5 (off Southern Hawkes Bay : "Common at many stations on slope").

Seabrookia cf. **earlandi** Wright, 1891. Kustanowich, 1965

Kustanowich, 1965: 52 (table 3, no. 67) (from NZOI Stn A325, Milford Sound, as *S.* cf. *earlandi* Wright, 1891, *q.v.*).

Seabrookia pellucida Brady, 1890

Brady, 1890: 568, text-figs 60, 1a-c, 2; Heron-Allen & Earland, 1922: 141 (New Zealand); Cushman, 1955: 319–320 (type species, generic descr.), pl. 26, fig. 10, key pl. 33, figs 14–15; Eade, 1967a: 35; Loeblich & Tappan, 1987: 437, pl. 470, figs 28–30 (type species).

Seabrookia sp. Lewis, 1979

Lewis, 1979: 29, table 5 (off Southern Hawkes Bay: "Chambers even less embracing than *S. earlandi;* reminiscent of *Edentostomina,* but wall clear and glassy ... Occurs at only two stations ...").

Suborder ROBERTININA
Superfamily CERATOBULIMINACEA
Family CERATOBULIMINIDAE
Subfamily CERATOBULIMININAE

Genus **Ceratobulimina** Toula, 1915

Ceratobulimina contraria (Reuss, 1851)

Reuss, 1851b: 76, pl. 5, fig. 37 (*Rotalina*); Brady, 1884: 409, pl. LIV, figs 18a-c; (*Bulimina*); Chapman, 1909: 331; Cushman, 1913: 89, text-fig. 143; Cushman, 1921: 167 (*Buliminella*), pl. 31, fig. 9; Chapman & Parr, 1937: 80 (as *Ceratobulimina pacifica* Cushman & Harris); Cushman, 1955: 312 (type species, generic descr.); Barker, 1960: 112, pl. 54, fig. 18 (identity); Loeblich & Tappan, 1987: 440, pl. 473, figs 9–13 (type species).

Genus **Lamarckina** Berthelin, 1881

Lamarckina haliotidea (Heron-Allen & Earland, 1911)

Heron-Allen & Earland, 1911: 338, pl. 11, figs 6–11 (*Pulvinulina*); Heron-Allen & Earland, 1922: 215 (N.Z.); Cushman, 1955: 288–289 (generic descr.); Eade, 1967a: 54; Murray, 1971: 4, 6, 204–205 (diagnostic features etc.), pl. 86, figs 1–6; Murray, 1979: 64 (descr.), figs 22D–F.

Lamarckina cf. **tuberculata** (Balkwill & Wright, 1885). Vella, 1957

Vella, 1957: 11 (Cook Strait, as *L.* cf. *tuberculata* (Balkwill & Wright, 1885: 350, pl. 13, figs 28–30 (*Discorbina*); Eade, 1967a: 54 (listed).

Family EPISTOMINIDAE
Subfamily EPISTOMININAE

Genus **Hoeglundina** Brotzen, 1948

Hoeglundina elegans (d'Orbigny, 1826)

d'Orbigny, 1826: 276, no. 54 (*Rotalia (Turbulina)*;

Brady, 1884: 699, pl. CV, figs 4–6 (*Pulvinulina*); Cushman, 1915: 63, pl. 26, fig. 3; Cushman, 1921: 342–344; Chapman, 1926: 82, pl. 16, fig. 11 (*Pulvinulina*); Phleger *et al.*, 1953: 43, pl. 9, figs 24–25; Parker, 1954: 531, pl. 10, figs 4 & 8; Cassie, 1961: 21, 51 (Campbell Is.); Hornibrook, 1961: 122, pl. 17, fig. 367 (*Epistomina*); Todd, 1965: 56–57 (detailed refs & syn.), 101, pl. 23, fig. 2; Kennett, 1966a: 59, pl. 7, figs 11–14 (Upper Miocene, N.Z.); Eade, 1967a: 55 (N.Z. refs); Gibson, 1967: 51, pl. 12, fig. 194; Hornibrook, 1968: 52 (descr., range); Reiss & Schneidermann, 1969: 135–144 (ultrastructure), 1 fig. 3 pls; Schnitker, 1971: pl. 10, fig. 15; Colom, 1974: 173, figs 44 v-w; Thompson, 1975 thesis: 96; Boltovskoy & Wright, 1976: 216, 242, 337; Lewis, 1979: 39, table 5 (off Southern Hawkes Bay: "A few specimens at many stations on outer shelf and on slope."); Hayward & Buzas, 1979: 61 (Miocene), pl. 18, fig. 231; Boltovskoy *et al.*, 1980: 35–36 (descr., etc.), pl. 18, figs 14–17; Haake, 1980: 18, pl. 3, fig 25; Poag, 1981: 69, pl. 19, fig. 3, pl. 20, figs 3a-c; Larsen, 1982: pl. 26, fig. 4; Tappan & Loeblich, 1982: pl. 50, fig. L; Loeblich & Tappan, 1987: 446, pl. 478, figs 1–5 (type species); Hornibrook *et al.*, 1989: 93, 114 (table 2(2), first appearance, N.Z.), 119 (table 3(1), last occurrence, N.Z.).

Superfamily ROBERTINACEA
Family ROBERTINIDAE
Subfamily ALLIATININAE

Genus **Cerobertina** Finlay, 1939

Cerobertina tenuis (Chapman & Parr, 1937)

Chapman & Parr, 1937: 80, pl. 7, fig. 11 (*Ceratobulimina*); Eade, 1967a: 55 (N.Z. refs).

Genus **Pseudobulimina** Earland, 1934

Pseudobulimina convoluta (Williamson, 1858)

Williamson, 1858: 63, pl. 5, figs 132–133 (*Bulimina pupoides* var. *convoluta*); Brady, 1884: 409, pl. CXIII, fig. 6 (*B. convoluta*); Heron-Allen & Earland, 1922: 130; Barker, 1960: 232, (fig. 6 of Brady, 1884, pl. CXIII ref. to *Pseudobulimina* sp. nov.?); Cushman, 1955: 266 (generic descr.); Todd, 1965: 57–58 (refs & syn. as *Geminospira*); Eade, 1967a: 55.

Subfamily ROBERTININAE
Genus **Robertina** d'Orbigny, 1846

Robertina declivis (Reuss, 1863)

Reuss, 1863a: 55, pl. 6, fig. 70, pl. 7, fig. 71 (*Bulimina*); Brady, 1884: 404, pl. LX, figs 19a-b; Heron-Allen & Earland, 1922: 130; Cushman & Parker, 1947: 75 (to *Robertina oceanica* n. sp.); Cushman, 1955: 265 (generic descr.); Barker, 1960: 104, pl. 50, fig. 19 (as *R. oceanica* Cushman & Parker); Eade, 1967a: 55 (N.Z. listed as *R. declivis* (Reuss)).

Robertina maculata maculata Saidova, 1975

Saidova, 1975: 282, pl. LXXVII, fig. 9 ("Ob" Stn 354, 266 m).

Robertina subteres (Brady, 1881)

Brady, 1881: 55 (*Bulimina*); Brady, 1884: 403, pl. L, figs 17–18; Chapman, 1909: 330, pl. 14, fig. 10; Cushman, 1911: 89 (*Buliminella*), text-fig. 142a-b; Cushman, 1921: 167 (refs & syn.); Heron-Allen & Earland, 1922: 130; Barker, 1960: 102, fig. 17 of Brady, 1884, pl. L. ref. to (?) *Robertina tasmanica* Parr, 1950: 369 and fig. 18 to *Robertinoides bradyi* Cushman & Parker, 1947: 99 (as *Robertina*).

Genus **Robertinoides** Höglund, 1947

Robertinoides cf. **pumilum** Höglund, 1947. Kustanowich, 1965

Kustanowich, 1965: 52 (NZOI Stn A325, Milford Sound, as *R.* cf. *pumilum* Höglund, 1947: 227, pl. 18, fig. 5); Eade, 1967a: 55 (listed).

Robertinoides subcylindricus (Brady, 1881)

Brady, 1881: 56 (*Bulimina*); Brady, 1884: 404, pl. L, fig. 16; Cushman & Parker, 1936: 95, pl. XVI, fig. 10; Cushman & Parker, 1947: 75, pl. 18, fig. 13 (*Robertina*); Parr, 1950: 369, pl. XV, fig. 12; Cushman, 1955: 266 (generic status of *Robertinoides*); Barker, 1960: 102, pl. 50, fig. 16; Eade, 1967a: 55.

Suborder GLOBIGERININA
Superfamily GLOBOROTALIACEA
Family GLOBOROTALIIDAE

Genus **Berggrenia** F.L. Parker, 1976

Berggrenia pumilio Parker, 1962

Parker, 1962b: 238, pl. 6, figs 2–3 (*Globorotalia*); Eade, 1967a: 48 (listed); Parker & Berger, 1971: 100 (generic status); Boltovskoy & Wright, 1976: 168, 184; Boltovskoy, 1981: 347; Saito *et al.*, 1981: 87 (diag. etc., refs to generic placing in *Berggrenia*), pl. 26, figs 1a-c.

Genus **Globorotalia** Cushman, 1927

Globorotalia canariensis (d'Orbigny, 1839)

d'Orbigny, 1839b (*in* Barker-Webb & Berthélot): 130, pl. 1, figs 34–36 (*Rotalina*); Brady, 1884: 692, pl. CIII, figs 8–10, (*Pulvinulina*); Cushman, 1915: 23, text-figs 55a-c, pl. 23, fig. 1; Cushman, 1921: 338, pl. 67, figs 1a-c; Cushman, 1955: 330 (generic descr.); cf. Barker, 1960: 212, pl. 103, figs 8–10 (status of Brady's (1884) material identified as *Pulvinulina canariensis* (d'Orbigny) — see *Globorotalia hirsuta* (d'Orbigny)); Eade, 1967a: 47 (N.Z. refs).

Globorotalia cavernula Bé, 1967

Bé, 1967: 128–132, text-fig. 1 (distrib.), pl. 10, figs 1–6; Bé, 1977: 11, pl. 11, figs 32a-c; Saito *et al.*, 1981: 145 (diag. refs), pl. 49, figs 1a-d; Hornibrook, 1982: 99, figs 8a-c; Hayward, 1983: 70 (key characters), figs 4A–C, 6 (latitudinal range in N.Z.); Hayward, 1986: 8, 11 (distrib. in intertidal sediments, Northland), fig. 2g.

Globorotalia crassa (d'Orbigny, 1840)

d'Orbigny, 1840 : 32, pl. 3, figs 7–8 (*Rotalina*); Brady, 1884: 694, pl. CIII, figs 11–12 (*Pulvinulina*); Cushman, 1915: 58, pl. 27, fig. 1; Cushman, 1921: 338, pl. 67, figs 3a-c; cf. Barker, 1960: 212, pl. 103, figs 11–12 (status of Brady's (1884) material identified as *Pulvinulina crassa* (d'Orbigny)); Eade, 1967a: 48 (N.Z. refs).

Globorotalia crassula Cushman & Stewart, 1930

Cushman & Stewart, 1930: 77; Ujiie, 1963: 396–397 (wall structure, refs etc., as *G. crassaformis*); Seiglie & Cucurullo, 1971: 101–122, pl. 1, figs 3–5; Kennett, 1975: 575 *et seq.* (biostratigr., paleoceanogr.), pl. 14, figs 7–14, pl. 15, figs 1–4; Vella, 1975: 769 *et seq.* (DSDP Site 284, Challenger Plateau, as *G. crassaformis*), pl. 4, figs 5–10; Saito *et al.*, 1981: 134 (diag. etc.), pl. 45, figs 1a-b, 2a-b; Hayward & Grace, 1981: 54 (off Cuvier Is, as *G. crassula* Cushman & Stewart); Hayward, 1981a: 92 (Tutukaka); Hayward, 1983: 70 (key characters, as *Globorotalia crassula* Cushman & Stewart, 1930: 77, pl. 7, fig. 1; syn. incl. *G. punctulata* (d'Orbigny) of Kustanowich, 1963: 561, pl. 2, figs 13–14, *G. crassaformis* (Galloway & Wissler) of Parker & Berger, 1971: 100 (in part), and *G. crassaformis* (Galloway & Wissler) of Eade, 1973: 253), figs 4D–F; accordingly include the following references as either to N.Z. records of *G. crassula* as noted or to *G. crassaformis* to be verified — Kennett, 1966b: 235–245 (bioseries, Upper Miocene to Pliocene), text-figs 1–10, pls 1–2; Eade, 1967a: 48 (N.Z. refs, notes on syn.); Bé, 1967: 3, 6 (in key), figs 26a-c (incl. *G. punctulata* (d'Orbigny)); Pessagno & Miyano, 1968: 38–50 *passim*, (wall structure), pl. 3, figs 1–2; Kennett, 1969a: 315, fig. 7 (distrib. S.E. of N.Z.); Boltovskoy, 1969: pl. 2, fig. 12; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 2 (7–11), 3–7; Subbotina, 1971: 290 (ref. to *Acarinina*); Parker & Berger, 1971: 100 (identif. features), fig. 16b (coiling direction); Bé & Tolderlund, 1971: 122 (distrib. patterns), fig. 6.3 (species assemblage), 6.4 (temperature range), 6.14 (distrib. map), tables 6.2 (distrib. zone), 6.3 (depth habitat); Jenkins, 1971: 85, 86 (stratigr. occurrence, coiling, refs etc.), 88, 117, 152, 178, tables 53–54, pl. 4, figs 105–107 (*Globorotalia (Globorotalia)*); Postuma, 1971: 318–319 (diag., etc.), figs; Berger & Piper, 1972: 275–287, figs, tables; Lidz, 1972: 194–211, text-fig. 1, pls 1–7 (morphotype var.); Collen & Vella, 1973: 25 etc., pl. 6, figs 1–6 (N.Z. Pliocene, descr., etc.); Eade, 1973: 249–256 *passim*, figs 8, 13 (geogr. distrib., SW Pacific); Rögl, 1974: 743–767, figs 1–5, pls 1–15 (evol.); Boltovskoy & Wright, 1976: 168, 173, 174, 182, 184, 187, 228, 243, 363; Blow, 1979: 163–164; Boltovskoy, 1981: 341 (identif. table), 343, 347, fig. 168.40; Huang, 1981: 188 (interior), pl. 6, figs 60–61; Larsen, 1982: pl. 18, figs 3–4; Lee, 1982: 21, fig. 1 (water mass niche) — but for descr. and refs for undoubted *Globorotalia crassaformis* (Galloway & Wissler, 1927: 41, pl. 7, fig. 12 (*Globigerina*)) see Saito *et al.*, 1981: 129–130, pl. 43, figs 2a-d, also Pessagno, 1964: 222–223 (refs etc.), text-fig. 4, chart 5, pl. 1, figs 10–16, pl. 3, figs 3–7, pl. 4, figs 4, 9–10, pl. 5, fig. 4; Hornibrook, 1982: 93, figs 5e-f, 7h-j; Arnold, 1983: 390–397; Hayward, 1986: 8, 9, 11 (distrib. in intertidal sediments, Northland).

Globorotalia hirsuta (d'Orbigny, 1839)

d'Orbigny, 1839b (*in* Barker-Webb & Berthélot): 131, pl. I, figs 37–39 (*Rotalina*); Cushman, 1931a: 99, pl. VIII, fig. 6; Chapman & Parr, 1937: 115, pl. IX, fig. 24; Parr, 1950: 367; Cheng & Cheng, 1960: 132 (refs & syn.), 133, pl. II, figs 2–3; cf. Barker, 1960: 212, pl. 103, figs 8–10 (status of Brady's (1884: 692, pl. CIII, figs 8–10) material identified as *Pulvinulina canariensis* (d'Orbigny), ref. by Cushman (1931) to *Globorotalia hirsuta*); Cassie, 1961: 21, 51 (Hawke Bay, (?) as *G. menardii* (d'Orbigny)); Parker, 1962b: 238, pl. 5, fig. 12 (*Globorotalia*); Eade, 1967a: 48 (N.Z. refs, notes on syn.); Bé, 1967 : 6 (in key), figs 27a-c; Albani, 1968b: 113; Kennett, 1969a: 316, fig. 7 (distrib. S.E. of N.Z.); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 39–40 (growth pattern, refs etc.), pl. 6, fig. 2; Berger, 1970: 185–186, tables 2–3; Parker & Berger, 1971: 100 (comment on N.Z. identif.); Bé & Tolderlund, 1971: 129 (distrib. patterns) figs 6.3 (species associations), 6.4 (temperature range), 6.18 (distrib.

map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 284 (morphol. changes in life-cycle), fig. 19.1 (nos 48–52); Jenkins, 1971: 89 (stratigr. occurrence, remarks, refs etc.), 94, pl. 4, figs 111–116 (in subgenus *Globorotalia*); Murray, 1971: 11, 220-221 (diag. features etc.), pl. 92, figs 1–8; Schnitker, 1971: 169–215, pl. 7, fig. 7; Glaçon *et al.*, 1973: 373–401 *passim* (esp. p. 394, species limits), pls IV, figs 1–3, pl. V, figs 1–2; Collen & Vella, 1973: 25 etc., pl. 7, figs 6–8 (N.Z. Pliocene, descr., etc.); Collins, 1974: 44; Cifelli, 1974: 180, pl. 2, fig. 3; Kennett, 1975: 575 *et seq.*, pl. 3, figs7–11; Thompson, 1975 thesis: 89, pl.23, figs 4–5; Boltovskoy & Wright, 1976: 37, 167–170, 174, 182, 184, 187, 228, 363; Bé *et al.*, 1977: 155–179 *passim*, pl. 2, fig. 3; Bé *in* Ramsay, 1977: 59 (review), fig. 22, pl. 11, figs 33a-c; Albani, 1979: 43 (features), fig. 101.1; Bé *et al.*, 1979: 294–307 (chamber formation), 6 pls; Hayward, 1979a: 152 &c, fig. 2g (Cavalli Is, N.Z.); Hornibrook, 1981: 263–292, figs 1–11; Hornibrook, 1982: 93, figs 7m-o; Boltovskoy, 1981: 341 (identif. table), 343, 344, 347, figs. 162.12 & 168.44; Saito *et al.*, 1981: 137 (diag. refs, etc.), pl. 46, figs 1a-d; Larsen, 1982: pl. 18, figs 5–6; Hayward, 1983: 70 (key characters), figs 4G–I; Hayward, 1986 : 8, 11 (distrib. in intertidal sediments, Northland); Loeblich & Tappan, 1987: 475, pl. 515; Hornibrook *et al.*, 1989: 130, fig. 30: 7a-c.

Globorotalia inflata (d'Orbigny, 1839)

d'Orbigny, 1839b (*in* Barker-Webb & Berthelot): 134, pl. II, figs 7–9 (*Globigerina*); Brady, 1884: 601–602, pl. LXXIX, figs 8–10; Cushman, 1914: 8, pl. 4, figs 4–8; Cushman, 1924: 12, pl. 3, figs 1–3; Parr, 1950: 366; Cheng & Cheng, 1960: 136 (refs & syn.), 153–154, pl. III, figs 1–2; Barker, 1960: 164, pl. 79, figs 8–10; cf. Galhano, 1963: 86–87 (refs etc.), pl. VIII, figs 20–21; Ujiie, 1963: 397–398 (refs & syn.), pl. 46, figs 2a-c, 3a-c, pl. 56, fig. 1; McInnes, 1965: 104–108; Eade, 1967a: 48 (N.Z. refs, in *Globorotalia*); Bé, 1967b: 3, 6 (in key), figs 24a-c; Albani, 1968a: 32, fig. 143; Albani, 1968b: 113; Hornibrook, 1968: 87, fig. 17; Blanc-Vernet & Pastouret, 1969: 535–538, pl. 1; Kennett, 1969a: 311– 312, figs 4 & 7 (distrib. S.E. of N.Z.); Bé, 1969: 11–12, text-fig. 2, pl. 2 (maps 11–12), table 1; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1(9–12), 3–7; Berger, 1970: 185–186, tables 2–3; Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 28–29 (growth patterns, refs etc.), text-figs 18h-t, pl. 2, figs 4–5 (in *Globigerina*); Bary, 1970: 211–215 *passim* (SW Pacific distrib.); Subbotina, 1971: 290 (new syn. of *Acarinina centralis* (Cushman & Bermudez, 1937); Bé & Tolderlund, 1971: 119, 121 (distrib. patterns), figs 6.3 (species association), 6.4 (temperature range), 6.9 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 284 (morphol. changes in life-cycle), fig. 19.1 (nos 53–59); Parker, 1971: figs 20.5 (world distrib. in deep-sea sediments), 20.7, 20.8, 20.9 (latitudinal ranges in world oceans), table 20.1; Schnitker, 1971: pl. 7, fig. 14 (*Globigerina*); Jenkins, 1971: 23, 32, 35, 86, 96, 116–117 (stratigr. occurrence, remarks, refs etc., as *Globorotalia (Turborotalia)*, table 55 (evol.), pl. 11, figs 282–287; Emiliani, 1971b: 1122–1124 (depth habitats, palaeotemperatures); Murray, 1971: 11, 222–223 (diag. features etc.), pl. 93, figs 1–6; Cifelli, 1971: 172 (temperature relationships); Thielde, 1972: 93–102 *passim* (dominance and diversity related to ecology); Berger & Piper, 1972: 275–287, figs, tables; Kennett, 1973: 575 *et seq.* (biostratigr./palaeoceanogr.), pl. 18, figs 12–66; Collen & Vella, 1973: 25–26 etc., pl. 5, figs 11–12 (N.Z. Pliocene, descr., etc.); Boltovskoy, 1973: 55–68 *passim* (use as palaeo-climatic criterion); Echols & Kennett, 1973: 14, pl. 6, map 5 (Southern Ocean distrib., etc.); cf. Theyer, 1973c: 199–201 (new subspecies); Eade, 1973: 249–256 *passim*, figs 11, 13 (geogr. distrib., SW Pacific); Haynes, 1973: 182–183 (diag., descr., distrib., refs), pl. 20, figs 3–4, pl. 21, figs 10–11; Jenkins, 1973: 78–88 *passim*, text-fig. 3 (diversity changes etc.); Collins, 1974: 44 (Australia, refs); Cifelli, 1974: 180–181, pl. 3, figs 4–5; Bé *et al.*, 1975: 27–55 *passim*, figs (dissolution etc.); Kennett & Vella, 1975: 769 *et seq.* (DSDP Site 249, Challenger Plateau), pl. 5, figs 9–16, pl. 6, figs 1–12; Hemleben, 1975: 334–341, table 1; Thompson, 1975 thesis: 89, pl. 23, figs 6–8; Belyaeva *in* Takayanagi & Saito, 1976: 10–15 (world distrib.), fig. 4; Boltovskoy & Wright, 1976: 37, 80, 168, 169, 173, 174, 182, 184, 187, 228, 243, 351, 356, 362, 381; Bé *in* Ramsay, 1977: 57 (review), fig. 19, pl. 11, figs 27a-c; Bé *et al.*, 1977: 155–179 *passim*, pl. 2, fig. 4; Albani, 1979: 44 (features, as *Turborotalia*), fig. 102.2; Hayward, 1979a: 152 &c, fig. 2h (Cavalli Is, N.Z.); Hayward, 1979b: 186 (*Zostera* pool community); Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Boltovskoy, 1981: 341 (identif. table), 344, 347, fig. 168.41; Saito *et al.*, 1981 124 (diag., refs & syn.), pl. 41, figs 1a-d; Malmgren & Kennett, 1981: 230–240 (biometry/evol., etc.); Huang, 1981: 188, pl. 6, figs 62–64; Hayward, 1981a: 82, 92 (Tutukaka Harbour); Hayward, 1981b: 134 (Bay of Islands); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1982b: 65 (off Little Barrier Is); Larsen, 1982: pl. 18, figs 7–8; Lee, 1982: 21, fig. 1 (water mass niche); Hornibrook, 1982: 93, figs 5a-j; Boltovskoy, 1982: pl. 1, figs 1 & 7 (twinned test); Hayward, 1983: 70 (key characters), figs 4J–L; Hayward, 1986: 1, 8, 9, 11 (distrib. in intertidal sediments, Northland), fig. 2K; Olson, 1986: 219–225 (ocean environ./faunal boundaries); Noble, 1987: 111–113 (temperature/

environ. indicator); Hornibrook *et al.*, 1989: 130–131, fig. 29 : 4a-b; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Globorotalia puncticulata Deshayes, 1832

Deshayes, 1832: 170; d'Orbigny, 1826: 277, no. 8 (as *Globigerina puncticulata, nomen nudum*); Fornasini, 1898: 210, text-fig. 5; Ujiie, 1963: 397, pl. 56, fig. 3, pl. 60, figs 1–2; Barbieri, 1967: 154, pl. 1; Kennett, 1970b: 126, fig. 2 (1–6) (*Globorotalia*); Collen & Vella, 1973: 26, pl. 5, figs 8–10; Kennett, 1973: 575 *et seq.*, pl. 18, figs 2–11; Thompson, 1975 thesis: 89, pl. 24, figs 1–2 (outer shelf and upper slope, north eastern New Zealand); Kennett & Vella, 1975: 769 *et seq.*, (DSDP Site 284, Challenger Plateau), pl. 4, figs 11–14, pl. 6, figs 3–6, 7–15; Zachariasse *et al.*, 1989: 339–355 (water temperature/environment.).

Globorotalia scitula (Brady, 1882)

Brady, 1882: 716 (*Pulvinulina*); Cushman, 1927b: 175 (*Globorotalia*); Cushman, 1931a: 100–101, pl. XVII, figs 5a-c; Parr, 1950: 367; Barker, 1960: 212, pl. 103, fig. 7; Smith, 1963: 3, pl. 2, figs 22–23; Pessagno, 1964: 223 (refs etc.), text-fig. 4, chart 6, pl. 2, figs 1–4, pl. 4, fig. 5, pl. 6, fig. 1; Kennett, 1966a: 73, pl. 11, figs 185–189 (Upper Miocene (Kapitean), N.Z., refs etc.); Eade, 1967a: 48 (N.Z. refs); Bé, 1967: 3, 6 (in key), figs 28a-c; Bé, 1969 : 12, table 1; Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 41 (growth patterns, refs etc.), pl. 6, fig. 4; Kennett, 1969a: 313, fig. 7 (distrib. S.E. of N.Z.); Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 2(12), 3–7; Parker & Berger, 1971: 100 (generic status); Bé & Tolderlund, 1971: 144 (distrib. pattern), figs 6.3 (species associations), 6.4 (temperature range), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 285 (morphol. changes in life cycle), fig. 19.1 (nos 68–74); Jenkins, 1971: 35, 130, 131–132 (stratigr. occurrence, remarks, refs etc., as *Globorotalia (Turborotalia)*, pl. 13, figs 371–373; Postuma, 1971: 356–357 (diag., etc.), figs; Murray, 1971: 11, 224–245 (diag. features etc.), pl. 94, figs 1–7; Collen & Vella, 1973: 26–27 etc., pl. 5, figs 5–7 (N.Z. Pliocene, descr., etc.); Echols & Kennett, 1973: 15, pl. 7, map 10 (Southern Ocean distrib. etc.); Kennett, 1973: 575 *et seq.*, pl. 11, fits 15–16; Cifelli, 1974: 181, pl. 3, fig. 2; Kennett & Vella, 1975: 769 *et seq.*, pl. 4, figs 2–4; Boltovskoy & Wright, 1976: 37, 167–169, 174, 184, 187, 192, 228; Hayward, 1979a: 152 &c, fig. 2j (Cavalli Is, N.Z.); Boltovskoy, 1981: 341 (identif. table), 344, 347, fig. 162.2 & 168.45; Saito *et al.*, 1981: 137–138 (diag., refs), pl. 46, figs 2a-d; Larsen, 1982: pl. 18, figs 11–12; Lee, 1982: 21, fig. 1 (water mass niche); Hornibrook, 1982: 95, figs 6x-z; Hayward, 1983: 70–71 (key characters), figs 4M–O; Hayward, 1986: 9, 11 (distrib. in intertidal sediments, Northland); Ganssen & Troelstra, 1987: 221–230 *passim* (var./environment response); Baumfalk *et al.*, 1987: 93–117, figs (morphol./environ.); Hornibrook *et al.*, 1989: 134, fig. 28: 11a-c.

Globorotalia truncatulinoides (d'Orbigny, 1839)

d'Orbigny, 1839b (*in* Barker-Webb & Berthélot): 132, pl. II, figs 25–27 (*Rotalina*); Brady, 1884: 694, pl. CIV, figs 1–2 (*Pulvinulina*); Cushman, 1915: 59, pl. 23, text-figs 57a-c, pl. 23, fig. 4; Cushman, 1921: 339, pl. 67, figs 2a-c; Cushman, 1931: 87, pl. XVII, figs 4a-c; Parr, 1950: 367; Phleger & Parker, 1951: 36, pl. 20, fig 10–13; Barker, 1960: 214, pl. 104 (CIV), figs 1a-c; Cheng & Cheng, 1960: 132–133 (refs & syn.), 153, pl. II, fig. 4; Andersen 1961: pl. 26, figs 3a-c; Galhano, 1963: 91 (refs etc.), pl. IX, fig. 3; Pessagno, 1964: 223 (refs etc.), text-fig. 4, Chart 4, pl. 1, figs 4–6, pl. 3, fig. 2, pl. 4, fig. 6, pl. 6, figs 3, 5–8; Ericson & Wollin, 1964: 73–94 *passim*, 145–171 *passim* (pop. acc. of paleoclimatic significance etc.); Eade, 1967a: 48 (N.Z. refs, notes on syn.); Bé, 1967: 3, 6 (in key), figs 25a-c; Kennett, 1968b: 1461–1463 (as a palaeoceanogr. indicator); Albani, 1968a: 32, fig. 142; Hornibrook, 1968: 87, 89, fig. 17; Albani, 1968b: 113–114 (distrib. refs etc.); Takayanagi *et al.*, 1968: 141–170 (wall microstructure), 4 figs, 11 pls; Pessagno & Miyano, 1968: 38–50 *passim* (wall structure), pl. 1, figs 1–3, pl. 2, figs 1–3, pl. 4, fig. 4, pl. 5, figs 4–5, pl. 7, figs 1–3; Bayliss, 1969: 133–143 (distrib. in type Calabrian); Bé, 1969: 11, text-fig. 2, pl. 2 (maps 1–10), table 1; Kennett, 1969a: 313, figs 5& 7 (distrib. S.E. of N.Z.); Kennett, 1969b: 178–179 (palaeoclimatology of Pleistocene); Kennett & Geitzenauer, 1969: 899–901, figs 1–3, table 1 (biostratigr. and Plio-Pleistocene boundaries in S.E. Pacific); Hansen *et al.*, 1969: 293–316 (wall ultrastructure); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 41 (growth pattern, refs etc.); Berger, 1970: 185–186, tables 2–3; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1 (13–15), 3–8; Bary, 1970: 211–225 *passim* (S.W. Pacific distrib.); Parker & Berger, 1971: 100 (coiling direction, refs etc.), fig. 16c; Bé & Tolderlund, 1971: 121–122 (distrib. patterns, refs to ecol., etc.), figs 6.3 (species associations), 6.4 (temperature range), 6.11 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 285–286 (morphol. changes in life cycle), fig. 19.1, (nos 75-82); Parker, 1971: figs 20.7, 20.8, 20.9 (latitudinal ranges in various oceans), 20.10 (coiling direction provinces; cf. also Bolli, 1971: 639–648); Kennett *et al.*, 1971: 276–279, text-figs 1–3 (use in climatic chronology and Plio-Pleistocene boundary in N.Z. refs); Postuma, 1971: 36 (diag.,

etc.), figs; Swain, 1971: 487–492; Murray, 1971: 11, 226–227, pl. 95, figs 1–7 (diag. features etc.); Cifelli, 1971: 171–172 (temperature relationships); Schnitker, 1971: 169–215, pl. 7, fig. 11; Herman, 1972: 394–395, figs 1–2 (palaeoceanogr. indicator); Berger & Piper, 1972: 275–257, figs, tables; Blanc *et al.*, 1972: 761–767 (coiling environment, factor analysis); Collen & Vella, 1973: 27 etc., pl. 7, figs 1–5 (N.Z. Pliocene, descr., etc.); Theyer, 1973a: 142–145 (Subantarctic dating); Boltovskoy, 1973b: 55–68 *passim* (use of coiling direction as palaeoclimatic criterion); Eade, 1973: 249–256 *passim* (geogr., distrib., SW Pacific), figs 9, 13; Kennett, 1973: 575 *et seq.* (first appearance at Plio-Pleistocene boundary), pl. 16, figs 1–3; Echols & Kennett, 1973: 14–15, pl. 6, map 6 (Southern Ocean distrib., etc.); Watkins *et al.*, 1973: 45–46, figs 1–2 (palaeomagnetic interpretations, and reply by Theyer, 1973b: 46–47, fig. 1); Brady, 1973: 286 (biostratigraphy, deep-sea cores); Collins, 1974: 44 (Australia); Rögel, 1974: 743–767, figs 1–5, pls 1–15 (evol.); Cifelli, 1974: 181, pl. 3, fig. 3; Bé *et al.*, 1975: 27–55 *passim*, figs (dissolution etc.); Kennett & Vella, 1975: 769 *et seq.* (at DSDP Site 249, Challenger Plateau), pl. 3, figs 15–16, pl. 4, fig. 1; Thompson, 1975 thesis: 90, pl. 24, figs 3–4; Boltovskoy & Wright, 1976: 37, 54, 80, 167–170, 173, 174, 182, 184, 186, 189, 192, 228, 232, 243, 350, 351, 356, 358, 361–364, 379–381, 387, 390; Hornibrook, 1976: 83–102 (Plio-Pleistocene boundary, N.Z.); Duckworth, 1977: 304–312 (mineralogy); Bé *in* Ramsay, 1977: 58–59 (review), fig. 21, pl. 11, figs 34a-c; Bé *et al.*, 1977: 155–179 *passim* (biol., lab. culture), pl. 2, fig. 6; Albani, 1979: 43 (features), fig. 101.2; Bé *et al.*, 1979: 294–307 (chamber form), 6 pls; Hayward, 1979a: 152 &c, fig. 2K (Cavalli Is, N.Z.); Hayward, 1979b: 186 (*Zostera* pool community), fig. 30; Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Boltovskoy, 1981: 341 (identif. table), 343, 344, 347, figs 162.20 & 168.43; Saito *et al.*, 1981: 158 (diag., refs etc.), pl. 54, figs 1a-d; Huang, 1981: 188 (interior), pl. 6, figs 65–68; Healy-Williams & Williams, 1981: 485–487, 3 figs (temperature/shape analysis); Larsen, 1982: pl. 19, figs 1–2; Lee, 1982: 21, fig. 1 (water mass niche); Hornibrook, 1982: 95, 97, fig. 6e; Healy-Williams, 1983: 1–15 (shape analysis); Erlich *et al.*, 1983: 202–206, figs; Hayward, 1983: 71 (key characters), figs 4P–R; Hayward, 1986: 11 (distrib. in intertidal sediments, Northland); Pharr & Williams, 1987: 343–355 (ontogeny/paleobiogeogr.); Hills & Thierstein, 1989: 67–96 (biochronol.); Hornibrook *et al.*, 1989: 135, fig. 30: 6a-d.

Globorotalia tumida (Brady, 1877)

Brady, 1877: 294 (*Pulvinulina menardii* d'Orbigny var. *tumida*); Brady, 1884: 692, pl. CIII, figs 4-6; Cushman, 1915: 56, pl. 22, fig, 3; Cushman, 1921: 337 (refs etc.), pl. 66, figs 3a-c; Heron-Allen & Earland, 1922: 215; Phleger & Parker, 1951: 36, pl. 20, figs 14–15; Cushman, 1955: 330 (generic descr.), pl. 27, fig 12, key pl. 35, fig. 16; Cheng & Cheng, 1960: 131–132 (refs & syn.), 153, pl. I, figs 3–5; Banner & Blow, 1960: 28, fig. 2; Barker, 1960: 212, pl. 103, figs 4–6; Andersen, 1961: pl. 26, figs 4a-c; Pessagno, 1964: 221 (refs etc.), text-figs 3, 5, chart 2, pl. 1, figs 1–3, pl. 4, fig. 3, pl. 5, figs 1–3, pl. 6, fig. 4; Eade, 1967a: 48; Bé, 1967: 36 (in key), figs 30 a-c; Boltovskoy, 1968: 90 (*G. tumida* "interpreted ... merely as a *forma* of *G. menardii*), pl. 1, figs 5–9; Blick *et al.*, 1970: 46–48 (role in benthic food chains); Seiglie & Cucurullo, 1971: pl. 1, figs 1–2; Jenkins, 1971: 23, 34, 90, 99 (stratigr. occurrence, remarks, refs etc., in subgenus *Globorotalia*), pl. 7, figs 164–166; see also p. 90 for N.Z. Cenozoic occurrence of *G. (G.) menardii* (Parker, Jones & Brady, 1865), remarks, refs etc.); Emiliani, 1971b: 1122–1124 (depth habitats of growth stages, palaeotemperatures etc.); Postuma, 1971: 364–365 (diag., etc.), figs; Berger & Piper, 1972: 275–287, figs, tables; Frerichs *et al.*, 1972: 6–13 *passim* (latitdinal variation in test porosity); Eade, 1973: 249–256 *passim* (geogr. distrib., SW Pacific), figs 5, 13; Kennett, 1973: 575 *et seq.*, pl. 12, figs 12–16; Berggren & Poore, 1974: 689–698; Boltovskoy & Wright, 1976: 167–169, 174, 182, 184, 186, 243, 331, 342, 350, 351, 356; cf. Hayward, 1979a: 152 &c (off Cavalli Is, N.Z., as *G. menardii*); Blow, 1979: 173–174; Huang, 1981: 188 (interior), pl. 6, figs 69–71; Hayward & Grace, 1981: 54 (off Cuvier Is); Boltovskoy, 1981: 342 (identif. table), 344, 347, figs 162.14 & 168.38 — see also pp. 341 (identif. table), 343, 344, 347, figs 162.10 & 168.35 as *G. menardii*; Saito *et al.*, 1981: 1481 (diag., refs), pl. 50, figs 2a-d, cf. also pp. 147–148, pl. 50, figs 1a-d (diag., refs & syn. for *G. menardii*); Larsen, 1982: pl. 19, figs 3–4; Hornibrook, 1982: 97, fig. 7K; Hayward, 1983: 71 (key characters), figs 4S–U; Loeblich & Tappan, 1987: 475, pl. 515; Kitchell *et al.*, 1987: 272–285 (evol.); Hills & Thierstein, 1989: 67–96 (biochronol.); Hornibrook *et al.*, 1989: 135, fig. 29: 9a-b.

Genus **Neogloboquadrina** Bandy, Frerichs & Vincent, 1967

Neogloboquadrina dutertrei (d'Orbigny, 1839)

d'Orbigny, 1839a (*in* de la Sagra): 84–85, 206, pl. IV, figs 19–21 (*Globigerina*); Brady, 1884: 601, pl. LXXXI, figs 1–6; Cushman, 1921: 55, pl. 12, fig. 1; Cushman, 1922: 36, pl. 5, figs 8, 9; Banner & Blow, 1960: 11, pl. 2, fig. 1; cf. Barker, 1960: 168; Cassie,

1961 : 21, 51 (as *G. eggeri* Rhumbler, 1901 (cf. refs in Cifelli & Smith, 1970: 21), Hawke Bay); Parker, 1962b: 242, 244 (refs), pl. 7, figs 1–13, pl. 8, figs 1–4; Smith, 1963: 2, pl. 1, figs 8–11 (as *G. eggeri* Rhumbler, 1901, remarks, refs etc.); Galhano, 1963: 85–86, pl. VIII, fig. 18; Ujiie, 1963: 394 (wall structure, coiling etc.), pl. 46, figs 8a-b, 9a-c, pl. 55, figs 7(?), 8, pl. 59, figs 3(?), 4(?), 5–6; Kennett, 1966a: 64–65, pl. 11, figs 173–178 (Upper Miocene (Kapitean), N.Z., remarks etc.); Eade, 1967a: 48 (N.Z. refs, note on syn., as *Globigerina*); Bé, 1967: 3, 5 (in key), figs 20a-c (incl. *G. eggeri* Rhumbler); Zobel, 1968: 97–122 (phenotypic var., related to Quaternary deep-sea stratigraphy); Albani, 1968b: 114 (range etc., in *Globoquadrina* Finlay, 1947); Boltovskoy, 1968: 90, pl. 1, figs 10–11; Boltovskoy, 1966a: pl. 1, figs 5–8; Boltovskoy, 1969b: 119, pl. 1, figs 8a-b, 10a-b; Kennett, 1969a: 316, fig. 7 (distrib. S.E. of N.Z.); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 21– 26 (growth patterns, refs etc.), text-figs 13a-i, 16, tables 4-5, pl. 2, figs 1–2; Parker & Berger, 1971: 97 (status); Bé & Tolderlund, 1971: 122 (distrib. patterns, refs to ecol., etc.), figs 6.2 (distrib. zones), 6.3 (depth habitat), 6.4 (temperature range), 6.13 (distrib. map) (in *Globoquadrina*); Pflaumann, 1971: 4–14, text-figs 1–5, pls 1–3 (shell-porosity as climatic indicator; as *Neogloboquadrina*); Boltovskoy, 1971: 281 (morphol. changes in life-cycle), fig. 19.1 (nos 6–10); Parke, 1971: figs 20.7, 20.8, 20.9, table 20.1 (latitudinal ranges in world oceans); Jenkins, 1971: 23, 35, 114– 115 (stratigr. occurrence, remarks, refs etc., in *Globorotalia*, subgenus *Turborotalia* Cushman & Bermudez, 1949), pl. 11, figs 273–275; Postuma, 1971: 320–321 (diag., etc., in *Globorotalia*); Schnikter, 1971: pl. 7, pl. 7, fig. 12; Frerichs *et al.*, 1972: 6–13 *passim* (latitudinal variation in test porosity); Hecht & Savin, 1972: 55–67 *passim* (phenotypic var. and oxygen isotope ratios); Bandy, 1972a: 294–318 *passim*, pl. 8, figs 6–8 (as *Neogloboquadrina dutertrei dutertrei*); Chen & Chen, 1973: 9–116 *passim* (chemical var.); Shackleton *et al.*, 1973: 177–179 fig. 1, tables 2–4 (isotopic composition of test); Collen & Vella, 1973: 18–19 etc. (N.Z. Pliocene, descr. etc., in *Neogloboquadrina* Bandy), pl. 1, figs 7–10; Brady, 1973: 286 (biostratigr.); Cifelli, 1974: 176, 179, pl. 1, fig. 3; Kennett & Vella, 1975: 769 *et seq.* (palaeoceanogr., DSDP Site 284, Challenger Plateau), pl. 2, fig. 16, pl. 3, fig. 1; Thompson, 1975 thesis: 91–92, pl. 26, figs 2–3; Srinivasan & Kennett, 1976: 329–355 (evol. and phenotypic var.); Boltovskoy & Wright, 1976: 168, 170, 213, 360; Bé *in* Ramsay, 1977: 62 (review), fig. 28, pl. 10, figs 23a-f; Bé *et al.*, 1977: 155–179 *passim*, pl. 3, fig. 1; Albani, 1979: 42 (features, as *Globoquadrina*), fig. 97.1; Hayward, 1979a: 152 &c (off Cavalli Is, N.Z.), figs 2f; Hayward, 1979b: 185 (*Zostera* pool community, as *Globorotalia*); Huang, 1981: 180, 181 (interior), pl. 3, figs 25–31 (*Globoquadrina*); Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Hayward & Grace, 1981: 54 (off Cuvier Is); Boltovskoy, 1981: 340 (identif. table), 344, 347, figs 162.5 & 168.24; Saito, 1981: 111 (diag., refs & syn.), pl. 36, figs 1a-c, 2; Cifelli, 1982: 8–9 (wall texture etc.), pls 10–11, pl. 12, fig. 1; Lee, 1982: 21, fig. 1 (water mass niche); Hayward, 1983: 71 (key characters, in *Neogloboquadrina*, syn. incl. *Globigerina eggeri* Rhumbler of Kustanowich, 1963: 552, pl. 3, figs 37–38, cf. Saito *et al.*, 1981: 111), figs 5D–F; Hayward, 1986: 8, 9, 11 (distrib. in intertidal sediments, Northland); Loeblich & Tappan, 1987: 476, pl. 524–525; Bijima *et al.*, 1990a: 95–116 (salinity/temperature, lab. culture etc.).

Neogloboquadrina pachyderma (Ehrenberg, 1861)

Ehrenberg, 1861b: 276, 277, 303 (*Aristerospira*); Ehrenberg, 1872 [1873]: pl. 1, fig. 4; Brady, 1884: 592 (in key), 600, pl. CXIV, figs 19–20; Heron-Allen & Earland, 1932: 401, pl. XIII, figs 9–13; Parr, 1950: 366; Parker, 1958: 278, pl. 5, fig. 9; Bé, 1960: 64–68, text-fig. 1; Parker, 1962b: 224, 225 (refs), pl. 1, figs 35–36, pl. 2, figs 1–6; Ujiie, 1963: 389 (wall structure, coiling ratio etc.); Barker, 1960: 236, pl. 114, figs 19–20 (*Globigerina*); Kennett, 1966a: 66, pl. 9, figs 139–145 (Upper Miocene (Kapitean), N.Z., remarks etc.); Ericson & Wallin, 1964: 73–94 *passim*, 145–171 *passim* (pop. acc. palaeoclimatological significance etc.); Eade, 1967a: 48 (N.Z. refs as *Globigerina*); Jenkins, 1967: 195–203, figs 1–8 (distrib., origin and coiling ratio); Kennett, 1967: 117–118 (latitudinal var.); Bé, 1967: 3, 4 (in key), figs 11a-f; Kennett, 1968a: 305–318; Kennett, 1968b: 1461–1463; Kennett, 1968c: 534– 565 (latitudinal var.); Jenkins, 1968: 34–35, fig. 1 (N.Z. Cenozoic palaeotemperatures); Kennett, 1969a: 309, fig. 7 (distrib. S.E. of N.Z.); Kennett, 1969b: 179 (palaeoclimatology of Pleistocene); Bé, 1969: 10–11, pl. 1, maps 4–6, table 1 (Southern Ocean distrib., ecol.); Williams, 1969: 284–285 (Pleistocene water masses), 2 figs; Kennett 1970a: 47–49 (comparison of Arctic and Antarctic populations); Bary, 1970: 211–225 (S.W. Pacific distrib. and abundance); Yoo, 1970: 119–129 (palaeoclimatol.), cf. Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 29 (growth patterns etc.), text-fig. 19, table 7, pl. 3, figs 2–3; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1(1–3), 3–7; Meuter & Laga, 1970: 175–183, text-figs 1–3, pl. 1 (coiling ratio and other variation); Parker & Berger, 1971: 97 (identif. features, refs etc.), fig. 16a (coiling direction); Bé & Tolderlund, 1971: 113–115 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.5 (distrib. map), 6.6 (coiling ratios),

tables 6.2 (distrib. zones), 6.3 (depth habitats); Olsson, 1971: 419–432 *passim* (population growth characteristics); Boltovsky, 1971: 281–282 (morphol. changes in life-cycle), fig. 19.1 (nos 11–16); Parker, 1971: 289–307, figs 20.6 (world distrib. and coiling zone provinces; cf. also Bolli, 1971: 639–64 1), 20.7, 20.8, 20.9, table 20.1 (latitudinal ranges); Schnitker, 1971: pl. 8, fig. 2; Jenkins, 1971: 23, 25, 31, 35, 99, 120, 128–129 (stratigr. occurrence, remarks, refs etc., (in *Globorotalia (Turborotalia)*), pl. 12, figs 345–347; Murray, 1971: 11, 214–215 (diagnostic features etc.), pl. 89, figs 1–5, Cifelli, 1971: 174–175 (coiling direction, temperature relationships etc.); Funnell *in* Middlemiss *et al.*, 1971: 195 (biogeogr. discuss.); Bandy & Theyer, 1971: 172–174 (growth var.), 2 pls; Bandy, 1971: 433–444 (origin and develop.), text-figs 1–3, pls 1–22; Bandy, 1972a: 294–318 (origin and develop.), text-figs 1–3, pls 1–7; Thielde, 1972: 93–102 *passim* (dominance and diversity related to ecol.); Root, 1972: 1–85 (thesis, Antarctic); Malmgren & Kennett, 1972: 241–248 (phenotypic var. analysis), figs 1–7; Keany & Kennett, 1972: 529–548 *passim* (fluctuations of life history and coiling etc.); Steuerwald & Clark, 1972: 573–580, figs 1–5; Vella, 1973: 293–295 (var. in coiling ratio, Antarctic), (shell form, palaeoecol.), 1 fig.; Cifelli, 1973: 157–166 (North Atlantic obs.), text-figs 1–2, pl 1–4; Collen & Vella, 1973: 19 etc. (N.Z. Pliocene, descr. etc., in *Neogloboquadrina* Bandy), pl. 1, figs 7–10; Olsson, 1973: 327–329 (ontogenesis), figs 1–2; Echols & Kennett, 1973: 14, pl. 6, maps 2–3 (Southern Ocean distrib. etc.); Malmgren & Kennett, 1973: 127–136 (coiling etc. in southern Pacific), figs 1–2; D'Onofrio, 1973: 905–908 (palaeoclimatic indicator); Kennett, 1973: 575 *et seq.*, pl. 1, figs 5–6; Vella, 1974: 1421–1424 (coiling ratios, var.); Kennett & Srinivasan, 1974: 263–265 (ultrastructural var.); Srinivasan & Kennett, 1974: 630–632 (calcification as climatic index), figs 1–2; Olsson, 1974: 47–60 (palae-oceanogr.); Thompson, 1975 thesis: 90, pl. 25, figs 1–2 (*Globigerina*); Kennett & Vella, 1975: 769 *et seq.*, (palaeoceanogr., DSDP Site 284, Challenger Plateau), pl. 2, figs 8–15, pl. 3, figs 2–6; Boltovskoy & Wright, 1976: 36, 39, 54, 87, 88, 160, 167–169, 171–175, 182, 184, 192, 213, 228, 231, 236, 243, 321, 344, 351, 356, 358–360, 363, 364, 380, 381, 384, 387; Olsson *in* Takayanagi & Saito, 1976: 244–257 (structure and topography), pls 1–6; Hornibrook, 1976: 83–102 *passim*, figs; Bé *in* Ramsay, 1977: 54, 56 (review), fig. 17, pl. 10, figs 22a-j; Dow, 1977: 157– 162 (test porosity, Miocene to Recent), fig. 1; Luz, 1977: 61–78 *passim* (S. Pacific palaeoclimate assemblages); Keller, 1978: 208–224 (morphol. var.); Sliter, 1980: 9–13 (refs to Bandy's work); Marks *et al.*, 1980: 127–133 (refs etc.), fig. 2 (coiling forms); Kennett & Srinivasan, 1980: 134–162 (surface ultrastructural var.), 3 figs, 8 pls; Thompson & Shackleton, 1980: 829–833 (coiling variations); Boltovskoy, 1981: 317, 340 (identif. table), 343, 346, 347, figs 162.11 & 168.21; Saito *et al.*, 1981: 106–108 (diag., refs & syn. etc.), pl. 34, fig. 1a-d, see also pl. 56, fig. 6; Huang, 1981: 184, 186 (interior), fig. 1, pl. 4, figs 42–47, pl. 5, figs 48–50 (*Globoquadrina*); Loubere, 1981: 137–138 *passim* (oceanogr. parameters and distrib.); Kahn, 1981: 203–211 *passim* (phenotype implication), fig. 4 (*Neogloboquadrina*); Boltovskoy, 1982: pl. 1, fig. 2 (twinned test); Cifelli, 1982: 9 (wall texture), pl. 12, figs 2–3; Lee, 1982: 20, fig. 1 (water mass niche); Hayward, 1983: 71 (key characters, in *Neogloboquadrina*), figs 5G–I; Blanc-Vernet & Sgarrella, 1983: 83–87, pl. 1, figs 1–4 (var., palaeoclimate, refs); Hayward, 1986: 8, 9, 11 (distrib. in intertidal sediments, Northland); Reynolds & Thunell, 1986: 1–18, text-figs 1–13, pls 1–2; Noble, 1987: 111–113 (temperature/environmental indicator); Hooper & Weaver, 1987: 21–43 *passim* (phylogeny, distrib., syst. review, palaeogeogr., etc.); Jansen & S'ejrup, 1987: 879–887 *passim* (isotopes/proteins); Lagoe & Thompson, 1988: 250 *et seq.* (tectonics etc.); Williams *et al.*, 1988: 153–162 *passim* (isotopes/morphol./environment); Aksu & Vilks, 1988: 701–709 *passim* (isotopic content etc.); Stott & Webb, 1989: 63–71 *passim* (stratigr./phylogeny); Yeh *et al.*, 1989: 77–85 (Fourier analysis/morphol.); Hornibrook *et al.*, 1989: 136, fig. 28: 13a-c; Mackensen *et al.*, 1989: 315–321, figs.

Family PULLENIATINIDAE
Genus **Pulleniatina** Cushman, 1927

Pulleniatina obliquiloculata (Parker & Jones, 1862)

Parker & Jones, 1862 (*in* Carpenter): 183 (*Pullenia*); Parker & Jones, 1865: 365, 368, pl. 19, figs 4a-b; Brady, 1884: 618, pl. LXXXIV, figs 16–20; Cushman, 1914: 22, pl. 10, fig. 3, pl. 12, figs 2–3; Cushman, 1924: 43, pl. 9, fig. 10; Cushman, 1927a: 90, pl. XIX, fig. 5; Cushman, 1928: 307, pl. 47, figs 11–13; Parr, 1950: 367; Phleger & Parker, 1951: 35, pl. 19, figs 19–20 (*Pulleniatina*); Cushman, 1955: 326 (type species, generic descr.), pl. 27, fig. 5, key pl. 35, figs 1–3; Banner & Blow, 1960a: 25, pl. 7, figs 4a-c (lectotype); Barker, 1960: 174, pl. 84 (LXXXIV), figs 16–20; Cheng & Cheng, 1960: 143–144 (refs & syn.), 156, pl. X, figs 1 & 5; Andersen, 1961: pl. 27, figs 7a-c; Ujiiha, 1963: 393, pl. 46, figs 1a-c, pl. 55, fig. 6; Galhano, 1963: 90 (refs), pl. IX, fig. 2; Eade, 1967a: 49 (N.Z. refs); Banner & Blow, 1967: 137 (in key), 137–139 (review, distrib., refs etc.), pl. 3, figs 4a-c, pl. 4, fig. 9; Bé, 1967: 3, 5 (in key), figs 23a-c; Albani, 1968a: 32, fig. 146;

Albani, 1968b: 115 (remarks, range etc.); Boltovskoy, 1968: 90, pl. 2, fig. 14; Bé & Tolderlund, 1971: 137 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.23 (distrib. map), table 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 286 (morphol. changes in life-cycle), fig. 19.1 (nos 86–91); Emiliani, 1971b: 1122–1124 (oxygen isotopic determinations of past sea-surface temperatures, depth, habitats, and growth stages); Parker, 1971: 289–307, figs 20.3 (world distrib. in deep-sea sediments), 20.7, 20.8, 20.9, table 20 (latitudinal ranges); Postuma, 1971: 380–381 (diag., etc.), figs; Schnitker, 1971: 169–215, pl. 8, fig. 6; Hansen & Reiss, 1972: 169–179, pl. 4, figs 1–4; Berger & Piper, 175–287, figs, tables; Shackleton *et al.*, 1973: 177–179, fig. 1, table 2-4 (isotopic composition of test); Chen & Chen, 1973: 97–116 *passim* (chemical var.); Eade, 1973: 249–256 *passim*, fig. 13 (abundance at different temperatures, SW Pacific); Jenkins, 1973a: 78–88, text-fig. 1; Kennett, 1973: 575 *et seq.* (biostratigr./paleoceanogr.), pl. 20, figs 8–9; Burt & Scott, 1975: 166–175, text-figs 1–2, pls 1–3 (spinosity and coiling geometry); Bé *et al.*, 1975: 27–55 *passim*, figs (dissolution effects etc.); Thompson, 1975 thesis: 92 (refs), pl. 26, fig. 7; Boltovskoy & Wright, 1976: 37, 160, 167, 168, 170, 171, 173, 175, 182, 184, 186, 187, 192, 350, 351, 356, 357; Bé *in* Ramsay, 1977: 62 (review), fig. 29, pl. 10, figs 26a-d; Bé *et al.*, 1977: 155–179 *passim*, pl. 3, figs 2–3; Prell & Damuth, 1978: 267–277 (climates); Hayward, 1979a: 152 &c (off Cavalli Is, N.Z.), fig. 2b; Hayward, 1979b: 186 (*Zostera* pool community); Blow, 1979: 178; Albani, 1979: 43 (features), fig. 98.1; Boltovskoy, 1981: 341 (identif. table), 344, 347, figs 162.16 & 162.18; Saito *et al.*, 1981: 96, 98–100 (diag., refs & syn.), pl. 30, figs 1a-d, 2a-d, pl. 31, figs 3a-d; Huang, 1981: 186, 188 (interior), pl. 5, figs 51–55, table 1; Hayward, 1983: 71 (key characters), figs 3K–M; Larsen, 1982: pl. 20, fig. 5; Lee, 1982: 21, fig. 1 (water mass niche); Taylor, 1982: 77, table III (symbiosis); cf. Belyea & Thunell, 1984: 1026–1040 (shape analysis); Hayward, 1986: 8, 11 (distrib. in intertidal sediments, Northland); Loeblich & Tappan, 1987: 480, pl. 524; Wu & Berger, 1989: 181–198 (isotopes/environment).

Family CANDEINIDAE
Subfamily GLOBIGERINITINAE
Genus **Globigerinita** Brönnimann, 1951

Globigerinita elevata (d'Orbigny, 1840)

d'Orbigny, 1840: 34, pl. III, figs 15–16 (*Globigerina*); Heron-Allen & Earland, 1922: 191 (N.Z. as *Globigerina rubra* var. *elevata*, refs); Eade, 1967a: 49.

Globigerinita glutinata (Egger, 1893)

Egger, 1893: 371, pl. 13, figs 19–21 (*Globigerina*); Rhumbler, 1911: 149, pl. 29, figs 14–26, pl. 33, fig. 20, pl. 34, fig. 1; Phleger *et al.*, 1953: 16, pl. 2, figs 12–15; Parker, 1962: 246, 248, 249 (refs), pl. 9, figs 1–16; Smith, 1963: 3, pl. 2, figs 26–28; Ujiie, 1963: 398, pl. 46, figs 13a-c, 14a-c, 15a-c, pl. 56, figs 6 & 9, pl. 60, figs 5–6; Kennett, 1966: 69–70, pl. 10, figs 161–165 (Upper Miocene, N.Z. remarks etc.); Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 5 (in key), figs 18a-c; Boltovskoy, 1968: 91, pl. 2, fig. 19; Boltovskoy, 1969: pl. 2, fig. 11; Kennett, 1969a: 313, fig. 7 (distrib. S.E. of N.Z.); Bé, 1969: 12, pl. 2 (maps 11–12), table 1 (southern distrib.); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 35–36 (growth patterns, status [cf. Parker, 1962b: 247], refs), pl. 4, fig. 5; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1(8), 3–7; Boltovskoy, 1971: 282 (morphol. changes in life-cycle), fig. 19.1 (nos 22–25); Murray, 1971: 11, 218–219 (diag. features etc.), pl. 91, figs 1–6; Schnitker, 1971: 169–215, pl. 8, fig. 8; Berger & Piper, 1972: 275–287, figs, tables; Collen & Vella, 1973: 17–18 etc. (N.Z. Pliocene, descr., refs etc.), pl. 1, figs 1–2; Echols & Kennett, 1973: 15, pls 7, 9 (Southern Ocean distrib. etc.); Kennett & Vella, 1975: 769 *et seq.* (DSDP Site 249, Challenger Plateau), pl. 8, figs 11–13; Boltovskoy & Wright, 1976: 37, 88, 162, 167–170, 174, 182, 184, 187, 228, 231, 321; Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Huang, 1981: 188 (interior), pl. 5, figs 56–58, table 1; Boltovskoy, 1981: 342 (identif. table), 343 (comp. with *G. uvula*), 346, fig. 168.30; Saito *et al.*, 1981: 77 (diag., refs), pl. 22, figs 1a-d, see also pl. 23, figs 1a-c; Kahn, 1981: 203–211 *passim* (phenotype implications), figs 4–5; Lee, 1982: 21, fig. 1 (water mass niche); not *G. glutinata* Egger of Rhumbler, 1909, Phleger *et al.*, 1953 : 16, and others = *Tinophodella ambitacrena* Loeblich & Tappan, 1957, see Cheng & Cheng, 1960: 147 (refs & syn.), 156, pl. XI, figs 1–6; Hayward, 1983: 70 (key characters, syn. incl. *Globigerinita juvenilis* Bolli of Hayward, 1979a: 152 &c (off Cavalli Is) and (presumably) of Hayward, 1979b: 185 (*Zostera* pool community), figs 3F–H; Hayward, 1986: 11 (distrib. in intertidal sediments, Kawerua, Northland); Olson, 1986: 219–225 *passim* (ocean environ./faunal boundaries).

Globigerinita iota Parker, 1962

Parker, 1962b: 250, pl. 10, figs 26–30; Eade, 1967a: 49 (listed); Boltovskoy & Wright, 1976: 182, 184, 289, 321; Boltovskoy, 1981: 342 (identif. table), 345, fig. 168, 33; Saito *et al.*, 1981: 79 (diag., refs), pl. 23, figs 2a-d; Hayward, 1983: 70 (key characters, incl. *G. incrusta* Akers of Hayward, 1979b: 185 (*Zostera* pool community), figs 3I–K, 6 (latitudinal range, N.Z.); Hay-

ward, 1986: 11 (distrib. in intertidal sediments, Northland); Fordham, 1986: 56 (in new genus *Parkerina*); Li Quianyu, 1987: 311 (type species of new genus *Tenuitellita*); Loeblich & Tappan, 1987: 722.

Globigerinita uvula (Ehrenberg, 1861)

Ehrenberg, 1861: 276, 277, 308 (*Pylodexia*); Parker, 1962b: 252 (refs), pl. 8, figs 14–2 (*Globigerinita*); Ujiie, 1963: 398–399 (wall structure, coiling etc.), pl. 46, figs 16a-c, 17a-c, 18a-c, pl. 56, figs 7–8, pl. 60, figs 7–8; Kennett, 1966a: 70, pl. 10, figs 167–168 (Upper Miocene, N.Z.); Eade, 1967a: 49; Kennett, 1969a: 313, figs 6–7 (distrib. S.E. of N.Z.); Bé, 1969: 12 (southern distrib.), table 1; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1(7), 3–7; Boltovskoy, 1971: 283 (morphol. changes in life-cycle), fig. 19.1, (nos 26–30); Collen & Vella, 1973: 18 etc. (N.Z. Pliocene, refs etc.), pl. 1, figs 3–6; Echols & Kennett, 1973: 15, pl. 7, map 8; Boltovskoy & Wright, 1976: 37, 88, 168, 170, 172, 174, 185, 189, 228, 236, 289; Boltovskoy, 1981: 317, 342 (identif. table), 344, 346, figs 162.13 & 168.31; Saito *et al.*, 1981: 81–82 (diag., refs etc.), pl. 24, figs 3a-d; Hayward, 1983: 70 (key characters as *G. bradyi* (Wiesner, 1931: 133), incl. *G. uvula* (Ehrenberg) of Parker & Berger, 1971: 97), figs 3D–E, 6 (latitudinal range, N.Z.).

Globigerinita sp. Hayward, 1979

Hayward, 1979a: 152 (off Cavalli Is).

Subfamily CANDEININAE
Genus **Candeina** d'Orbigny, 1839

Candeina nitida d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra : 108, 204, pl. II, figs 27–28; Brady, 1884: 622–624, pl. LXXXII, figs 13–20; Millett, 1903: 692, pl. VI, fig. 2; Chapman, 1909a: 352; Cushman, 1914: 16, pl. 11, fig. 1; Heron-Allen & Earland, 1930b: 178, pl. IV, figs47–48; Cushman, 1955 : 327 (type species, generic descr.), pl. 27, fig. 3, key pl. 35, fig. 8; Cheng & Cheng, 1960: 144 (refs & syn.), 156, pl. XI, figs 7–8; Barker, 1960: 170, pl. 82, fig 13–20; Andersen, 1961: pl. 28, figs 1a-b; Eade, 1967a: 49; Bé, 1967: 3, 6 (in key), figs 31a-c; Boltov-skoy, 1968: 91, pl. 2, fig. 21; Bé & Tolderlund, 1971: 138 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.25 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Schnitker, 1971: 169–215, pl. 8, fig. 10; Postuma, 1971: 252–253 (diag., etc.), figs; Kennett, 1973: 575 *et seq.* (biostratigr., paleoceanogr.), pl. 1, figs 1–4; Boltovskoy & Wright, 1976: 160, 167– 169, 174, 182, 184, 187, 228; Blow, 1979: 137; Boltovskoy, 1981: 342 (identif. table), 344, 345, fig. 162.18; Saito *et al.*, 1981: 75 (diag. remarks, etc.), pl. 21, figs 1a-d, 2a-d; Huang, 1981: 188 (interior), pl. 5, fig. 59, table 1; Hayward, 1983: 71 (key characters of genus), figs 2A–B, fig. 6 (latitudinal range); Loeblich & Tap-pan, 1987: 482, pl. 526.

Family CATAPSYDRACIDAE
Genus **Globoquadrina** Finlay, 1947

Globoquadrina conglomerata (Schwager, 1866)

Schwager, 1866: 255, pl. 7, fig. 113 (*Globigerina*); Cushman, 1921: 295 (descr.); Parr, 1950: 366; cf. Barker, 1960: 168; Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 5 (in key), figs 21a-c; Boltovskoy, 1969: 248, pl. 1, figs 3–4 (*Globigerina*); Bé & Tolderlund, 1971: 138 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.26 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy & Wright, 1976: 166, 168, 169, 174, 182, 184, 187, 228; Boltovskoy, 1981: 340 (identif. table), 346, 347, figs 162.4 & 168.26; Saito *et al.*, 1981: 93–94 (diag., etc.), pl. 29, figs 2a-c, 3.

Genus **Globorotaloides** Bolli, 1957

Globorotaloides hexagona (Natland, 1938)

Natland, 1938: 149, pl. 7, fig. 1 (*Globigerina*); Parker, 1962b: 244, pl. 8, figs 5–13 (*Globoquadrina*); Eade, 1967a: 49; Bé, 1967: 3, 5 (in key), figs 22a-c; Boltovskoy, 1969: pl. 1, figs 9–10 (*Globigerina*); Bé & Tolderlund, 1971: 144 (distrib. pattern, as *Globoquadrina*), figs 6.3 (species associations), 6.4 (temperature range), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1981: 340 (identif. table), 347, figs 162.3 & 168.25; Saito *et al.*, 1981: 91 (diag., refs etc.), pl. 28, figs 1a-d, 2a-d.

Superfamily HANTKENINACEA
Family GLOBANOMALINIDAE

Genus **Hastigerinella** Cushman, 1927

Hastigerinella digitata (Rhumbler, 1911)

Rhumbler, 1911: 202, pl. XXXVII, fig. 9 (*Hastigerina*); Cushman, 1927a: 87–88 (*Hastigerinella* n.g.), pl. XIX, fig. 5; Parr, 1950: 367; Cheng & Cheng, 1960: 137–138 (refs & syn.), 154, pl. III, figs 5–6; Kustanowich, 1963: 543,563 (as *H. rhumbleri* Galloway, 1933: 333 (new name for *H. digitata* of Rhumbler, 1911); Cushman, 1955: 324 (type species, generic descr.), pl.

27, fig. 9, key pl. 34, fig. 16; Bolli *et al.*, 1957: 32 (status of Galloway's name)); cf. pl. 5, figs 1–2, *H. rhumbleri* after Rhumbler's original figures of *H. digitata*); Banner & Blow, 1960a: 35, 36 (refs), pl. 7, fig. 3; Ujiie, 1963: 393, pl. 45, figs 14a-c, 15a-b, pl. 61, fig. 9; Eade, 1967a: 49 (note on syn., following Parker, 1962: 228); Bé, 1967: 3, 4 (in key), figs 2a-b; Seiglie & Cucurullo, 1971: 101–122, pl. 2, figs 38a-b(?), pl. 3, figs 53–55; Berggren & Poore, 1974: 689–698 (biochronology); Kennett, 1975: 575 *et seq.* (palaeoecol., negative value for Mio/Pliocene boundary), pl. 21, figs 2–6; cf. Srinivasan & Kennett, 1975: 158; Boltovskoy & Wright, 1976: 168, 169, 188; Blow, 1979: 138; cf. Saito & Thompson *in* Takayanagi & Saito, 1976: 284–286, pl. 2, figs 3–4, pl. 6, fig. 5, pl. 8, fig. 2 (*Hastigerinopsis* [n.g.] *digitiformans*, new name for *Hasterigina digitata* (Brady) of Rhumbler, 1895, and 1911: 163–164, 202, 220, pl. 37, figs 7–14, incl. Cushman, 1927a: 87; Galloway, 1933: pl. 30, fig. 9; Banner & Blow, 1960b: 24–26, text-figs 5 & 8; see also Saito *et al.*, 1981: 23–24, pl. 1, figs 2a-d (diag., discuss, refs & syn.).

Superfamily GLOBIGERINACEA
Family GLOBIGERINIDAE
Subfamily GLOBIGERININAE

Genus **Beella** Banner & Blow, 1960

Beella digitata Brady, 1879

Brady, 1879b: 286 (*Globigerina*); Brady, 1884: 599, pl. LXXX, figs 6–10, pl. LXXXII, figs 6–7; Cushman, 1914: 7, pl. 14, figs 1–3; Bolli *et al.*, 1957: 32, pl. 5, figs 3a-b; Barker, 1960: 166, pl. 80, figs 6–10, pl. 82, figs 6–7 (in *Hastigerinella*, following Galloway, 1933); Parker, 1962: 266, pl. 1, figs 20–25; Kustanowich, 1963: 543, 552; Eade, 1967a: 49 (*Beella*); Jenkins, 1971: 169 (stratigr. occurrence, remarks, refs), pl. 17, figs 534–535; Collen & Vella, 1973: 21 (use of subgeneric placing in *Globigerina (Beella)*, following Parker, 1967; Srinivasan & Kennett, 1975: 157, table 2, pl. 1, figs 9–14, pl. 2, figs 1–2 & 4 (morphol. characteristics etc. in subgenus of *Globigerina*), 158 (characteristics of *Beella*, refs); Blow, 1979: 125 (as *Globigerina*, subgenus *Beella*); Boltovskoy, 1981: 339 (identif. table), 346, fig. 168.7; Saito *et al.*, 1981: 29–30 (diag., remarks, refs & syn.), pl. 3, figs 2a-d (*Beella*); Larsen, 1982: pl. 19, fig. 11; Lee, 1982: 20 (water mass niche); Hayward, 1983: 64, figs 2F–H (key characters, in *Globigerina*, incl. *Hastigerinella rhumbleri* Galloway of Kustanowich, 1963: 543, 563 but see also Eade, 1967a: 49 and under *Hastigerinopsis digitiformans* Saito & Thompson of this list, cf. also Srinivasan & Kennett, 1975: 158); Holmes, 1984: 101, 102, pl. 1, figs 6–7, 9–10 (in *Beella*, emended diag., remarks etc., as type species, examination of type material etc.).

Genus **Globigerina** d'Orbigny, 1826

Globigerina bulloides d'Orbigny, 1826

d'Orbigny, 1826: 277, no. 1, Modèles no. 17; Brady, 1884: 593–595, pl. LXXVII, pl. LXXIX, figs 3–7; Cushman, 1914: 5, pl. 2, figs 7–9, pl. 9; Parr, 1950: 365; Parker & Phleger, 1951: 34, pl. 19, figs 6–7; Cushman, 1955: 322 (type species, generic descr.), pl. 27, fig. 1, key pl. 34, figs 4–5; Todd & Bronnimann, 1957: pl. 12, fig. 1; Hofker, 1959: 1–9; Banner & Blow, 1960: 3, pl. 1, figs 1 & 4; Cheng & Cheng, 1960: 133–134 (refs & syn.), 153, pl. III, figs 3–4; Barker, 1960: 160, pl. 77, pl. 79, figs 3–7; Andersen, 1961: pl. 27, figs 1a-b; Cassie, 1961: 21, 51 (N.Z. localities); McKenzie, 1962: 127 (Australian refs); Galhano, 1963: 85 (refs), pl. VIII, fig. 17; Ujiie, 1963: 388 (descr. of wall structure etc.), pl. 44, figs 1a-c, pl. 54, fig. 1, pl. 57, figs 1–2; Smith, 1963: 2, pl. 1, figs 1–4; Lee *et al.*, 1965a: 1–11, pls 1–5 (cytology); Kennett, 1966a: 64, pl. 8, figs 133–135 (Upper Miocene) (Kapitean), N.Z., range etc.; Eade, 1967a: 48 (N.Z. refs); Bé, 1967: 3, 5 (in key), figs 14a-c; Albani, 1968a: 31, fig. 140; Albani, 1968b: 114 (range etc.); Hornibrook, 1968: 85, fig. 16; Boltovskoy, 1968: 248, pl. 1, figs 1–2; Bé, 1969: 11, table 1, pl. 2 (maps 7–8) (southern distrib., ecol.); Kennett, 1969a: 310, figs 2 & 7 (distrib. SE of N.Z.); Bary, 1970: 211–225 *passim* (S.W. Pacific distrib.); Hada, 1970: 22–23, text-fig. 27 (ecol., refs); Cifelli & Smith, 1970: 5 *et seq.* (ecol. etc.), 18–20 (growth patterns, etc. as *G. bulloides bulloides*), text-fig. 12, table 3, pl. 1, figs 5–6; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1(6), 3–7; Berger, 1970: 185–186, tables 2–3; Belyaeva, 1970: 156–161; Parker & Berger, 1971: 97 (identif. features); Bé & Tolderlund, 1971: 119 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.8 (distrib. chart), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovsky, 1971: 281 (morphol. changes in life-cycle), fig. 19.1 (nos 1–5); Parker, 1971: figs 20.7, 20.8, 20.9 (latitudinal ranges in North Atlantic, South Pacific and Indian Ocean sediments), table 20.1; Kameswara Rao, 1971: 11 (descr., refs), figs 74a-b; Jenkins 1971: 9, 14, 33, 126, 127, 141–143 (stratigr. occurrence, remarks, refs etc., in subgenus *Globigerina* sensu lato), pl. 14, figs 408–410; Murray, 1971: 11, 210–211 (diag. features etc.), pl. 87, figs 1–5; Schnitker, 1971: 169–215, pl. 7, fig. 13 (*Globigerina*); Febvre-Chevalier, 1971: 311–324 (ultrastructure), 11 figs; Berger & Piper, 1972: 275–287, figs, tables; Thiede, 1972: 93–102 *passim* (dominance and diversity related to

ecology); Hansen & Reiss, 1972: pl. 2, figs 7–9; Bandy, 1972b: 194–195, figs 1–2 (var. and water masses); Stehman, 1972: 13 (distrib. status); Collen & Vella, 1973: 20 etc., pl. 2, fig. 7 (N.Z. Pliocene, descr., etc.); Boltovskoy, 1973: 152–155, text-fig. 1 (palaeotemperature determinations); Miro, 1973: 95–108 *passim* (upwelling); Eade, 1973: 249–256 *passim* (geogr. distrib., SW Pacific), figs 12, 13; Echols & Kennett, 1973: 14, pl. 6, map 4 (Southern Ocean distrib., etc.); Kennett, 1973: 575 *et seq.* (biostratigr., palaeoceanogr., etc.), pl. 1, figs 12–14; Collins, 1974: 45 (Australia, refs); Cifelli, 1974: 176, pl. 1, figs 1–2; Thompson, 1975 thesis: 90, pl. 24, fig. 5; Kennett & Vella, 1975: 769 *et seq.* (palaeoceanogr., DSDP Site 284, Challenger Plateau), pl. 1, figs 1–4; Boltovskoy & Wright, 1976: 7, 9, 10, 36, 61, 88, 90, 141, 159, 167–170, 172–175, 182–184, 187, 189, 228, 231, 236, 310, 311, 348, 351, 356, 363–365, 392; Malmgren & Kennett, 1976: 3–25, 20 figs, 1 pl. (phenotypic var.); Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis); Luz, 1977: 61–78 *passim* (S. Pacific palaeoclimate assemblage), fig. 1; Bé *in* Ramsay, 1977: 56–57 (review), fig. 18, pl. 8, figs 9a-e; Malmgren & Kennett, 1977: 131–148 (biometry); Albani, 1979: 42 (features), fig. 95.1; Blow, 1979: 850 (refs & syn.), fig. 118; Hayward 1979a: 151, 154 (Cavalli Is, N.Z.), fig. 2a; Hayward, 1979b: 185 (*Zostera* pool community), fig. 3p; Hayward, 1979c: 216 (early Miocene, Auckland); Adshead, 1980: 9–126 *passim* (pseudopodial variability and behaviour in culture); Huang, 1981: 180 (interior), pl. 2, figs 18–19; Kahn, 1981: 203–211 *passim* (phenotype implications), figs 4, 6–8, tables 1–2; Boltovskoy, 1981: 317, 339 (identif. table), 343, 344, 346, figs 162.17 & 168.1; Loubere, 1981: 13–158 *passim* (oceanogr. parameters and distrib.); Hayward, 1981a: 82, 92 (Tutukaka Harbour); Hayward, 1981b: 134 (Bay of Islands); Hayward & Grace, 1981: 54 (off Cuvier Is); Saito *et al.*, 1981: 40 (diag. remarks, refs & syn.), pl. 7, figs 1a-d; Boltovsky, 1982: 79–82, pl. 1, fig. 5 (twinned test); Cifelli, 1982: 7–8 (wall texture etc.), pl. 8, figs 1–2, pl. 9; Larsen, 1982: pl. 19, fig. 5; Lee, 1982: 20, fig. 1 (water mass niche); Taylor, 1982: 77 (table III), 78 (sym-biosis); Hayward, 1983: 64 (key characters), figs 2C–E; Hayward, 1986: 1, 7, 8, 9, 11 (distrib. in intertidal sediments, Northland), fig. 2a; Noble, 1987: 111–113 (temperature/environment indicator); Keigwin 1987: 911 *et seq.* (stable isotopes/climate); Boltovskoy, 1988: 375–382, tables, figs; Pal, 1988: 320–326 *passim* (salinity/environment); Bard *et al.*, 1989: 381–391 (sea-level changes/environmental indicators).

Globigerina calida Parker, 1962

Parker, 1962b: 221, pl. 1, figs 9–13, 15; Eade, 1967a: 48 (listed); Bé, 1967: 3, 5 (in key), figs 15a-e; Kennett, 1969a: 316, fig. 7 (distrib. SE of N.Z.); Berger, 1970: 185–186, tables 2–3; Parker & Berger, 1971: 97; Thompson, 1975 thesis: 90, pl. 24, figs 6–7; Berger & Piper, 1972: 275–287, figs, tables; Boltovskoy & Wright, 1976: 168, 174, 182, 184, 187; Blow, 1979: 850, fig. 119; Boltovskoy, 1981: 340 (identif. table), 344, 346, figs 162.1 & 168.28; Saito *et al.*, 1981: 32–34 (diag., remarks, refs), pl. 4, figs 2a-d (*Globigerinella*); Larsen, 1982: pl. 19, fig. 6; Lee, 1982: 21, fig. 1 (water mass niche); Hayward, 1986: 8–9, 11 (in intertidal sediments, Kawerua, Northland; alleged first N.Z. record — but see Eade, 1967a: 48), fig. 2e (in *Globigerinella*).

Globigerina cf. **calida** Parker, 1962. Hayward, 1979

Hayward, 1979a: 152 &c (off Cavalli Is, N.Z. as *G.* cf. *calida* Parker, *q.v.*), fig. 2b; cf. Hayward, 1986: 8–9.

Globigerina cretacea d'Orbigny var. **eggeri** Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 188, pl. VII, figs 6–8; Eade, 1967a: 48 (listed); Parker & Berger, 1971: 100 (status).

Globergina dubia Egger, 1857

Egger, 1857: 281, pl. 9, figs 7–9; Brady, 1884: 595–596, pl. LXXIX, figs 17a-c; Eade, 1967a: 48 (N.Z. refs); Kameswara Rao, 1971: 11–12 (descr., refs), fig. 75; Boltovskoy & Wright, 1976: 186; not *G. dubia* of Brady, 1879 and others, see Cheng & Cheng, 1960: 134–135 (refs & syn.), fig. 53, pl. IV, figs 4–6.

Globigerina falconensis Blow, 1959

Blow, 1959: 177, pl. 9, figs 40–41; Parker, 1962b: 224, pl. 1, figs 14, 16–19; Kennett, 1966: 65, pl. 8, figs 136–138 (Upper Miocene, N.Z.); Eade, 1967a: 48; Bé, 1967: 3, 5 (in key), figs 13a-c; Kennett, 1969: 316, fig. 7 (distrib. SE of N.Z.); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 20 (growth patterns etc.) (as *G. bulloides falconensis*), pl. 1, fig. 4; Jenkins, 1971: 148 (stratigr. occurrence, range, comparison with *G. (G.) bulloides* d'Orbigny etc.), pl. 16, figs 463–465; Murray, 1971: 11, 212–213 (diag. features etc.), pl. 88, figs 1–6 (as *G. falconensis*); Kennett, 1973: 575 *et seq.* (biostratigr., palaeoceanogr., etc.), pl. 2, figs 3–4; Collen & Vella, 1973: 21, pl. 3, figs 4–5; Cifelli, 1974: 176, pl. 1, fig. 4; Kennett & Vella, 1975: 769 *et seq.* (palaeoceanogr. from DSDP Site 284, Challenger Plateau); Boltovskoy & Wright, 1976: 169, 174, 182, 184; Malmgren & Kennett, 1977: 131–148 (biometry); Blow, 1979: 850, fig. 121; Hayward, 1979a: 152 &c (off Cavalli Is, N.Z. warm-water form of *G. bulloides*); Hayward, 1979b:

185 (*Zostera* pool community); Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Hayward, 1981a: 82, 92 (Tutukaka Harbour); Hayward, 1981b: 134 (Bay of Islands); Hayward & Grace, 1981: 54 (off Cuvier Is); Boltovskoy, 1981: 339 (identif. table), 344, 346, figs 162.19 & 168.4; Saito *et al.*, 1981: 40–42 (diag., etc.), pl. 7, figs 2a-d; Hayward, 1982b: 55, 65 (off Little Barrier Is); Larsen, 1982: pl. 19, fig. 7; Hayward, 1983: 64 (key characters), figs 2I–K; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Globigerina helicina d'Orbigny, 1826

d'Orbigny, 1826: 277, no. 5; Brady, 1884: 605, pl. LXXXI, figs 4–5; Cushman, 1914: 12, pl. III, figs 1–2; Heron-Allen & Earland, 1922: 192 (N.Z.); Barker, 1960: 168, pl. 81, figs 4–5; Eade, 1967a: 48.

Globigerina humilis (Brady, 1884)

Brady, 1884: 665–666, pl. XCIV, figs 7a-c (*Truncatulina*); Thalmann, 1932: 115 (*Anomalina*); Chapman & Parr, 1937: 115 (*Globorotalia*); Phleger *et al.*, 1953: 40, pl. 8, figs 31–32 (*Valvulineria*); Barker, 1960: 194 (?*Valvulineria*, generic status of Brady's species), pl. 94 (XCIV), fig. 7; Parker, 1962: 249–250 (features, refs & syn.), pl. 10, figs 1–25; Seiglie & Cucurullo, 1971: 101–122, pl. 4, figs 61a-b, 64a-b, 65a-b, 66a–67b; Bé, 1977: 10, pl. 9, figs 16a-c; Saito *et al.*, 1981: 84–86 (diag., refs & syn.), pl. 25, figs 1a-c & 3a-c (*Turborotalita*); Hayward, 1983: 64 (key characters), figs 2L–N, 6 (latitudinal range in N.Z.).

Globigerina megastoma Earland, 1934

Earland, 1934: 177, pl. 8, figs 9–12; Kustanowich, 1963: 543, 554, pl. 3, nos 40–41; Eade, 1967a: 48; Banner & Blow, 1960a: 14–15, pl. 1, figs 3a-c (lectotype); Kennett, 1969: 316, fig. 7 (distrib. SE of N.Z.); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 29 (growth patterns), pl. 3, fig. 1; Blow, 1979: 850, fig. 122; Boltovskoy, 1981: 339 (identif. table), 346; Saito *et al.*, 1981: 35 (diag., etc.), pl. 5, figs 2a-d.

Globigerina quinqueloba Natland, 1938

Natland, 1938: 149–150, pl. 6, figs 7a-c; Smith, 1963: 3, pl. 1, figs 5–7; Ujiie, 1963: 389–390 (wall structure, refs etc.), pl. 44, figs 10a-c, 11a-b, 12a-b, pl. 54, figs 8–9, pl. 57, figs 10–11; Kennett, 1966a: 67–68, pl. 9, figs 153–154 (Upper Miocene, N.Z.); Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 4 (in key), figs 10a-c; Boltovskoy, 1969: pl. 1, figs 13–14; Bé, 1969: 9–10 (southern distrib., ecol. etc.), table 1, pl. 1 (maps 2–3); Kennett, 1969a: 310, figs 3 & 7 (distrib. SE of N.Z.); cf. Cifelli & Smith, 1970: 32–34 (cf. with new subspecies *G. q. egelida*); Berger, 1970: 185–186, tables 2-3; Kennett, 1970b: 125–140 *passim* (palaeoclimates), figs 1(4–5), 3–7; Parker & Berger, 1971: 97; Bé & Tolderlund, 1971: 115, 119 (distrib. patterns), figs 6.3 (temperature range), 6.7 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Jenkins, 1971: 155–156 (stratigr. occurrence, remarks, refs etc., in subgenus *Globigerina*), pl. 18, figs 539–544; Murray, 1971: 11, 216–217 (diag. features etc.), pl. 90, figs 1–5; Root, 1972: 1–85 (thesis, Arctic sediments); Collen & Vella, 1973 : 22 (N.Z. Pliocene, descr., etc., in *Turborotalita* Blow & Banner, 1962), pl. 4, figs 10–12, pl. 5, fig. 4; Echols & Kennett, 1973: 15, pl. 7, map 4 (Southern Ocean distrib. etc.); Kennett & Vella, 1975: 769 *et seq.* (palaeoceanogr. from DSDP Site 284, Challenger Plateau), pl. 2, figs 2–6; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 90, pl. 25, figs 4–5); Boltovskoy & Wright, 1976: 80, 88, 167–169, 172, 174, 184, 187, 189, 225, 236, 321, 351, 356; Hayward, 1979a: 152 &c (Cavalli Is, N.Z.), fig. 2i; Huang, 1981: 180 (interior), pl. 2, figs 20–24, table 1; Boltovskoy, 1981: 317, 339 (identif. table), 343, 344, 346, fig. 168.5; Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Saito *et al.*, 1981: 48 (diag. etc.), pl. 10, figs 1a-c, 2a-d; Hayward, 1981a: 82, 92 (Tutukaka Harbour); Hayward, 1982b: 65 (off Little Barrier Is); Larsen, 1982: pl. 19, figs 8–9; Lee, 1982: 21, fig. 1 (water mass niche); Hayward, 1983: 64 (key characters), figs 2O–Q; Blanc-Vernet & Sgarrella, 1983: 83–87, pl. 1, figs 5–6 (var., palaeoclimate, refs); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Globigerina sp. Cassie, 1961

Cassie, 1961: 21, 51 (Otago Peninsula).

Genus **Globigerinella** Cushman, 1927

Globigerinella aequilateralis (Brady, 1879)

Brady, 1879b: 285 (*Globigerina*); Brady, 1884: 605–606, pl. LXXX, figs 18–21; Cushman, 1917: 662, text-figs 11a-c; Cushman, 1924: 25, pl. 4, figs 7–8; Cushman, 1927: 87, pl. XIX, fig. 7; Parr, 1950: 366; Cushman, 1955: 323 (type species, generic descr.), pl. 27, fig. 7, key pl. 34, figs 11–12; Walker & Vilks, 1973: 196–198, pl. 1, figs 6–7 (*Globigerinella*); Saito *et al.*, 1981: 26–28, pl. 2, figs 2a-d (diag., refs & syn.); Hayward, 1983: 67, 70, figs 3A–C (key characters, syn. incl. *Globigerina subcretacea* Lomnicki of Kustanowich, 1963: 556, fig. 35, *Globigerina siphonifera* (d'Orbigny), N.Z. material of Parker & Berger, 1971: 81 and *Hastigerina siphonifera* (d'Orbigny) of Hayward, 1979a: 152 [accordingly, include the following references to *Hastigerina* or *Globigerinella siphonifera* if

regarded as *nomen oblitum* after Banner & Blow (1960b: 22–23, text-figs 2a-c, 32b) — d'Orbigny, 1839a (*in* de la Sagra): 83–84, 206, pl. IV, figs 15–18 (*Globiginera siphonifera*); Phleger & Parker, 1951: 35, pl. 19, fig. 14 (*Globigerinella*); Galhano, 1963: 89 (refs etc.), pl. VIII, fig. 25; Hulme, 1964: 337 (Manukau Harbour; ref.); Eade, 1967a: 47 (N.Z. refs, notes on syn.); Albani, 1968b: 113 (distrib., as *Globigerinella*); Eade, 1973: 249–256 *passim*, fig. 13 (abundance at different temperatures, SW Pacific); Thompson, 1975 thesis: 91 (refs), pl. 25, fig. 3, Albani, 1979: 44 (features), fig. 103.1; Hayward, 1979a: 152 &c. (Cavalli Is, N.Z.); Hayward, 1979b: 186 (*Zostera* pool community, N.Z.); Hayward, 1981a: 92 (Tutukaka Harbour); Hayward & Grace, 1981: 54 (off Cuvier Is); Andersen, 1981: pl. 28, figs 2 a-b; Larsen, 1981: pl. 18, fig. 2 (as *Globigerinella*); Lee, 1982: 21, fig. 1 (water mass niche); Taylor, 1982: 77, table III (symbiosis)]; Hayward, 1986: 1, 7, 8, 11 (distrib. in intertidal sediments, Northland), fig. 2d; Loeblich & Tappan, 1987: 489, pl. 535; Bijima *et al.*, 1990a: 117–127 *passim* (reprod./lunar cycle, as *H. siphonaperta*); Bijima *et al.*, 1990b: 95–116 *passim* (salinity/temperature, lab. culture).

Genus **Globigerinoides** Cushman, 1927

Globigerinoides conglobatus (Brady, 1879)

Brady, 1879: 286–287 (*Globigerina*); Brady, 1884: 603, pl. LXXX, figs 1–5; Cushman, 1914: 10, pl. 3, figs 3–5, pl. 10, figs 1&6; Cushman, 1924: 18, pl. 3, figs 8–13; Parr, 1950: 366; Parker & Phleger, 1951: 35, pl. 19, fig. 15; Banner & Blow, 1960: 6, pl. 4, fig. 4; Cheng & Cheng, 1960: 139 (refs & syn.), 154, pl. VII, fig. 2, pl. VIII, figs 1–2; Barker, 1960: 166, pl. 80, figs 1–5 (in *Globigerinoides* following Cushman, 1927); Andersen, 1961: pl. 27, figs 5a-b; Parker, 1962: 229 (refs), pl. 3, figs 1–5; Ujiie, 1963: 392, pl. 45, figs 9a-c; Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 4 (in key), figs 4a-b; Albani, 1968a: 31, fig. 136; Albani, 1968b: 114 (distrib., etc.); Boltovskoy, 1968: 91, pl. 2, figs 16–18; Boltovskoy, 1969: pl. 2, figs 6–7; Cifelli & Smith, 1970: 5 *et seq* . (ecol. etc.), 37 (growth patterns, refs etc.), pl. 5, figs 2–5); Bé & Tolderlund, 1971: 132, 137 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature ranges), 6.21 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Seiglie & Cucurullo, 1971: 101–122, pl. 2, figs 35–37; Boltovskoy, 1971: 283 (morphol. changes in life-cycle), fig. 19.1 (nos 31–35); Schnitker, 1971: 169–215, pl. 8, fig. 3; Jenkins, 1971: 176 (stratigr. occurrence, remarks, refs), pl. 21, figs 610–612; Emiliani, 1971b: 1122–1124 (depth habitats, palaeotemperatures etc.); Postuma, 1971: 286–287 (diag., etc.), figs; Berger & Piper, 1972: 275–287, figs, tables; Hecht & Savin, 1972: 55–67 *passim* (phenotypic var. and oxygen isotope ratios); Kennett, 1973: 575 *et seq*. (biostratigr., paleoceanogr.), pl. 3, figs 12, 14 & 15; Eade, 1973: 249–256 *passim* (geogr. distrib. SW Pacific), figs 7, 13; Thompson, 1975 thesis: 91, pl. 25, fig. 6; Boltovskoy & Wright, 1976: 37, 46, 160, 167, 168,170, 174, 182, 184, 186, 187, 192, 228, 243, 351, 356; Albani, 1979: 42 (features), fig. 96.1; Bé *et al.*, 1977: 155–179, pl. 1, fig. 4 (biology, lab. culture etc.); Blow, 1979: 126; Boltovskoy, 1981: 339 (identif. table), 344, 347, fig. 168.13; Saito *et al.*, 1981: 56 (diag., refs & syn.), pl. 14, figs 1a-d; Huang, 1981: 175 (interior), pl. 1, figs 1–2, table 1; Hayward, 1981a: 92 (Tutukaka Harbour); Cifelli, 1982: 5–7 (wall texture, morphol. develop., etc.), pls 6–7, pl. 8, fig. 1; Lee, 1982: 21, fig. 1 (water mass niche); Taylor, 1982: 77, table III (symbiosis); Boltovsky, 1982: 79–82, pl. 1, fig. 82 (twinning); Hayward, 1983: 70 (key characters), figs 3L– M; Huang, 1986: 94 (type species of new genus *Alloglobigerinoides*); Loeblich & Tappan, 1987: 724; Gastrich, 1987: 623–632; Bijima *et al.*, 1990b: 95–116 *passim* (lab. culture/salinity & temperature limits).

Globigerinoides ruber (d'Orbigny, 1839)

d'Orbigny, 1839a (*in* de la Sagra): 82–83, 94, pl. IV, figs 12–14 (*Globigerina rubra*); Brady, 1884: 602–603, pl. LXXIX, figs 11–16; Cushman, 1914: 9, pl. 3, figs 6–9; Cushman, 1921: 289; Phleger & Parker, 1951: 35, pl. 19, fig. 16; Cushman, 1955: 322 (type species, generic descr.), pl. 27, fig. 6, key pl. 34, fig. 8; Todd & Bronnimann, 1957: 1–43, pl. 12 fig. 5 (*G. rubra*); Barker, 1960: 164, pl. 79 (LXXIX), figs 12–13 (*Globigerinoides*); Banner & Blow, 1960a: 19, pl. 3, fig. 8; Cheng & Cheng, 1960: 138–139 (refs & syn.), 154, pl. V, figs 3–6, pl. VII, fig. 1; Andersen, 1961: pl. 27, figs 4a-b; Ujiie, 1963: 390–391 (wall structure, coiling ratios etc., refs), pl. 45, figs 1a-c, 3a-b, 4a-b, 5a-c, pl. 55, figs 1, 3 & 4, pl. 58, figs 1–6; Galhano, 1963: 88–89 (refs etc.), pl. VIII, fig. 24; Lee *et al.*, 1965a: 1–11, pls 1–5 (cytology); Lee *et al.*, 1965b: 531–542 (cytology); Christiansen, 1965: 197–202 (benthic form); Eade, 1967a: 49 (N.Z. refs); Honjo & Berggren, 1967: 393–406; Bé, 1967: 3, 4 (in key), figs 5a-c; Cordey, 1967: 647–659 (develop., Miocene to Recent); Hornibrook, 1968: 89, fig. 17; Albani, 1968a: 31, fig. 139; Albani, 1968b: 114; Boltovskoy, 1968: 89–90 (ecol. forms), pl. 1, figs 2–4; Boltovskoy, 1969: pl. 2, fig. 8; Kennett, 1969 : 316, fig. 7 (distrib. SE of N.Z.); Cordey, 1969: 98–99 (summary on comments on Cordey, 1967); Berger, 1970: 185–186, tables 2–3; Cifelli & Smith, 1970: 5 *et seq*. (ecol., etc.), 38 (growth patterns, refs etc.), text-fig. 21, pl. 5, fig. 6; Seiglie & Cucurullo, 1971: 101–122, pl. 2, figs 30–32; Parker & Berger,

1971: 100; Bé & Tolderlund, 1971: 132 (distrib. patterns), fig. 6.3 (species associations), 6.4 (temperature range), 6.19, 6.20 (distrib. maps), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 283 (morphol. changes in life-cycle), fig. 19.1 (nos 36–40); Parker, 1971: 289–307, figs 20.4 (world distrib. in deep-sea sediments), 20.7, 20.8, 20.9 (latitudinal ranges in North Atlantic, South Pacific and Indian Ocean sediments), table 20.1; Jenkins, 1971: 34, 99, 159, 174, 177–178 (stratigr. occurrence, remarks, refs etc.), 180, pl. 21, figs 616–618; Schnitker, 1971: 169–215, pl. 8, fig. 5; Postuma, 1971: 300–301 (diag., etc.), figs; Emiliani, 1971a: 233–238, pls 1–3 (isotopic palaeotemperatures and shell morphol.); Emiliani, 1971b: 1122–1124 (depth habitats of growth stages); Berger & Piper, 1972: 275–287, figs, tables; Hecht & Savin, 1972: 55–67 *passim* (phenotypic var. and oxygen isotope ratios); Hansen & Reiss, 1972: 169–179, pl. 3, figs 1–8; Kennett, 1973: 575 *et seq.* (biostratigr., palaeoceanogr., etc.), pl. 4, figs 6–7; D'Onofrio, 1973: 905–908 (palaeoclimatic indicator); Chen & Chen, 1973: 97–116 *passim* (chemical var.); Miro, 1973: 95–108 *passim* (upwelling); Eade, 1973: 249–256 *passim* (geogr. distrib., SW Pacific), figs 10, 13; Shackleton *et al.*, 1973: 177–179, fig. 1, tables 2–4 (isotopic composition of test); Collins, 1974: 45 (Australia, refs); Hecht, 1974: 1217–1234, 10 text-figs, 5 tables (variation related to palaeoenvironmental analysis); Cifelli, 1974: 180, pl. 2, figs 4–5; Emiliani, 1974: 106–109 (shell morphol./isotopic palaeotemps); Bé *et al.*, 1975: 27–55 *passim*, figs (dissolution effects etc.); Hecht *et al.*, 1975: 56-69 *passim* figs (experimental dissolution); Hemleben, 1975: 334–341, table 1; Weiner, 1975: 149–156 (carbon isotopic composition); Thompson, 1975 thesis: 91, pl. 25, fig. 7, pl. 26, fig. 1 (NE N.Z.); Kennett & Vella, 1975: 769 *et seq.*, pl. 7, fig. 12, pl. 8, figs 3–14 (DSDP Site 284, Challenger Plateau); Mateu, 1976: 24 (ultrastructure), pl. I, figs 4 & 6; Bé *et al.*, 1977: 155–179 *passim* (biol., lab. culture etc.), pl. 1, fig. 2, pl. 5, figs 1–2, pl. 6, figs 1–3, pl. 7, fig. 1; Bé *in* Ramsay, 1977: 57–58 (review), fig. 20, pl. 7, figs 4a-c; Boltovskoy & Wright, 1976: 9, 37, 74, 79, 80, 87, 159, 165, 167–174, 182–184, 186, 187, 228, 231, 232, 236, 243, 266, 309–311, 350, 351, 356, 357, 380; Albani, 1979: 43, fig. 96.3; Thompson *et al.*, 1979: 554–558 (pink-pigmented test variety/120,000 yrs B.P. etc.); Blow, 1979: 128; Hayward, 1979a: 152 &c (Cavalli Is, N.Z.), fig. 2d; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward, 1981a: 92 (Tutukaka Harbour); Hayward, 1981b: 134 (Bay of Islands); Hayward & Grace, 1981: 54 (off Cuvier Is); Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Saito *et al.*, 1981: 59 (diag., etc.), pl. 15, figs 1a-d; Huang, 1981: 175 (interior), pl. 1, figs 1–2, table 1; Boltovskoy, 1981: 317, 339 (identif. table), 344, 346, figs 162.7 & 168.8; Taylor, 1982: 77, table III (symbiosis); Lee, 1982: 20, fig. 1 (water mass niche); Larsen, 1982: pl. 19, fig. 12; Cifelli, 1982: 4–5 (wall texture), pls 4–5; Hayward, 1982b: 65 (off Little Barrier Is); Hayward, 1983: 70 (key characters, N.Z.), figs 3N–O; Digas, 1983: 48– 51 (pigmentation); Curry *et al.*, 1983: 33-43 (seasonal changes in isotopic composition); Anderson & Tuntivate-Choy, 1984: 203–205; Spindler *et al.*, 1984: 237–249; Jenkins & Williams, 1984: 521–534, figs 1–5 (oxygen isotope values/sapropel formation study); Olsson, 1986: 219–225 *passim* (ocean environ. properties/faunal boundaries); Brummer *et al.*, 1987: 375–381 (ontogeny); Parisi, 1987: 201–209 (oxygen/carbon isotopes/environmental implications); Noble, 1987: 111–113 (temperature/environmental indicator); Loeblich & Tappan, 1987: 490, fig. 536; Slowey & Curry, 1987: 54–58 (oxygen isotope/glacial thermocline); Gastrich, 1987: 623-632; Gastrich & Bartha, 1988: 137–142 (primary productivity etc.); Pal, 1988: 320-326 (salinity/temperature distrib.); Bijima *et al.*, 1990a: 117–127 *passim* (reprod., lunar cycles); Bijima *et al.*, 1990b: 95–116 *passim* (salinity/temperature limits, lab. culture); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Globigerinoides sacculifer (Brady, 1877)

Brady, 1877: 535 (*Globigerina*); Brady, 1884: 604, pl. LXXX, figs 11–17, pl. LXXXII, fig. 4; Cushman, 1914: 11, pl. 2, figs 4–6, pl. 5, pl. 10, fig. 4; Cushman, 1924: 21, pl. 4, figs 1–6; Parr, 1950: 366; Phleger & Parker, 1951: 35, pl. 19, figs 17–18; Todd & Bronnimann, 1957: 1–43, pl. 12, fig. 6; Banner & Blow, 1960: 21, pl. 4, figs 1–2; Cheng & Cheng, 1960: 139–141 (refs & syn.), 154–155, pl. VII, figs 3–8; Barker, 1960: 166, 170, pl. 80, figs 11–17, pl. 82, fig. 4 (*Globigerinoides*); Andersen, 1961: pl. 27, figs 3a-b; Galhano, 1963: 87-88 (refs etc.), pl. VIII, fig. 23; Ujiie, 1963: 391–392 (wall structure, evolution etc.), pl. 45, figs 7a-b, pl. 55, fig. 5; Bé, 1965: 81–87 (shell growth and depth), pls 1–2; Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 4 (in key), figs 6a-d (*G. sacculifer* = *G. trilobus* (Reuss)); Albani, 1968a: 31, fig. 168 (as *Globigerinoides quadrilobatus sacculifer*); Albani, 1968b: 114 (range, refs etc.); Boltovskoy, 1969: pl. 2, fig. 10 (as *G. trilobus* (Reuss) forma *sacculifer* (Brady)); Bé & Hemleben, 1970: 221–234 (calcification); Bé & Tolderlund, 1971: 137 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.24 (distrib. map), tables 6.3 (distrib. zones), 6.3 (depth habitats); Schnitker, 1971: 169–215, pl. 8, fig. 4; Jenkins, 1971: 21–23, 33, 35, 171, 178–179 (stratigr. occurrence, remarks, refs etc.), 180, 181, pl. 21, figs 619–621, and

see note (p. 179) suggesting that *Sphaeroidinella dehiscens* [q.v.] "is the gerontic, deep-water stage developed during the ontogeny" of *G. sacculifer*, following Bé's (1965) evidence; Emiliani, 1971b: 1122–1124 (depth habitats of growth stages, oxygen isotopic determinations of past sea-surface temperatures); Postuma, 1971: 302–303 (diag., etc.), figs; Seiglie & Cucurullo, 1971: 101–122, pl. 2, figs 23–25; Frerichs *et al.*, 1972: 6–13 *passim* (latitudinal var. in test porosity); Berger & Piper, 1972: 275–287, figs, tables; Hecht & Savin, 1972: 55-67 *passim* (phenotypic var. and oxygen isotope ratios); Hansen & Reiss, 1972: pl. 3, fig. 9, pl. 5, figs 1–2; Chen & Chen, 1973: 97–116 *passim* (chemical var.n); Miro, 1973: 95–108 (upwelling); Collen & Vella, 1973: 23 etc., pl. 4, figs 86–88 (N.Z. Pliocene); Eade, 1973: 249–256 *passim* (geogr. distrib., SW Pacific), figs 6 & 13; Kennett, 1973: 575 *et seq.*, pl. 5, figs 8, 10–13, pl. 6, fig. 1, pl. 8, figs 11–14; Hemleben, 1975: 334–341, table 1; Kennett & Vella, 1975: 769 *et seq.* (DSDP Site 249, Challenger Plateau), pl. 7, fig. 13, pl. 8, fig. 2; Thompson, 1975 thesis: 91, pl. 26, fig. 4; Boltovksoy & Wright, 1976: 167, 168, 170, 172, 173, 182, 184, 186, 187, 192, 236, 243, 351, 356, 358, 363; Anderson & Bé, 1976a: 1–21 (ultrastructure, symbionts); Be *et al.*, 1977: 155–179 *passim* (biol., lab. culture), pl. 1, fig. 3, pl. 7, figs 3–5; Bé *in* Ramsay, 1977: 60 (review), 26, pl. 7, figs 6a-c; Albani, 1979: 42 (as *G. quadrilobatus sacculifer*), fig. 96.2; Vincent & Shackleton, 1980: 89–93 (oxygen isotope analyses), 6 figs; Bé, 1980: 283–310 (gametogenic calcification); Huang, 1981: 176, 177 (interior), pl. 1, figs 7–8, 10, table 1; Bé *et al.*, 1981: 257–277 (life processes and feeding in culture), 13 figs; Bé & Spero, 1981: 305–316 (shell regeneration after injury etc., refs), pls 1–4; Loubere, 1981: 137–158 *passim* (oceanogr. parameters and distrib.); Boltovskoy, 1981: 339 (identif. table), 344, 347, figs 162.21 & 168.12; Saito *et al.*, 1981: 65–66 (diag., remarks, refs & syn.), pl. 17, figs 1a-d, 2a-d; Keigwin, 1982: 269–288 (stable isotope analysis); Prell, 1982: 455–464 (isotopic record), 4 figs; Hayward, 1982b: 65 (off Little Barrier Is); Larsen, 1982: pl. 20, fig. 1; Tappan & Loeblich, 1982: pl. 50, fig. 3; Lee, 1982: 21, fig. 2 (water mass niche); Taylor, 1982: 77 (table III); 78 (symbiosis); Bé *in* Heinbokel, 1982: 215–216 (gametogenesis); Curry *et al.*, 1983: 33-43 (seasonal changes in isotopic composition); Bé *et al.*, 1983: 310–325; Hayward, 1983: 70 (key characters, N.Z., incl. *Globigerinoides trilobus* (Reuss) of Hayward, 1979a: 152, fig. 2e); Anderson & Faber, 1984: 303–308; Spindler *et al.*, 1984: 237–249; Caron & Bé, 1984: 1–10 (feeding rates); Jorgensen *et al.*, 1985: 1253–1267 (symbiotic photosynthesis); Hemleben *et al.*, 1987: 305–324, figs (morphol./environmental indicator etc.); Brummer *et al.*, 1987: 357–381 (morphol./ontogeny); Popescu, 1987: 150 (stratigr. correlation etc.); Gastrich, 1987: 623–632; Sen Gupta & Aharon, 1987: 25–32 *passim* (climate/environment etc.); Zachariasse *et al.*, 1989: 339–355 *passim* (water temperature/environmental indicator etc.); Wu & Berger, 1989: 181–198 *passim* (chemical composition/environmental indicator etc.); Bijima *et al.*, 1990a: 117–127 *passim* (reprod./lunar cycles); Bijima *et al.*, 1990b: 95–116 *passim* (salinity/temperature limits, lab. culture).

Globigerinoides trilobus (Reuss, 1850)

Reuss, 1850: 374, pl. 47, figs 11a-c (*Globigerina*); Brady, 1884: 595, pl. LXXIX, figs 1–2, pl. LXXXI, figs 2–3 (as *G. bulloides* d'Orbigny var. *triloba*); Cushman, 1955: key pl. 34, figs 1–3; Cheng & Cheng, 1960: 141 (refs & syn.), 155, pl. VI, fig. 4; Barker, 1960: 164, pl. 79, figs 1–2 (as *Globigerina* n.sp.?), pl. 81, figs 2–3 (as *Globigerina tricamerata* Tolmachoff, 1934); Ujiie, 1963: 392–393 (wall structure etc.), pl. 45, figs 12a-c, 13a-c, pl. 55, fig. 2, pl. 58, figs 9–10; Jenkins, 1965: 116–121 (origin in New Zealand), pls 17–18; Jenkins, 1966: 8–9 (lineage, remarks, refs & syn.), pl. 2, figs 8a-c, pl. 3; Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 4 (= *G. sacculifer*, q.v.); Scott, 1968: 391–404, 48 figs (stratigr. var. in Lower Miocene); Boltovskoy, 1969: 252, pl. 2, fig. 9 (*Globigerina*); Bandy *et al.*, 1970: 980–985 (dating use); Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 38–39 (growth patterns, cf. *G. ruber* immature, refs), text-fig. 22, pl. 6, fig. 1; Scott, 1970: 385–398 (N.Z. Miocene variability); McGowan, 1971: 14 *et seq.* (biogeogr.), 57, fig. 1.21 (distrib.); Schnitker, 1971: 169–215, pl. 8, fig. 7; Margolis & Kennett, 1971: 1–36, fig. 16 (palaeoglacial history etc., refs); Jenkins, 1971: 12, 21, 28, 29, 94, 133, 157, 171, 172, 178, 179, 180–182 (stratigr. occurrence, remarks, refs etc.), pl. 19, figs 571–581; Postuma, 1971: 308–309 (diag., etc.), figs; Sieglie & Cucurullo, 1971: 101–122, pl. 2, figs 21–22; Kennett, 1973: 575 *et seq.*, pl. 4, figs 11–12, pl. 5, figs 1–5; Jenkins, 1973a: 78–88 *passim*, text-figs 5–7 (diversity changes etc.); Collen & Vella, 1973: 23–24 etc., pl. 4, figs 1–3 (N.Z. Pliocene); Scott, 1974: 466–472 (topography); Collins, 1974: 45 (Australia); Hecht, 1974: 1217–1234, 10 text-figs, 5 tables (var. related to palaeoenvironmental analysis); Hecht *et al.*, 1975: 56–69 *passim* (experimental dissolution); Cifelli, 1976: 180, pl. 2, figs 8–9; Boltovskoy & Wright, 1976: 37, 80, 160, 168, 170, 172, 174, 187, 228, 231; Hayward, 1979a: 152 &c. (off Cavalli Is, N.Z. possible var. of *G. sacculifer*), fig. 2e; Hayward, 1979c: 216 (Altonian fossil), fig. 3g; Keller, 1981: 293–304 *passim* (evolution *tribolus-bullatus* to *sacculifer*), pl. 2; Hayward, 1981a: 92 (Tutukaka Harbour); Hayward, 1981b: 134

(Bay of Islands); Hayward & Grace 1981: 54 (off Cuvier Is); Boltovskoy, 1981: 339 (identif. table), 344, 347, figs 162.8 & 168.11; Keigwin, 1982: 444–453 (stable isotope analysis); Cifelli, 1982: 2–4 (wall texture etc.), pls 1–3; Larsen, 1982: pl. 20, fig. 2; Srinivasan & Kennett, 1983: 798–812, text-figs 1–5; Hayward 1983: 70 (incl. in *G. sacculifer* (Brady), *q.v.*); Popescu, 1987: 56 (as type of new genus *Trilobogerina*); Pal, 1988: 320–326 (salinity/environment).

Genus **Sphaeroidinella** Cushman, 1927

Sphaeroidinella dehiscens (Parker & Jones, 1865)

Parker & Jones, 1865 : 369, pl. 19, figs 5a-b (*Sphaeroidina bulloides* d'Orbigny var. *dehiscens*); Brady, 1884: 621, pl. LXXXIV, figs 8–11; Cushman, 1914: 19, pl. 10, fig. 2, pl. 13, fig. 1; Cushman, 1955: 326 (type species, generic descr.), pl. 27, fig. 2, key pl. 35, figs 4–7; Banner & Blow, 1960b: 35, pl. 7, figs 3a-b (lectotype); Cheng & Cheng, 1960: 142–143 (refs & syn.), 156, pl. X, figs 2–4 & 6); Barker, 1960: 174, pl. 84, figs 8–11 (in *Sphaeroidinella* following Cushman, 1927); Andersen, 1961: pl. 28, figs 7a-b; Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 4 (in key), figs 7a-c ("a terminal form of *Globigerinoides sacculifer* (Brady)"); Albani, 1968b: 115 (distrib., refs); Jenkins, 1971: 32, 35, 173, 179 (note on syn., following Bé's (1965) conclusion that *S. dehiscens* "is the gerontic, deep-water stage developed during the ontogeny of *Globigerinoides sacculifer*"); Boltovskoy & Wright, 1976: 61, 162, 167–169, 174, 182–184, 188, 356, 387; Albani, 1979: 43 (features), fig. 99.1; Adams *et al.*, 1980: 11 (type); Boltovskoy, 1981: 340 (identif. table), 344, 347, fig. 168.19; Saito *et al.*, 1981: 72 (diag., etc.), pl. 20, figs 2a-d; Huang, 1981: 178 (interior), pl. 1, figs 9, 11–12, table 1; Hayward, 1983: 70 (characters), figs 5N–O, 6 (latitudinal range, N.Z.); Larsen, 1982: pl. 20, fig. 6; Tappan & Loeblich, 1982: 527–552, pl. 50, fig. 14; Loeblich & Tappan, 1987: 491, pl. 539.

Subfamily ORBULININAE
Genus **Orbulina** d'Orbigny, 1839

Orbulina universa d'Orbigny, 1839

d'Orbigny, 1839b (*in* Barker-Webb & Berthelot): 3, pl. 1, fig. 1; Brady, 1884: 608, 611 pl. LXXVIII, pl. LXXXI, figs 8–26, pl. LXXXII, figs 1–3; Cushman, 1914: 14, pl. 6, pl. 7, pl. 11, fig. 3; Cushman, 1924: 28, pl. 5, figs 2–9; Parr, 1950: 366; Hofker, 1954: 38–39; Cushman, 1955: 327 (type species, generic descr.), pl. 27, fig. 4, key pl. 34, figs 17–18; Blow, 1956: 57–70 (origin and evolution of genus), text-figs 1–4; Parker, 1958: 280, pl. 6, fig. 3; Hofker, 1959a: 279–286, pls 1–3; Cheng & Cheng, 1960: 145 (refs & syn.), 156, pl. IX, figs 4–5, 7–8, pl. X, figs 7–8; Barker, 1960: 162, pl. 78, pl. 81, figs 8–26, pl. 82, figs 1–13; Andersen, 1961: pl. 27, fig. 6; McKenzie, 1962: 127 (Australian refs); Smith, 1963: 3, pl. 2, figs 19–20; Kennett, 1966: 71, pl. 10, fig. 172 (Upper Miocene, N.Z.); Eade, 1967a: 49 (N.Z. refs); Bé, 1967: 3, 4 (in key), figs 3a-d; Albani, 1968a: 32, fig. 144; Albani, 1968b: 115 (refs etc.); Hornibrook, 1968: 85, 90, 92–93, figs 17–18; Boltovskoy, 1968: 90–91, pl. 2, figs 15; Pessagno & Miyano, 1968: 38–50 *passim*, pl. 5, fig 1 & 7; Kennett, 1969a: 313, fig. 7 (distrib. S.E. of N.Z.); Hofker, 1969: 279–286 (generic status); Berger, 1970: 185–186, tables 2–3; Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 42 (refs etc.), pl. 5, fig. 6; Bé & Tolderlund, 1971: 122 (distrib. patterns), figs 6.3 (species associations), 6.4 (temperature range), 6.15 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Seiglie & Cucurullo, 1971: 101–122, pl. 2, fig. 29; Jenkins, 1971: 11, 12, 22, 28, 29, 33, 181, 192–194 (stratigr. occurrence, remarks, refs etc.), pl. 23, fig. 660; Schnitker, 1971: 169–215, pl. 8, fig. 9; Emiliani, 1971b: 1122–1124 (depth habitats of growth stages, oxygen isotopic determinations of temperature); Postuma, 1971: 374–375 (diag., etc.), figs; Murray, 1971: 229 (diag. features etc.), pl. 96; Berger & Piper, 1972: 275–282, figs, tables; Jenkins, 1973a: 78–88, fig. 1; Kennett, 1973: 575 *et seq.* (stratigr., palaeoceanogr.), pl. 20, fig. 7; Haynes, 1973: 184 (diag., descr., remarks, refs), pl. 20, fig. 6; Eade, 1973: 249–256 *passim*, fig. 13 (abundance at different temperatures, SW Pacific); Bé *et al.*, 1973: 150–192 (growth, life-cycle etc.), figs 1–17, pls 1–10; Bé & Okado, 1973: 28–29, 7 figs; Collen & Vella, 1973: 24, etc. (N.Z. Pliocene, descr. etc.), pl. 3, fig. 10; Vilks & Walker, 1974: 1–8, pls 1–3 (morphol.); Collins, 1974: 45; Cifelli, 1974: 181, pl. 3, fig. 4; Bé *et al.*, 1975: 27–55 *passim*, figs (dissolution effects); Hecht *et al.*, 1975: 56–69 *passim*, figs (experimental dissolution); Weiner, 1975: 149–156 (carbon isotopic composition); Kennett & Vella, 1975: 769 *et seq.* (DSDP Site 249, Challenger Plateau), pl. 7, fig. 16; Bé *et al.*, 1977: 155–179 *passim* (biology, lab. culture etc.), pl. 1, fig. 5, pl. 5, fig. 3, pl. 6, figs 3–6, pl. 7, figs 2 & 6; Albani, 1979: 43 (features), fig. 100.1; Thompson, 1975 thesis: 92, pl. 26, figs 5-6; Hecht *et al.*, 1976: 422–424 (implications of variation), 2 figs; Boltovskoy & Wright, 1976 : 13, 17, 37, 70, 74, 87, 93, 159–161, 163–165, 167–169, 171, 172, 174, 182–184, 187, 192, 193, 220, 228, 392; Bé *et al.*, *in* Takayanagi & Saito, 1976: 1–9 (test porosity), 3 figs, 3 pls; Bé *in* Ramsay, 1977: 59–60 (review), fig. 24, pl. 7, figs 3a-b; Hayward, 1979a: 152 &c. (off Cavalli Is, N.Z.); Hayward, 1979b: 186 (*Zostera* pool community); Hayward &

Grace, 1981: 54 (off Cuvier Is); Boltovskoy, 1981: 341 (identif. table), 344, 347, fig. 168.16; Saito *et al.*, 1981: 70 (diag., refs & syn.), pl. 19, figs 1a-d, 2a-b, 3a-b, 4 & 5; Cifelli, 1982: 11–12 (wall texture etc.), pl. 15, figs 2–3; Hayward, 1982b: 65 (off Little Barrier Is); Larsen, 1982: pl. 20, fig. 7; Lee, 1982: 21, fig. 1 (water mass niche); Taylor, 1982: 77, table III (symbiosis); Hayward, 1983: 70 (characters), figs 5J, 6 (latitudinal range); Spindler *et al.*, 1984: 237–249; Takahashi & Bé, 1985: 777; Spero, 1986: 1371 (symbiosis/chamber formation); Spero, 1987: 307–317; Spero & Deniro, 1987: 213–218 (symbiont/photosynthesis); Haenel, 1987: 15–25 (size var./palaeoecol.); Kokke & Spero, 1987: 475–478 (sterols/mutualism, dinoflagellates); Noble, 1987: 111–113 (temperature/environmental indicator); Loeblich & Tappan, 1987: 494, pl. 541; Robbins, 1988: 326–333 (morphol., var.); Spero, 1988: 9–20 (morphogenesis); Spero & Williams, 1988: 717–719 (isotopes/palaeoecol.); Hornibrook *et al.*, 1989: 136, fig. 28: 2.31; Bijima *et al.*, 1990b: 95–116 *passim* (salinity/temperature, lab. culture); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Family HASTERIGINIDAE
Genus **Hastigerina** Thomson, 1876

Hastigerina pelagica (d'Orbigny, 1839)

d'Orbigny, 1839c: 27–28, 79, pl. III, figs 13–14 [not figs 1–2 as on p. 27] (*Nonionina*); Cushman, 1955: 323–324 (generic descr.), key pl. 34, fig. 13; Barker, 1960: 172, pl. 83, figs 1–8 (Brady's (1884) pl. LXXXIII figs 1–8, as *Hastigerina pelagica* d'Orbigny = *H. murrayi* Thomson *fide* Bolli *et al.*, 1957); Banner & Blow, 1960: 20, text-fig. 1; Andersen, 1961: pl. 28, figs 3a-b; Eade, 1967a: 47 (N.Z. refs); Bé, 1967: 3, 4 (in key), figs 1a-b; Boltovskoy, 1968: 91, pl. 2, fig. 22; Cifelli & Smith, 1970: 5 *et seq.* (ecol., etc.), 41–42 (growth patterns, refs etc.); Berger, 1970: 185–186, tables 2–3; Parker & Berger, 1971: 101 (distrib.); Bé & Tolderlund, 1971: 129 (distrib. patterns), figs. 6.3 (species assemblages), 6.4 (temperature range), 6.17 (distrib. map), tables 6.2 (distrib. zones), 6.3 (depth habitats); Boltovskoy, 1971: 286 (morphol. changes in life-cycle), fig. 19.1 (nos 83–85); Jenkins, 1971: 76–77 (stratigr. occur-rence, remarks, refs), pl. 2, figs 43–46; Schnitker, 1971: 169–205, pl. 7, fig. 9; Kennett, 1973: 575 *et seq.*, pl. 9, figs 6–7; Eade, 1973: 249–256 *passim*, fig. 13 (abundance at different temperatures, SW Pacific); Aldredge & Jones, 1973: 131–136 (habitat for dinoflagellates); Walker & Vilks, 1973: 196–198 (ultrastructure, use in systematics), pl. 1 (1–5); Jenkins, 1973a: 78, 80, 85 (diversity changes), text-fig. 1 (latitudinal distrib., after Bé, 1967); Cifelli, 1974: 181, pl. 3, fig. 6; Boltovskoy & Wright, 1976: 13, 37, 46, 73, 74, 80, 163, 164, 167–169, 171, 174, 182, 184, 185, 187, 228, 243; Anderson & Bé, 1976b: 437–449 (fine structure), 10 figs; Bé *et al.*, 1977: 155–179 (biol., etc.), pl. 1, fig. 1, pl. 4, figs 1 & 4, pl. 6, figs 7–8; Spindler *et al.*, 1978: 427–433 (gametogenesis); Hemleben *et al.*, 1979: 118–124 (dissolution effects in gametogenesis); Spindler *et al.*, 1979: 61–64 (reprod. periodicity); Blow, 1979: 1176; Boltovskoy, 1981: 341 (identif. table), 344, 347, figs 162.9 & 168.17; Saito *et al.*, 1981: 26 (diag., remarks, refs & syn.), pl. 2, figs 1a-d; Spindler & Hemleben, 1982: 341–350, (annulate lamellae), figs 1–20; Larsen, 1982: pl. 18, fig. 1; Lee, 1982: 21, fig. 1 (water mass niche); Taylor, 1982: 72 (symbiotic dinoflagellates); Hayward, 1983: 64 (key characters, N.Z.), figs 5A–C; Loeblich & Tappan, 1987: 495, fig. 544.

Suborder ROTALIINA
Superfamily BOLIVINACEA
Family BOLIVINIDAE

Genus **Bolivina** d'Orbigny, 1839

Bolivina cf. **arta** MacFadyen, 1931. Hayward & Grace, 1981

Hayward & Grace, 1981: 52 (off Cuvier Is, as *B.* cf. *arta* MacFadyen, 1931: 58, pl. 4, figs 21a-b; Cushman, 1937: 79–80, 82 (descr., etc.), pl. 9, figs 23–26; Cushman, 1955: 268–269 (generic descr.); cf. Hayward & Buzas, 1979: 42 (*B. arta*, Miocene, refs etc.); Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 63 (off Little Barrier Is).

Bolivina cacozela Vella, 1957

Vella, 1957: 10 (Cook Strait), 33, pl. 8, figs 162–163; Eade, 1967a: 38 (refs, note on syn., as *Brizalina*); Lewis, 1979: 31, table 3 (off Southern Hawkes Bay, abundance, in *Brizalina*); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 60; Hayward, 1982b: 63 (off Little Barrier Is); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina compacta Sidebottom, 1905

Sidebottom, 1905: 15, pl. 3, fig. 7 (*Bolivina robusta* Brady var. *compacta*); Cushman, 1911: 36 (*B. compacta*), text-figs 58a-b; Cushman, 1921: 137, pl. 26, fig. 7; Cushman, 1937: 135–136 (descr., refs etc.), pl. XVII, figs 22–24; Parr, 1950: 338; Hedley *et al.*, 1967:

30, text-figs 20–27, pl. 9, fig. 3 (incl. *B. inflata* of Heron-Allen & Earland, 1922: 135, and of Hulme, 1964: 330 (refs)); Eade, 1967a: 38 (refs); Boltovskoy & Wright, 1976: 102, 144, 225; Hayward, 1979b: 184 (*Zostera* pool community, N.Z., as *Bolivina*); Boltovskoy *et al.*, 1980: 17 (descr., etc.), pl. 2, figs 9–10 & 12); Hayward, 1982b: 63 (off Little Barrier Is); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina multifida Saidova, 1975

Saidova, 1975: 304, pl. CXXXIV, fig. 11 ("Ob" Stn 353, 156 m).

Bolivina pseudoplicata Heron-Allen & Earland, 1930

Heron-Allen & Earland, 1930a: 81–82, pl. III, figs 36-40 (incl. *Bolivina plicata* Brady, 1870: 302, pl. XII, figs 7a-b, not of d'Orbigny, 1839: 62, pl. VIII, figs 4–7, as *B. plicata* of Halkyard, 1889: 65, pl. 1, fig. 13); Cushman 1937a: 166, pl. 19, figs 12–20; Eade, 1967a: 38 (N.Z. refs); Murray, 1971: 5, 7, 106–107 (diag. features etc.), pl. 43, figs 1–7; Schnitker, 1971: 169–215, pl. 4, fig. 23; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 4, fig. 6; Haynes, 1973: 132–133 (diag., remarks, distrib., refs), text-fig. 25 (nos 20–21), pl. 10, fig. 3, pl. 11, fig. 7; Collins, 1974: 30; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 83, pl. 17, fig. 8, pl. 18, figs 1–2); Boltovskoy & Wright, 1976: 144; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Murray, 1979: 42 (descr.), fig. 12F; Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Common from inner shelf to mid slope."); Adams *et al.*, 1980: 4 (type); Boltovskoy *et al.*, 1980: 18 (descr., etc.), pl. 3, figs 4–8; Todd & Low, 1981: 31 (in key), 3 figs; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina aff. **pseudoplicata** Heron-Allen & Earland, 1930. Hornibrook 1952

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait oyster-beds, as *B.* aff. *pseudoplicata* Heron-Allen & Earland, 1930, *q.v.*); Eade, 1967a: 38 (listed).

Bolivina robusta Brady, 1881

Brady, 1881: 57; Brady, 1884: 421, pl. LIII, figs 7–9; Egger, 1893: 294, pl. VIII, figs 31–32; Cushman, 1911: 36, text-figs 59–60; Cushman, 1921: 129–130; Cushman, 1937: 131–133 (descr., refs etc.), pl. XVII, figs 1–4; Parr, 1950: 340; Eade, 1967a: 38 (refs); Albani, 1968a: 25, fig. 98; Albani, 1968b: 106; Collins, 1974: 30 (Australia, refs); Thompson, 1975 thesis: 83, pl. 18, fig. 3; Albani, 1979: 33 (features), fig. 57.2; Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Moderately common on shelf, abundant on banks, common on upper and mid slope."); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments); Hamsa & Gandhi, 1983: 165 (diag., refs), fig. 1g; Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina spathulata (Williamson, 1858)

Williamson, 1858: 76, pl. 6, figs 164–165 (*Textularia variabilis* var. *spathulata*); Cushman, 1937: 162–164 (descr., refs etc.), pl. 15, figs 20–24; Todd & Bronnimann, 1957: pl. 8, figs 22–23; Hedley *et al.*, 1965: 21–22, text-figs 6a-g, pl. 6, figs 23a-b (incl. *Bolivina dilatata* of Heron-Allen & Earland, 1922: 134 (in part) and *B. numerosa* Vella, 1957: 33, pl. 8, figs 160–161); Galhano, 1963: 68–69, pl. VII, fig. 4; Kennett, 1966: 45–46, pl. 4, fig. 60; Eade, 1967a: 39 (N.Z. refs); Murray, 1971: 7, 110–111 (diag. features etc.), pl. 45, figs 1–4; Haynes, 1973: 135–137 (diag. descr., remarks, distrib., refs, as *Bolivina (Brizalina)*), text-fig. 25 (nos 10–13); Colom, 1974: 121, figs 18h-i; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis); Albani, 1979: 33 (features), fig. 56.5; Hayward, 1979b: 184 (*Zostera* pool community, N.Z., as *Bolivina*), fig 3b; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981: 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hay- ward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments, as *Bolivina*); Larsen, 1982: pl. 12, fig. 8 (as *Brizalina*); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina sphenoides Chapman & Parr, 1937

Chapman & Parr, 1937: 93, pl. VIII, fig. 18; Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Specimens were compared with topotype material — there is no adequate figure of this species ... abundant on mid slope, common on lower slope.").

Bolivina striatula Cushman, 1922

Cushman, 1922: 27, pl. 3, fig. 10; Cushman & Parker, 1931: 16, pl. III, figs 21a-b; Cushman, 1937: 154–155 (descr., refs etc.), pl. XVIII, figs 30–31; Cushman, 1942: 30, pl. 9, fig. 1; Parr, 1950: 339; Carvalho & Chermont, 1952: 90, pl. I, figs 11a-b; Todd & Bronnimann, 1957: pl. 8, figs 12–16; Galhano, 1963: 67 (distrib., refs), pl. VII, fig. 1; Eade, 1967a: 39 (N.Z. list under *Brizalina*); Haynes, 1973:

137–138 (diag., descr., remarks, distrib., as *Bolivina (Brizalina)*, pl. 10, fig. 1:1, pl. 11, fig. 1; Collins, 1974: 30 (remarks etc., transferred to *Brizalina*); Seiler, 1975: 62, pl. 1, fig. 11; Boltovskoy & Wright, 1976: 103, 144; Haake, 1980: 11, pl. 2, fig. 11; Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 80, 81, 90 (Tutukaka Harbour), fig. K (abundance); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments, as *Bolivina*); Buzas & Severin, 1982: 32 (refs), pl. 5, fig. 8; Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina subexcavata Cushman & Wickenden, 1929

Cushman & Wickenden, 1929: 9, pl. 4, figs 4a-b; Cushman, 1937: 138–139 (descr., etc.), pl. 18, fig. 33; Todd & Bronnimann, 1957: pl. 8, fig. 29; Buzas *et al.*, 1977: 76–78 (discuss., etc.), pl. 2, figs 11–12; Hayward & Grace, 1981: 48, 49 (first N.Z. records from off Cuvier Is: "... commonly encountered in nearshore sediments around northern New Zealand ..."), 52, fig. 5c; Hayward, 1981a: 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 (Bay of Islands); Larsen, 1982: pl. 12, fig. 5; Buzas & Severin, 1982: pl. 5, fig. 9 (refs etc.); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bolivina sp. [A] Thompson, 1975

Thompson, 1975 thesis: 83, pl. 18, figs 6–7 (erratic occurrence, northern New Zealand, 75–200 m).

Bolivina (?) sp. Lewis, 1979

Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Has areal aperture so is not typical of the genus *Bolivina* ... Chambers with retral processes similar to those of *B. pseudoplicata* ... Abundant on Motukura Bank, rare elsewhere."

Genus **Brizalina** Costa, 1856

Brizalina aenariensis Costa, 1856

Costa, 1856: 297, pl. 15, figs 1–2; Heron-Allen & Earland, 1922: 134 (N.Z., as *Bolivina*); Eade, 1967a: 38; Loeblich & Tappan, 1987: 498, pl. 548.

Brizalina alata (Seguenza, 1862)

Seguenza, 1862b: 115, pl. 2, figs 5–5a (*Vulvulina*); Brady, 1884: 422, pl. LIII, figs 2-4 (*Bolivina beyrichi* var. *alata*); Cushman, 1911: 35, text-figs 57a-b; Cushman, 1921: 129 (refs, distrib., etc.); Andersen, 1961: 92, pl. 20, figs 9a-b (*Bolivina*); Eade, 1967a: 38 (N.Z. refs); Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Rare, on Motukura Bank and upper and mid slope."); Poag, 1981: 43–44, pl. 23, fig. 2, pl. 24, figs 2a-c; Larsen, 1982: pl. 11, fig. 8 (as *Bolivina*).

Brizalina beyrichi (Reuss, 1851)

Reuss, 1851b: pl. VI, fig. 51 (*Bolivina*); Brady, 1884: 422, pl. LIII, fig. 1; Cushman, 1911: 34, text-fig. 56; Heron-Allen & Earland, 1922: 134 (N.Z. refs); Eade, 1967a: 38.

Brizalina dilatata (Reuss, 1850)

Reuss, 1850: 381, pl. 48, fig. 15 (*Bolivina*); Brady, 1884: 418, pl. LII, figs 20–21; Cushman, 1911: 33, text-fig. 54; (?) Cushman, 1919: 603 (N.Z.); Cushman, 1921: 128, pl. 26, fig. 6; Eade, 1967a: 39.

Brizalina earlandi (Parr, 1950)

Parr, 1950: 339, pl. XII, figs 1-6 (*Bolivina*); Earland, 1934: 132, pl. VI, figs 5–7 (as *B. punctata* d'Orbigny); Cushman & Parker, 1937: 92, pl. VIII, fig. 16; Lewis, 1979: 11 (table 5), 31 (off Southern Hawkes Bay: "Common only on mid and lower slope.").

Brizalina (?) **karreriana** (Brady). Lewis, 1979

Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Common or abundant on outer shelf, banks and upper slope, rare elsewhere." — referred to Brady, 1884: pl. LIII, figs 19–21 (see also Barker, 1960: 110 (as *Loxostomum*, pl. 53, figs 19–21)). Lewis noted: "Remarks: Hedley *et al.*, (1967) noted that this species has a radial wall structure and belongs with the Bolivinidae. However, its areal aperture is not typical of the genus *Brizalina*.").

Brizalina lowmani (Phleger & Parker, 1951)

Phleger & Parker, 1951: 13, pl. 6, figs 20a-b, 21 (*Bolivina*); Hulme, 1964: 330; Eade, 1967a: 39; Poag, 1981: 46, pl. 25, fig. 3, pl. 26, figs 3a-c.

Brizalina malovensis (Heron-Allen & Earland, 1932)

Heron-Allen & Earland, 1932: 355, pl. 11, figs 12–15 (*Bolivina*); Kustanowich, 1965: 52; Eade, 1967a: 39.

Brizalina nobilis (Hantken, 1876)

Hantken, 1876: 56, pl. 15, fig. 4 (*Bolivina*); Brady, 1884: 424, pl. LIII, figs 14–15; Cushman, 1911: 39, text-figs 64a-b; (?) Cushman, 1919: 604 (N.Z.); Cushman, 1921: 130–131 (distrib., refs & syn.); Eade, 1967a: 39.

Brizalina cf. parri (Cushman, 1936). Vella, 1957

Vella, 1957: 10 (Cook Strait, as *B.* cf. *parri* (Cushman, 1936a: 57, pl. 8, fig. 7 (*Bolivina*)); Eade, 1967a: 39 (listed).

Brizalina punctata (d'Orbigny, 1839)

d'Orbigny, 1939c: 63, pl. VIII, figs 10–12 (*Bolivina*); Brady, 1884: 417, pl. LII, figs 18–19 Cushman, 1911: 32, text-figs 53a-b; Cushman, 1921: 156–157, pl. 26, fig. 5; Eade, 1967a: 39 (N.Z. refs); Larsen, 1982: pl. 12, fig. 2 (as *Bolivina*).

Brizalina pygmaea (Brady, 1881)

Brady, 1881: 57 (*Bolivina*); Brady, 1884: 421, pl. LIII, figs 5-6; Eade, 1967a: 39 (N.Z. refs, note on syn.).

Brizalina seminuda (Cushman, 1911)

Cushman, 1911: 34, text-fig. 55 (*Bolivina*); Cushman, 1942: 26 (descr., refs), pl. 7, fig. 6, table 11; Kustanowich, 1965: 52; Eade, 1967a: 39.

Brizalina spathulata (Williamson, 1858)

Williamson, 1858: 76, pl. 6, figs 164–165 (*Textularia*); Brady, 1884: 418, pl. LII, figs 20–21 (as *Bolivina dilatata*); Heron-Allen & Earland, 1922: 134 (as *Bolivina dilatata*, in part); Cushman, 1937: 162, pl. 15, figs 20-24; Vella, 1957: 33, pl. 8, figs 160-161 (as *B. numerosa* n. sp.); Hulme, 1964: 330; Eade, 1967a: 39 (N.Z. refs); Hedley *et al.*, 1965: 21, pl. 6, fig. 23 (*Brizalina*); Thompson, 1975 thesis: 83, pl. 18, fig. 4; Albani, 1978: 380-381 (descr., etc.), fig. 8E; Lewis, 1979: 31, table 5 (off Southern Hawkes Bay: "Common on continental shelf ... a few ... from continental slope.").

Brizalina spinescens (Cushman, 1911)

Cushman, 1911: 46, fig. 76 (*Bolivina*); Heron-Allen & Earland, 1922: 133 (N.Z. records & refs as *Bolivina textilaroides* var. *spinescens*); Cushman, 1942: 27–28 (descr., refs & syn.), pl. 7, fig. 7, table 12; Eade, 1967a: 39; Hayward & Grace, 1981: 52 (off Cuvier Is); Larsen, 1982: pl. 12, fig. 3 (as *Bolivina*).

Brizalina subreticulata (Parr, 1932)

Parr, 1932: 12, pl. 1, fig. 21 (*Bolivina*); Cushman, 1937: 149 (prob. incl. *Bolivina reticulata* of Heron-Allen & Earland, 1922: 135); Cushman, 1942: 31–32 (descr., refs), pl. 9, fig. 2, table 15; Eade, 1967a: 39.

Brizalina aff. subspinescens (Cushman, 1922). Vella, 1957. Lewis, 1979

Vella, 1957: 10 (Cook Strait, as *Bolivina* aff. *subspinescens* (Cushman, 1922b: 48, pl. 4, fig. 5); Eade, 1967a: 39 (listed in *Brizalina*); Lewis, 1979: 31, table 5 (off Southern Hawkes Bay): "Common from outer shelf to mid slope." — "... may be referable to genus *Laterostomella* or perhaps to *Stainforthia*.").

Brizalina textilarioides (Reuss, 1863)

Reuss, 1863a: 81, pl. X, fig. 1 (*Bolivina*); Brady, 1884: 419, pl. LII, fig. 23; Heron-Allen & Earland, 1922: 133; Barker, 1960: 108, pl. 52, fig. 23 (as *Bolivina* n. sp. Thalmann, 1933: discuss., etc.); Eade, 1967a: 39.

Brizalina variabilis (Williamson, 1858)

Williamson, 1858: 76, pl. 6, figs 162–163 [incorrectly labelled 164] (*Textularia*); Heron-Allen & Earland, 1922: 135 (*Bolivina* N.Z.); Cushman, 1942: 32–33 (descr., refs etc.), pl. 9, fig. 3, table 16; Hulme, 1964: 330 (refs); Eade, 1967a: 39; Haynes, 1973: 141–142 (diag., descr., refs etc. as *Bolivina*), text-fig. 25 (no. 16), pl. 10, fig. 8, pl. 11, fig. 81; Murray, 1979: 42 (descr.), fig. 12E.

Brizalina sp. Gregory, 1973

Gregory, 1973: 195, 197 (N.Z. mangrove swamp ecol.).

Genus **Lugdunum** Saidova, 1975

Lugdunum admirandum Saidova, 1975

Saidova, 1975: 309, pl. LXXXVI, fig. 1 ("Ob" Stn 354, 266 m).

Superfamily LOXOSTOMATACEA
Family LOXOSTOMATIDAE

Genus **Loxostomum** Ehrenberg, 1854

Loxostomum karrerianum (Brady, 1881)

Brady, 1881: 58 (*Bolivina*); Brady, 1884: 424, pl. LIII, figs 19–21; Cushman, 1911: 40, text-figs 65a-b; Cushman, 1921: 131, pl. 26, fig. 4; Cushman, 1955: 269 (generic descr.), key pl. 27, fig. 31; Barker, 1960: 110, pl. 53, figs 19–21 (in *Loxostomum* following Cushman, 1937); Eade, 1967a: 52 (N.Z. refs); Hornibrook, 1968: 77, fig. 14; Thompson, 1975 thesis: 93, pl. 28, fig. 4; Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is); Hornibrook *et al.*, 1989: 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Loxostomum limbatum costulatum (Cushman, 1922)

Cushman, 1922: 26, pl. 3, fig. 8 (as *Bolivina limbata* Brady var. *costulata*); Cushman, 1937: 187–188 (refs & syn. etc), pl. 21, figs 30–31; Cushman, 1942: 36 (refs & syn.), pl. 10, figs 2–4, table 17 (as *L. limbatum* var. *costulatum*); Hayward, 1980: 186 (first N.Z. records), fig. 3; Hayward, 1982b: 61, 64 (off Little Barrier Is); Hayward, 1990: 98 (negative records in Bay of Plenty of subtropical species at southerly limits).

Loxostomum limbatum limbatum (Brady, 1881)

Brady, 1881: 57 (*Bolivina*); Brady, 1884: 419, pl. LII, figs 26–28; Cushman, 1911: 47, text-figs 78a-c; Cushman, 1921: 135–136, pl. 19, fig. 5; Heron-Allen & Earland, 1922: 137; Cushman, 1937: 186, pl. 21, figs 26–29 (*Loxostoma*); Eade, 1967a: 52; Chave, 1987: 66, pl. 11, fig. 4.

Loxostomum lobatum (Brady, 1881)

Brady, 1881: 58 (*Bolivina*); Brady, 1884: 425, pl. LIII, figs 22–23; Heron-Allen & Earland, 1922: 134 (N.Z.); Cushman, 1937: 188, pl. 22, figs 2–4 (*Loxostoma*); Cushman, 1942: 36–37 (descr., refs etc.), pl. 10, fig. 5; Barker, 1960: 110, pl. 53, figs 22–23 (in *Loxostomum* following Cushman, 1937); Hedley *et al.*, 1965: 22, pl. 6, fig. 24 (*Loxostomum*); Eade, 1967a: 52; Thompson, 1975 thesis: 93, pl. 28, figs 5–6 (NE N.Z.).

Loxostomum porrectum (Brady, 1881)

Brady, 1881: 27 (*Bolivina*); Brady, 1884: 418, pl. LII, figs 22a-c; Mestayer, 1916: 129 (N.Z.); Cushman, 1937: 190–191 (descr., refs etc.), pl. 22, figs 7–10; Todd & Bronnimann, 1957: 1–43, pl. 8, fig. 39; Barker, 1960: 106–108, pl. 52, fig. 22 (in *Loxostomum* following Cushman, 1937); Eade, 1967a: 52.

Superfamily BOLIVINITACEA
Family BOLIVINITIDAE

Genus **Bolivinita** Cushman, 1927

Bolivinita cf. **granttaylori** Vella, 1957. Vella, 1957

Vella, 1957: 10, 34 (Cook Strait, as *B.* cf. *granttaylori* Vella, 1957: 33–34, pl. 8, figs 157–159 (Pliocene, near Wairoa); Eade, 1967a: 38 (listed); Hornibrook, 1968: 105, fig. 23.

Bolivinita pliozea Finlay, 1939

Finlay, 1939b: 319; Vella, 1957: 10 (Cook Strait), 14; Hulme, 1964: 331; Eade, 1967a: 38; Hornibrook 1968: 107, fig. 23; Hornibrook *et al.*, 1989: 118 (table 2(6) first appearance, N.Z.), 119 (table 3(1), last occurrence).

Bolivinita pohana Finlay, 1939

Finlay, 1939b: 319, pl. 27, figs 99–100; Vella, 1957: 10 (Cook Strait); Eade, 1967a: 38.

Bolivinita quadrilatera (Schwager, 1866)

Schwager, 1866: 253, pl. 7, fig. 103 (*Textularia*); Brady, 1884: 358, pl. XLII, figs 8–12; Murray, 1895: 605, 610; Cushman, 1911: 24, text-figs 42–44; Cushman, 1921: 125, pl. 23, figs 2a-b; Cushman, 1955: 257–258 (type species, generic descr.), key pl. 50, fig. 12; Eade, 1967a: 38; Colom, 1974: 121, figs 18a-d; Scott, 1979: 509–519 (var., upper Neogene, N.Z.), 47 figs; Lewis, 1979: 31, table 5 (off Southern Hawkes Bay, as *B. quadrilaterata* [sic]: "Moderately common on mid and lower slope."); Larsen, 1982: pl. 11, fig. 6; Loeblich & Tappan, 1987: 503, pl. 554; Hornibrook *et al.*, 1989: 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence).

Bolivinita quadrilatera var. **tortilis** Chapman, 1941

Chapman, 1941: 169, pl. 3, fig. 3 (probably incl. *B. obsoleta* of Heron-Allen & Earland, 1922: 136); Eade, 1967a: 38.

Superfamily CASSIDULINACEA
Family CASSIDULINIDAE

Genus **Cassidulina** d'Orbigny, 1826

Cassidulina angulosa surtida Saidova, 1975

Saidova, 1975: 323–324, pl. LXXXVIII, fig. 1 (distrib., incl. New Zealand).

Cassidulina carinata Silvestri, 1896

Silvestri, 1896: 104, pl. II, figs 10a-c (*C. laevigata* d'Orbigny var. *carinata*); Cushman, 1955: 313 (generic descr.); Todd, 1965: 40–41 (refs etc.), pl. 17, fig. 4; Eade, 1967b: 422–423 (table 1), 429–430 (N.Z. material identical with topotype of *C. laevigata* var. *carinata* Cushman = *C. neocarinata* Thalmann, 1950 = *C. carinata* Silvestri *fide* Todd, 1965), text-fig. 2(5–9) (distrib., discuss., syn., [incl. *C. laevigata* d'Orbigny, 1826 of Brady, 1884, Chapman, 1906, Rhumbler, 1906: 62 (Chatham Is record), Chapman, 1909, Mestayer, 1916, Heron-Allen & Earland, 1922 (in part), and Hornibrook *in* Fleming, 1952; *C. laevigata* var. *carinata* Silvestri of Cushman, 1922; *C. carinata* Silvestri of Todd, 1965; *C. carinata* Cushman of Vella, 1957; *C. neocarinata* Thalmann, 1950 (new name for *C. carinata*

Cushman, 1922, not of Silvestri, 1896) of Hedley *et al.*, 1967 (incl. *C. laevigata* of Heron-Allen & Earland, 1922 and Heron-Allen & Earland, 1930a: 82, pl. III, figs 44–46; *C.* aff. *laevigata* d'Orbigny of Kustanowich, 1965; (?) *C. laevigata* var. *tumida* Heron-Allen & Earland, 1922 (see separate entries in Eade 1967a: 52)]); Murray, 1971: 6, 7, 186–187 (diag. features etc.), pl. 78, figs 1–5; Collins, 1974: 51 (Australia); Thompson, 1975 thesis: 94; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Eade, 1967b); Zobell & Ranke, 1978: 35, pl. 2, figs 1–2; Dawson, 1979: 17 (figured specimens of Eade (1967b) listed); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.), figs 3d, 4; Lewis, 1979: 36, table 5 (off Southern Hawkes Bay, abundance etc.); Haake, 1980: 17, pl. 3, fig. 16; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6b; Hayward, 1982b: 64 (off Little Barrier Is); Larsen, 1982: pl. 23, fig. 4; Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Cassidulina micae micae (Saidova, 1975)

Saidova, 1975: 326 (*Lernina*), pl. CXIII, fig. 9 ("Ob" Stn 354, 266 m).

Cassidulina micae tropica (Saidova, 1975)

Saidova, 1975: 327 (*Lernina*), pl. LXXXVIII, fig. 14, pl. CXIII, fig. 11 ("Vityaz" Stn 3840, 1235 m).

Cassidulina planata Saidova, 1975

Saidova, 1975: 325, pl. LXXXVIII, fig. 5, pl. CXIII, fig. 8 ("Vityaz" Stn 3828, 870 m).

Genus **Cassidulinoides** Cushman, 1927

Cassidulinoides parkerianus (Brady, 1881)

Brady, 1881: 59 (*Cassidulina*); Brady, 1884: 432, pl. LIV, figs 11–16; Heron-Allen & Earland, 1922: 139; Heron-Allen & Earland, 1932: 359, pl. IX, figs 22–25; Parr, 1950: 344 (remarks), pl. XII, fig. 25; Cushman, 1955: 315 (type species, generic descr.), pl. 26, fig. 4, key pl. 33, fig. 5; Barker, 1960: 112, pl. 54, figs 11–16 (in *Cassidulinoides* following Thalmann, 1932); Eade, 1967a: 40 (listed); Eade, 1967b: 425, text-fig. 2(4); Boltovskoy & Wright, 1967: 103; Dawson, 1979: 17 (figured specimen of Eade (1967b) listed); Boltovskoy *et al.*, 1980: 23 (descr., etc.), pl. 8, figs 1–4; Chave, 1987: 62, pl. 8, fig. 1.

Genus **Evolvocassidulina** Eade, 1967

Evolvocassidulina aff. **inflata** (Le Roy, 1944). Eade, 1967

Eade, 1967b: 422–423 (table 1), 432–433 (first Recent record), text-fig. 4(3); cf. Le Roy, 1944: 37, pl. 4, figs 30–31 (*Cassidulina*, Miocene, central Sumatra); Belford, 1966: 54, text-fig. 17: 13–14, pl. 26, figs 14–17 (*Cassidulinoides*, Miocene, Papua New Guinea); Collins, 1974: 52 (in *Cassidulina*); Dawson, 1979: 18 (figured specimens of Eade (1967b) listed).

Evolvocassidulina orientalis (Cushman, 1922)

Cushman, 1922: 129 (*Cassidulina*); Eade, 1967b: 422–423 (table 1), 431–432 text-fig. 4(1–2) (generic placing, distrib., discuss., refs, syn. incl. *Cassidulina bradyi* Norman *in* Wright, 1880 of Brady, 1884, Chapman, 1906, Mestayer, 1916, Cushman, 1919, Heron-Allen & Earland, 1922, see Eade, 1967a: 39; *Cassidulinoides orientalis* Cushman, 1922 of Hornibrook *in* Fleming, 1952, Vella, 1957, Hornibrook, 1961, Hulme, 1964, Kustanowich, 1965, Kennett, 1966, Gibson, 1967, Hedley *et al.*, 1967 (incl. *C. bradyi* of Cushman, 1919 and of Heron-Allen & Earland, 1922, see Eade, 1967a: 39); Eade, 1969: 65 (as *Cassidulina orientalis* Cushman, 1922 from the N.Z. continental shelf, distinguished from *Cassidulina orientale* Cushman, 1925, from abyssal depths off Japan = *Globocassidulina nipponensis* Eade, 1969, new name); Schnitker, 1971: 196, pl. 5, fig. 2 (as *Cassidulinoides bradyi* (Norman)); Thompson, 1975 thesis: 84, pl. 18, figs 8–9; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Eade, 1967); Hayward & Buzas 1979: 56 (Miocene), pl. 14, fig. 181; Dawson, 1979: 18 (figured specimens of Eade (1967b) listed); Hayward, 1979b: 184 (*Zostera* pool community, figs 3i, 4; Lewis, 1979: 36, table 5 (off Southern Hawkes Bay, abundance etc.); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6u; Hayward, 1982b: 64 (off Little Barrier Is); Loeblich & Tappan, 1985b: 105–107 (descr., notes on types etc.), figs 1–5; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Evolvocassidulina tenuis (Phleger & Parker, 1951)

Phleger & Parker, 1951: 27, pl. 14, figs 14–17 (*Cassidulinoides*); Todd, 1965: 46, pl. 17, fig. 9 (South Pacific record); Eade, 1967b: 422–423 (table 1), 433 (first N.Z. record, off Great Barrier Is, 514–922 m), text-fig. 3(3–4); Dawson, 1979: 19 (figured specimens of Eade (1967b) listed); Loeblich & Tappan, 1987: 505, pl. 555.

Genus **Favocassidulina** Loeblich & Tappan, 1957

Favocassidulina australis Eade, 1967

Eade, 1967b: 422–423 (table 1), 426–428, text-figs 2(2–3), 3(1–2); Dawson, 1979: 19 (type data).

Favocassidulina favus (Brady, 1877)

Brady, 1877: 535 (*Pulvinulina*); Heron-Allen & Earland, 1922: 219; Cushman, 1924: 1; Cushman, 1926: 70–71 (generic position); Eade, 1967a: 52 (*Favocassidulina*, in family Cassidulinidae); Eade, 1967b: 425 (type locality, etc., removed to family Islandiellidae), text-fig. 2(1); Dawson, 1979: 19 (figured specimen of Eade (1967b) listed &c); Nomura, 1984: 93–100 (SEM morphol.); Loeblich & Tappan, 1987: 505, pl. 556.

Genus **Globocassidulina** Voloshinova, 1960

Globocassidulina canalisuturata Eade, 1967

Eade, 1967b: 422–423 (table 1), 440–441 text-figs 3(5–7), 5(7–8) [for species recorded in New Zealand region as *Cassidulina subglobosa* Brady, 1881, see refs in Eade, 1967b: 440, and in Eade, 1967a: 52 (as *G. subglobosa* (Brady), incl. Chapman, 1906: 90; Chapman, 1909: 332; Heron-Allen & Earland, 1922: 138 (in part); Hornibrook *in* Knox, 1951: 43; Vella, 1957: 10; Hornibrook, 1961: 85, pl. 10, fig. 198; Kennett, 1966a: 49–50, pl. 4, fig. 66 but cf. Todd, 1965: 45 (descr., etc. refs), pl. 16, fig. 7)]; Thompson, 1975 thesis: 94; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Eade, 1967b); Dawson, 1979: 19 (type data, depositories &c); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay: "Abundant on banks"); Hayward & Grace, 1981: 47, 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6n; Hayward, 1982b: 64 (off Little Barrier Is).

Globocassidulina crassa (d'Orbigny, 1839)

d'Orbigny, 1839c: 56–57, 81, pl. 2, figs 18–20 (*Cassidulina*); Cushman, 1911: 91, text-fig. 151; Barker, 1960: 110–112, pl. 54, figs 4–5; Eade, 1967a: 52 (N.Z. refs, note on syn.); Eade, 1967b: 422–423 (table 1), 435, text-fig. 4(4); Colom, 1974: 162, figs 42 i-j (*Cassidulina*); Dawson, 1979: 19 (figured specimen of Eade (1967b) listed); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Globocassidulina crassa complanata (Saidova, 1975)

Saidova, 1975: 333 (*Smyrnella*), pl. CXIV, fig. 7 (distrib., incl. New Zealand); cf. as subspecies of *Globocassidulina crassa* (d'Orbigny, 1839), *q.v.*

Globocassidulina decorata (Sidebottom, 1910)

Sidebottom, 1910: 107, pl. 4, fig. 2 (*Cassidulina*) (off southern Fiji); Eade, 1967b: 422-423 (table 1), 435 (first N.Z. record off Great Barrier Is., 1176–2041 m), text-fig. 5(1); Dawson, 1979: 20 (figured specimen of Eade (1967b) listed).

Globocassidulina elegans (Sidebottom, 1910)

Sidebottom, 1910: 106, pl. 4, fig. 1 (*Cassidulina*); Cushman *et al.*, 1954: 366, pl. 90, fig. 23; Eade, 1967b: 422–423 (table 1), 435-437 (distrib., refs, first N.Z. record), text-fig. 4(6–7); Dawson, 1979: 20 (figured specimen of Eade (1967b) listed).

Globocassidulina gemma (Todd, 1954)

Todd *in* Cushman *et al.*, 1954: 366, pl. 90, figs 26–27 (*Cassidulina*); Brady, 1884: 430 (in part as *Cassidulina subglobosa*); Todd, 1965: 42-43; Belford, 1966: 147, text-figs 16, 11–12, pl. 24, figs 22–25 (*Globocassidulina*); Eade, 1967b: 422–423 (table 1), ("many of the records of [*Cassidulina subglobosa*] from the Pacific are probably of *G. gemma*"), 437 (distrib., first N.Z. record), text-fig. 5(4); Dawson, 1979: 20 (figured specimen of Eade (1967b) listed).

Globocassidulina aff. inflata (Le Roy, 1944)

Le Roy, 1944: 37, pl. IV, figs 30–31 (*Cassidulina*); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay: "Common at many stations between outer shelf and mid slope.").

Globocassidulina minuta (Cushman, 1933)

Cushman, 1933a: 92, pl. 10, fig. 3 (*Cassidulina*); Cushman *et al.*, 1954: 366, pl. 90, fig. 35; Todd, 1965: 43, pl. 17, fig. 3; Eade, 1967b: 422-423 (table 1), 437–439 (distrib., first N.Z. records, as *Globocassidulina*), text-figs 5(2–3), 6; Collins, 1974: 52 (cf. of Australian specimens); Dawson, 1979: 20 (figured and other specimens of Eade (1967b) listed); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay, abundance); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is).

Globocassidulina murrhyna (Saidova, 1975)

Saidova, 1975: 343 (*Sphaeroislandiella*), pl. XCI, fig. 6, pl. CXVI, fig. 1 ("Vityaz" Stn 3837, 2090 m).

Globocassidulina notalnella (Saidova, 1975

Saidova, 1975: 343–344 (*Sphaeroislandiella*), pl. XCI, figs 7–8, pl. CXVI, fig. 2 ("Ob" Stn 358, 1418 m).

Globocassidulina pacifica (Cushman, 1925)

Cushman, 1925: 53, pl. 9, figs 14–16 (*Cassidulina*

pacifica, new name for Recent Pacific forms referred to *C. calabra* incl. Brady, 1884: 431, pl. CXIII, fig. 8, cf. Barker, 1960: 232); Heron-Allen & Earland, 1922: 139 (N.Z. record as *Cassidulina calabra*); Parr, 1950: 343, pl. 12, fig. 23; Todd, 1965: 43-44 (descr., etc.); Eade, 1967a: 52.

Globocassidulina producta (Chapman & Parr, 1937)

Chapman & Parr, 1937: 82, pl. 8, fig. 12 (*Cassidulina subglobosa* Brady var. *producta*); Eade, 1967b: 422-423 (table 1), 439-440 (distrib., ref., first N.Z. record), text-fig. 4(5); Dawson, 1979: 20 (figured and other specimens of Eade (1967b) listed); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay, abundance).

Globocassidulina salebrosa (Saidova, 1975)

Saidova, 1975: 330 (*Cassidulinitella*), pl. LXXXVIII, fig. 13 ("Vityaz" Stn 3841, 159 m).

Globocassidulina spherica Eade, 1967

Eade, 1967b: 422-423 (table 1), 441-444 text-fig. 7(1–3); Dawson, 1979: 20 (type data, depositories &c); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay: "Rare, on shelf only.").

Globocassidulina subglobosa (Brady, 1881)

Brady, 1881: 60 (*Cassidulina*); Brady, 1884: 430, pl. LIV, fig. 17; Cushman, 1911: 98, text-fig. 152; Cushman, 1921: 171–172 pl. 32, fig. 2; Cushman, 1922: 127, pl. 24, fig. 6; Phleger & Parker, 1951: 27, pl. 14, figs 11–13; Barker, 1960: 112, pl. 54, fig. 17; Andersen, 1961: pl. 25, figs 2a-c; Hornibrook, 1961: 85, pl. 10, fig 198; Galhano, 1963: 83-84, pl. VIII, fig. 15; Todd, 1965: 45 (descr., etc., refs), pl. 16, fig. 7; Eade, 1967a: 52 (N.Z. refs); Eade, 1967b: 440-441 (N.Z. records of *Cassidulina subglobosa* Brady now referable to *Globocassidulina canalisuturata* n. sp., *q.v.*); cf. Murray, 1971: 6, 190–191, pl. 80, figs 1-4; Collins, 1974: 52 (occurrence in Victoria, Australia); Hayward & Buzas, 1979: 1–154, (N.Z. Miocene), pl. 17, figs 219–220; Loeblich & Tappan, 1987: 505, pl. 557; Hornibrook *et al.*, 1989: 93, 113 (table 2(1), first appearance, N.Z.), 119 (table 3(1), last occurrence).

Globocassidulina tumida Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 137, pl. V, figs 8–10 (as *Cassidulina laevigata* d'Orbigny, 1826, var. *tumida* N.Z.); Eade, 1967b: 422-423 (table 1), 440 (distrib., first N.Z. record), text-fig. 5(5-6); Dawson, 1979: 20 (figured and other specimens of Eade (1967b) listed).

Genus **Lernella** Saidova, 1975

Lernella crispa Saidova, 1975

Saidova, 1975: 328–329, pl. CXIV, fig. 3 ("Ob" Stn 354, 266 m).

Subfamily EHRENBERGININAE
Genus **Ehrenbergina** Reuss, 1850

Ehrenbergina aspinosa Parr, 1950

Parr, 1950: 345, pl. XIII, figs 1–2 (*E. pacifica* var. *aspinosa*); Brady, 1884: 434, pl. IV, figs 5-6 (*E. serrata*, in part, cf. Barker, 1960: 112); Cushman, 1927c: 5, pl. 2, fig. 2a (*E. pacifica*, in part); Todd, 1965: 47, pl. 20, fig. 1 (as *E. pacifica*, in part); Eade, 1967b: 422–423 (table 1), 444–445 (N.Z. records, discuss. of status etc.), text-figs 7(4–6), 8(1–2); Collins, 1974: 52 (remarks etc.); Dawson, 1979: 18 (type data).

Ehrenbergina carinata Eade, 1967

Eade, 1967b: 422-423 (table 1), 448-450, text-figs 8(9), 9(1-4); Dawson, 1979: 18 (type data).

Ehrenbergina glabra Heron-Allen & Earland, 1922

Heron-Allen & Earland, 1922: 140–141, pl. V, figs 1-6, 11 (*E. hystrix* Brady 1881 var. *glabra*); Wiesner, 1931: 132, pl. XXII, fig. 262; cf. Chapman & Parr, 1937: 84 (*E. glabra*) and Parr, 1950: 344 (remarks, refs etc.); Eade, 1967a: 52 (listed); Eade, 1967b: 422–423 (table 1), 445-446 (distrib., N.Z. records, refs); Sissingh, 1973: 362 (remarks); cf. Collins, 1974: 53.

Ehrenbergina mestayeri Cushman, 1922

Cushman, 1922b: 135; Cushman, 1919: 607 (as *E. serrata*); Heron-Allen & Earland, 1922: 140 (in part as *E. serrata* Reuss, cf. Eade, 1967a: 52); Cushman, 1927c: 4, pl. 1, fig. 9; Eade, 1967a: 52 (N.Z. refs); Eade, 1967b: 422-423 (table 1), 446 (distrib., remarks), text-fig. 8(6-7); Hornibrook, 1968: 76, fig. 14; Thompson, 1975 thesis 94; Dawson, 1979: 18 (figured specimens of Eade (1967b) listed); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981b: 132 (Bay of Islands); Hornibrook *et al.*, 1989: 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1)), last occurrence).

Ehrenbergina serrata Reuss, 1850

Reuss, 1850: 377, pl. 48, fig. 7; Brady, 1884: 434, pl. LV, figs 2–7; (cf. Barker, 1960: 112); Cushman, 1911: 101, text-figs 155a-d; Heron-Allen & Earland, 1922: 140 (? in part); Cushman, 1955: 315 (type species, generic descr.), pl. 26, fig. 6, key pl. 33, fig. 7; cf. Barker, 1960: 112, pl. 55, figs 2–7 (status etc.); Eade, 1967a: 52 (listed); cf. Colom, 1974: 163, figs 42 k-l; Loeblich & Tappan, 1987: 508, pl. 561.

Ehrenbergina trigona Goës, 1896

Goës, 1896: 49 (*E. serrata* Reuss var. *trigona*, incl. *E. serrata* of Brady, 1884: 91, 434, pl. LV, figs 2, 3, 5 (cf. Barker, 1960: 112)); Heron-Allen & Earland, 1922: 140 (in part as *E. serrata*); Phleger *et al.*, 1953: 46, pl. 10, figs 12–13; Barker, 1960: 112, pl. 55, figs 2, 3, (?)5 (notes on status etc.); Todd, 1965: 48, pl. 20, fig. 2; Eade, 1967a: 52; Eade, 1967b: 422-423 (table 1), 446-448 (distrib., N.Z. rec.), text-fig. 8(8); Dawson, 1979: 18 (figured specimens of Eade (1967b) listed).

Superfamily TURRILINACEA
Family STAINFORTHIIDAE

Genus **Hopkinsina** Howe & Wallace, 1932

Hopkinsina pacifica Cushman, 1933

Cushman, 1933a: 86, pl. 8, fig. 16; Hulme, 1964: 330 (ref.); Eade, 1967a: 41; Collins, 1974: 34 (Victoria); Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Common from outer shelf to mid slope."); Boltovksoy *et al.*, 1980: 36 (descr., etc.), pl. 18, figs 18–20; Buzas & Severin, 1982: 33 (refs, specific status), pl. 5, fig. 14.

Genus **Stainforthia** Hofker, 1956

Stainforthia concava (Höglund, 1947)

Höglund, 1947: 257-261, text-figs 273–275, pl. 23, figs 3–4, pl. 32, figs 4–7 (*Virgulina*); Lewis, 1979: 32, table 5 (off Southern Hawkes Bay, abundance etc.) — ref. to Loeblich & Tappan, 1964: fig. 442, nos 10–11).

Stainforthia sp. Lewis, 1979

Lewis, 1979: 32–33 table 5 (off Southern Hawkes Bay: "Aperture and apertural face smaller than *S. concava* but otherwise similar.").

Genus **Virgulopsis** Finlay, 1939

Virgulopsis turris (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 124, pl. IV, figs 8–12 (*Verneuilina*, N.Z.); Cushman, 1955: 267 (generic descr.); Hedley *et al.*, 1965: 32, pl. 9, figs 5a-b; Eade, 1967a: 41 (N.Z. refs); Hornibrook, 1968: 76, fig. 14; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 85, pl. 19, figs 4–5); Lewis, 1979: 33, table 5 (off Southern Hawkes Bay, abundance etc.); Hayward, 1979b: 185 (*Zostera* pool community); Hayward, 1981a: 80, 81, 92 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 134 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (Cavalli Is, ecol.), fig. 5c; Hayward, 1982b: 65 (off Little Barrier Is); Hornibrook *et al.*, 1989: 117 (table 2(5), first appearance, N.Z.), 119 (table 3(1), last occurrence); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Superfamily BULIMINACEA
Family SIPHOGENERINOIDIDAE
Subfamily SIPHOGENERINOIDINAE

Genus **Rectobolivina** Cushman, 1927

Rectobolivina bifrons (Brady, 1881)

Brady, 1881: 64 (*Sagrina*); Brady, 1884: 582, pl. LXXV, figs 18–20; Cushman, 1913: 105, pl. 45, figs 1–2, 5–7 (*Siphogenerina*); Cushman, 1921: 277–278 (distrib., etc.), pl. 56, figs 2–3; Heron-Allen & Earland, 1922: 186 (N.Z.); Cushman, 1955: 270 (type species, generic descr.), pl. 22, fig. 30, key pl. 27, fig. 29; Barker, 1960: 156, pl. 75, figs 18–20 (*Rectobolivina*); Eade, 1967a: 39; Hayward, 1979: 185 (*Zostera* pool community, N.Z.); Adams *et al.*, 1980: 10 (type); Loeblich & Tappan, 1987: 517.

Rectobolivina bifrons var. striatula (Cushman, 1917)

Cushman, 1917: 662 (*Siphogenerina*); Cushman, 1919: 620 (N.Z.); Cushman, 1921: 278–279 (descr., distrib., etc.), pl. 56, fig. 4; Eade, 1967a: 39.

Rectobolivina columellaris (Brady, 1881)

Brady, 1881: 64 (*Sagrina*); Brady, 1884: 581, pl. LXXV, figs 15–17; Cushman, 1913: 104, pl. 47, figs 2–3 (*Siphogenerina*); Cushman, 1921: 276–277, pl. 56, fig. 1; Heron-Allen & Earland, 1922: 185 (N.Z.); Barker, 1960: 156, pl. 75 (LXXV), figs 15–17 (generic placings etc.); Eade, 1967a: 39; Albani, 1968a: 25, fig. 99; Colom, 1974: 122, figs 18p-s; Albani, 1979: 34 (features), fig. 58.1; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Moderately common on Motukura Bank."); Adams *et al.*, 1980: 10 (type); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1982b: 65 (off Little Barrier Is).

Rectobolivina dimorpha (Parker & Jones) **var. pacifica** (Cushman, 1926)

Cushman, 1926b: 13, pl. 2, fig. 9, pl. 3, figs 6a-b (*Siphogenerina*, incl. *Sagrina dimorpha* of Heron-Allen & Earland, 1922: 186); Cushman, 1942: 53, pl. 15, fig. 4; Eade, 1967a: 39; Collins, 1974: 31 (Australia).

Rectobolivina raphana (Parker & Jones, 1865)

Parker & Jones, 1865: 364, pl. XVIII, figs 16–17 (*Uvigerina (Sagrina)*); Brady, 1884: 585, pl. LXXV, figs 21–24 (*Sagrina*); Cushman, 1913: 108, pl. 46, figs 1–5 (*Siphogenerina (Sagrina)*); Cushman, 1921: 280–281 pl. 56, fig. 7; Heron-Allen & Earland, 1922: 186 (*Sagrina*, N.Z.); Parr, 1932b: 218–234, pl. XXI, fig. 24; Parr, 1945: 207; Eade, 1967a: 39; Albani, 1968a: 25–26, fig. 102; Albani, 1968b: 106–107 (refs, distrib., etc.); Collins, 1974: 30; Albani, 1979: 34 (features), fig. 58.2; Poag & Tresslar, 1981: 54 (refs), pl. 10, figs 6–7.

Rectobolivina cf. **striatula** (Cushman, 1913). Hulme, 1964

Hulme, 1964: 331 (Manukau Harbour, [as *R.* cf. *striatula* (Cushman, 1913: 108, pl. 74, fig. 1 (*Siphogenerina*), see also refs in Hayward & Buzas, 1979: 72, pl. 26, fig 320–321 and Cushman, 1917: 662 (*S. bifrons* Brady var. *striatula*)]); Cushman, 1922: 278–279, pl. 56, fig. 4; cf. Kennett, 1966a: 47, pl. 4, fig. 59 (N.Z. Upper Miocene occurrence, refs etc.); Eade, 1967a: 39 (listed); cf. Collins, 1974 : 30; Hornibrook *et al.*, 1989: 99, 118 (table 2(6), first appearance in N.Z.), 119 (table 3(1), last occurrence), fig. 22:24.

Subfamily TUBULOGENERININAE
Genus **Siphogenerina** Schlumberger, 1883

Siphogenerina striata (Schwager, 1866)

Schwager, 1866: 251, pl. 7, fig. 99 (*Dimorphina*); Cushman, 1921: 280 (refs etc.), pl. 56, fig. 5; Heron-Allen & Earland, 1922: 186 (*Sagrina*); Cushman, 1955: 274 (generic descr.); Barker, 1960: 158, pl. 75, figs 25–26; Eade, 1967a: 41 (*Siphogenerina*).

Family BULIMINIDAE
Genus **Bulimina** d'Orbigny, 1826

Bulimina cf. **acanthia** Costa, 1856. Vella, 1957

Vella, 1957: 10 (Cook Strait, as *B.* cf. *acanthia* Costa, 1856 : 335, pl. 14, figs 35–36); Galhano, 1963: 65-66, pl. VI, fig. 18; Eade, 1967a : 40 (listed).

Bulimina aculeata d'Orbigny, 1826

d'Orbigny, 1826: no. 7; Brady, 1884: 406, pl. LI, figs 7–9; Williamson, 1858: 63, fig. 128 (as *B. pupoides* var. *spinulosa*); Fornasini, 1902: 153, fig. 4; Cushman, 1911: 286, text-figs 139a-b; Cushman, 1921: 161, pl. 31, fig. 5; Cushman & Parker, 1938a: 92, pl. XV, figs 8–10; Cushman & Parker, 1938b: 90–94, pl. XVI; Cushman & Parker, 1947: 120, pl. 28, figs 8–11; Parker, 1954: 510, pl. 6, fig. 19; Parr, 1950: 337; Cushman, 1955: 266–267 (generic descr.), key pl. 27, fig. 12; Barker, 1960: 104, pl. 51, figs 7–9; Bandy & Chierici, 1966: 267, fig. 7 (depth/temperature relations); Kennett, 1966: 38 (Upper Miocene in N.Z., refs & syn. etc.); Eade, 1967a: 40 (N.Z. refs); Hornibrook, 1968: 73, fig. 13; Schnitker, 1971: pl. 5, fig. 4; Colom, 1974: 115, fig. 16; Boltovskoy & Wright, 1976: 144; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Abundant and living at almost every station on slope."); Boltovskoy *et al.*, 1980: 19–20 (descr.), pl. 5, figs 1–3; Haake, 1980: 12, pl. 2, figs 17–18; Poag, 1981: 48-49, pl. 21, fig. 1, pl. 22, figs 1a-b; Larsen, 1982: pl. 12, fig. 13; Buzas & Severin, 1982: 33 (refs), pl. 5, fig. 12; Collins, 1989: 222–234 (morphol., var.); Hornibrook *et al.*, 1989: 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence); Burgess & Schnitker, 1990: 37-49 (morphometry).

Bulimina affinis d'Orbigny, 1839

d'Orbigny, 1839a (*in* de la Sagra): 109, 204, pl. II, figs 25–26; Brady, 1884: 400, pl. L, figs 14a-b; Cushman, 1911: 79, text-fig. 130; Cushman, 1921: 165, text-fig 5a-b, 6; Heron-Allen & Earland, 1922: 128; Cushman, 1922: 103, pl. 20, fig. 6; Phleger & Parker, 1951: 15, pl. 7, figs 21–22; Barker, 1960: 102, pl. 50, fig. 14 (status of Brady's (1884) identification); Andersen, 1961: pl. 19, figs 11a-b; Galhano, 1963: 66–67 (refs etc.), pl. VI, fig. 12; Eade, 1967a: 40; Colom, 1974: 115, figs h-j.

Bulimina australis Vella, 1957

Vella, 1957: 10, 32, pl. 8, figs 168–169; Eade, 1967a: 40 (listed).

Bulimina buchiana d'Orbigny, 1846

d'Orbigny, 1846: 186, pl. 11, figs 15–18; Parker & Jones, 1865: 374, pl. 17, fig. 71; Brady, 1884: 407, pl. LI, figs 18–19; Cushman, 1911: 85, text-figs 138a-b; Cushman, 1921: 160; Cushman, 1922: 95, pl. 20, fig. 4; Heron-Allen & Earland, 1922: 129; Barker, 1960: 104 (Brady's (1884) material as *Bulimina* n.sp.); Galhano, 1963: 66, pl. VI, fig. 19; Eade, 1967a: 40; Colom, 1974: 116, figs 16b-c; Boltovskoy & Wright, 1976: 249.

Bulimina denudata Cushman & Parker, 1938

Cushman & Parker, 1938: 57, pl. 10, figs 1–2 (*B. pagoda* var. *denudata*); Kustanowich, 1965: 52; Eade, 1967a: 40; Boltovskoy & Wright, 1976: 243, 337.

Bulimina echinata d'Orbigny, 1826

d'Orbigny, 1826: 269, no. 5; Heron-Allen & Ear-

land, 1922: 128 (N.Z. refs); Parr, 1939: 61, fig. 7 on pl.; Cushman & Parker, 1947: 108, pl. 25, figs 14–17; Eade, 1967a: 40; Collins, 1974: 32 (refs).

Bulimina elongata d'Orbigny var. **subulata** Cushman & Parker, 193

Cushman & Parker, 1937: 51, pl. 7, figs 6–7; Hulme, 1964: 329 (refs); Eade, 1967a: 40; Haynes, 1973: 120 (diag., descr., remarks, distrib., refs & syn.), text-fig. 24 (no. 8), pl. 30, figs 10 & 15; Colom, 1974: 117; Albani, 1978: 381–382 (descr., etc.), pl. 7, O; Albani, 1979: 35 (features), fig. 65.1.

Bulimina exilis Brady, 1884

Brady, 1884: 399, pl. L, figs 5–6 (*B. elegans* var. *exilis*); Cushman, 1911: 82, text-figs 135a-d; Heron-Allen & Earland, 1922: 127 (N.Z.); Loeblich & Tappan, 1953: 110, pl. 20, figs 4–5; Cushman & Parker, 1947: 123, pl. 28, figs 27–28; Barker, 1960: 102, pl. 50, figs 5–6; Eade, 1967a: 40; Larsen, 1982: pl. 12, fig. 14; Hamsa & Gandhi, 1983: 164–165 (diag., refs, as var. *exilis*), fig. 1f.

Bulimina cf. **exilis** Brady, 1884. Vella, 1957

Vella, 1957: 10, 14, 32, pl. 8, figs 164–165 (Cook Strait, as *B.* cf. *exilis* Brady, 1884, *q.v.*); Eade, 1967a: 40 (listed).

Bulimina gibba Fornasini, 1902

Fornasini, 1902: 378, pl. 0, figs 32–34; Brady, 1884: 398, pl. L, figs 1–4 (as *Bulimina elegans fide* Cushman & Parker, 1937: 48 and Haake, 1980: 11); Barker, 1960: 102, pl. 50 (L), figs 1–4; Eade, 1967a: 40 (N.Z. refs, note on syn.); Albani, 1968a: 107, pl. 8, fig. 21 (first Australian record); Albani, 1968b: 107; Murray, 1971: 116–117 (diag. features etc.), pl. 48, figs 1–8; Topping, 1973 thesis: 26, pl. 7, figs 3.5 (Puhoi Estuary, Auckland); Haynes, 1973: 121–122 (diag., descr. etc. "This is a very variable group which combines the features of *B. gibba* and *B. elongata*. Many authors have identified it in the past as *B. elegans* d'Orbigny and *B. pupoides* Fornasini"), text-figs 24 (nos 10–17), pl. 10, fig. 14; Thompson, 1975 thesis: 84, pl. 19, fig. 1; Boltovskoy & Wright, 1976: 103, 144; Albani, 1979: 35 (features), fig. 65.2; Boltovskoy *et al.*, 1980: 20 (descr., etc.), pl. 5, figs 7–9; Haake, 1980: 11–12, pl. 2, figs 15–16; Hayward, 1981a: 90 (Tutukaka Harbour).

Bulimina inflata Seguenza, 1862

Seguenza, 1862b: 109, pl. 1, fig. 10; Brady, 1884: 406, pl. 21, figs 10–13; Cushman, 1911: 84, text-figs 137a-b; Cushman, 1921: 160, pl. 31, fig. 6; Barker, 1960: 104 (status of Brady's (1884) identification); Eade, 1967a: 40 (N.Z. refs); Boltovskoy & Wright, 1976: 273; Larsen, 1982: pl. 12, fig. 15.

Bulimina marginata d'Orbigny, 1826

d'Orbigny, 1826: 269, no. 4, pl. XII, figs 10–12; Parker & Jones, 1857: 297, figs 35–40; Parker & Jones, 1865: 372, pl. 15, fig. 10, pl. 17, fig. 70; Brady, 1884: 405, pl. LI, figs 3–5; Heron-Allen & Earland, 1911: 312 (refs); Cushman, 1911: 83, text-figs 136a-b; Cushman, 1921: 159; Cushman & Parker, 1947: 119, pl. 28, figs5–6; Phleger & Parker, 1951: 16, pl. 7, figs 27–28; Parker, 1954: 410, pl. 6, fig. 20; Cushman, 1955: 226–227 (type species, generic descr.), pl. 22, fig. 7, key pl. 27, fig. 11; Barker, 1960: 104, pl. 51, figs 3–5; Andersen, 1961: pl. 19, figs 14– 16; Galhano, 1963: 65 (distrib., refs etc.), pl. VI, fig. 17; Eade, 1967a: 40 (N.Z. refs); Murray, 1968a: 83–96; Albani, 1968b: 107 (refs, range etc.); Seiglie, 1969: 98–99, pl. 4, figs 8–16; Kameswara Rao, 1970: 266 (descr., distrib., refs), pl. V, fig. 51; Murray, 1971: 16, 118–119 (diag. features etc.), pl. 49, figs 1–7; Schnitker, 1971: pl. 5, fig. 5; Haynes, 1973: 222–223 (diag., descr., detailed distrib., refs), text-fig 24 (nos 18–19); Lankford & Phleger, 1973: 103, 116 *passim* (distrib. patterns & ecol.), pl. 4, fig. 11; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 84, pl. 19, figs 2–3); Boltovksoy & Wright, 1976: 16, 97, 144, 199, 201, 249; Collins, 1974: 33 (Australian records); Colom, 1974: 117, figs 16d-h, k-o; Albani, 1979: 36 (features), fig. 65.3; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Common on shelf and upper shelf, range overlaps with that of *B. aculeata* on upper slope."); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.), fig. 3c; Murray, 1979: 42 (descr.), fig. 12G; Boltovskoy *et al.*, 1980: 20 (descr., etc.), pl. 5, figs 10–12; Hayward & Grace, 1981: 52 (off Cuvier Is); Poag, 1981: 49, pl. 21, fig. 2, pl. 22, figs 2a-b; Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Todd & Low, 1981: 32 (in key), 2 figs; Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments); Larsen, 1982: pl. 13, fig. 1; Verhallen, 1987: 161–180, figs (early develop./palaeoecol. etc.); Loeblich & Tappan, 1987: 521, pl. 571; Collins, 1989: 222–234 (morphol. var.); Burgess & Schnitker, 1990: 37–49 (morphometry).

Bulimina nipponica Asano, 1938

Asano, 1938 [1951]: 600; Brady, 1884: pl. LI, figs 11–13 (as *Bulimina costata* d'Orbigny?); Barker, 1960: 104, pl. 51 (LI), figs 11–13 (identity etc.: "Brady's form would appear to be more closely allied to *B. striata* d'Orbigny"); Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Moderately common everywhere." — referred to Brady, 1884: pl. 5 [error for 51?!], figs

11–13: "Brady's figures are not *B. costata*, which does not have spines".).

Bulimina cf. **patagonica** d'Orbigny, 1839. Vella, 1957.

Vella, 1957: 10 (Cook Strait, as *B.* cf. *patagonica* d'Orbigny, 1839c: 50–51, 78, pl. I, figs 8–9; cf. also Cushman & Kellett, 1929: 7, pl. III, figs 4a-b; Cushman & Wickenden, 1929: 8, pl. III, figs 11a-b; Cushman, 1931: 14, pl. III, fig. 4; Eade, 1967a: 40 (listed); see also Boltovskoy *et al.*, 1980: 20, pl. 5, figs 13–17 and Larsen, 1982: pl. 13, fig. 2.

Bulimina pyrula d'Orbigny, 1846

d'Orbigny, 1846: 184, pl. XI, figs 9–10; Brady, 1884: 399, pl. L, figs 7–10; Cushman, 1911: 78, text-figs 126a-b; Cushman, 1921: 162–163 text-figs 1–2; Cushman, 1922: 101, pl. 20, fig. 1; Barker, 1960: 102 (status of Brady's (1884) identification); Galhano, 1963: 63, pl. VI, fig. 13; Eade, 1967a: 40 (N.Z. refs); Colom, 1974: 117.

Bulimina rostrata Brady, 1884

Brady, 1884: 408, pl. L1, figs 14–15; Heron-Allen & Earland, 1922: 129 (N.Z.); Barker, 1960: 104, pl. 51, figs 14–5; Eade, 1967a: 40; Boltovskoy & Wright, 1976: 337; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Common on mid slope, rare on lower slope.") — "... Similar to *B. truncanella*" — referred to Cushman & Parker, 1947: 65–176, pl. 28, fig. 34); Larsen, 1982: pl. 13, fig. 3; Boltovskoy & Boltovskoy, 1989: 283–316 *passim* (palaeoecol., new syn., incl. [p. 297] *B. alazanensis* Cushman and *B. rostratiforma* McCulloch).

Bulimina squammigera d'Orbigny, 1839

d'Orbigny, 1839b (in Barker-Webb & Berthelot): 137, pl. 1, figs 22–24; Heron-Allen & Earland, 1915: 642, pl. XLVIII, figs 31–35; Heron-Allen & Earland, 1922: 131 (N.Z.); Eade, 1967a: 40.

Bulimina submarginata Parr, 1950

Parr, 1950: 336–337, pl. XII, fig. 13; Eade, 1967a: 40; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6m; Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Bulimina n. sp. Barker, 1960

Barker, 1960: 104, pl. 51 (LI), figs 18–19 (*B. buchiana* d'Orbigny, of Brady, 1884 ("Challenger" Stn 192, Ki Islands, 129 fm) considered to be a new species); Eade, 1967a: 40 [see also entry above under *B. buchiana* d'Orbigny].

Genus **Globobulimina** Cushman, 1927

Globobulimina hoeglundi Uchino, 1967

Uchino, 1967: 399; Höglund, 1947: 244–245, "*Globobulimina* species a" text-figs 243–246; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank and at some stations on upper slope.").

Globobulimina notovata (Chapman, 1941)

Chapman, 1941: 166 (*Bulimina*) [incl. all Recent forms from N.Z. region recorded as *B. ovata* d'Orbigny cf. Cushman, 1921: 164–165 (refs to *B. ovata* d'Orbigny, 1846); Barker, 1960: 102, pl. 50 (L), fig. 13 (Brady's (1884: 400, pl. L, figs 9 & 13) record of *B. ovata* ("Challenger" Stn 168, off East Cape, 1100 fm)) as *B. notovata*, following Chapman, 1941: 166]; Eade, 1967a: 40 (N.Z. refs); Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Common everywhere on slope.").

Globobulimina pacifica Cushman, 1927

Cushman, 1927a: 67, pl. 14, fig. 12; Cushman & Parker, 1947: 134, pl. 29, fig. 37; Cushman, 1955: 267 (type species, generic descr.), pl. 22, fig. 22, key pl. 27, fig. 16; Barker, 1960: 102, pl. L, figs 7–10; Hedley *et al.*, 1965: 23, pl. 7, figs 26a-b (as *G. turgida*); Eade, 1967a: 40 (refs, note on syn.); Gibson, 1967: 27, pl. 7, fig. 115; Thompson, 1975 thesis: 84, pl. 19, fig. 6; Boltovskoy & Wright, 1976: 104; Hayward & Buzas, 1979: 59, pl. 17, figs 216–217; Loeblich & Tappan, 1987: 521, pl. 571.

Globobulimina cf. **pacifica** Cushman, 1927. Lewis, 1979

Lewis, 1979: 32, table 5 (off Southern Hawkes Bay as *G.* cf. *pacifica* Cushman, 1927 *q.v.* — "cf. Brady 1884, pl. 50, fig. 10 [see also Barker, 1960: 102, pl. 50 (L), fig. 10 ("Challenger" Stn 192, off Ki Islands) — "Referred by Brady to *Bulimina pyrula* d'Orbigny and by Galloway & Wissler, 1927: 74, to *Globobulimina pacifica* Cushman. Parr ... 1950 ... also gives this determination. Cushman and Parker ... 1947 refer these figures doubtfully to *G. glabra* Cushman and Parker ... Brady's figures may represent more than one species."]).

Globobulimina turgida (Bailey, 1851)

Bailey, 1851: 12, pls 28–31 (*Bulimina*); Höglund,

1947: 248, text-figs 247–257, 271, pl. 20, fig. 5, pl. 21, figs 4 & 8, pl. 22, fig. 5, pl. 31, fig. 3; Phleger *et al.*, 1958: 34, pl. 6, figs 33–34; Eade, 1967a: 41 (N.Z. refs, note on syn.); Colom, 1974: 118 (descr.); Boltovskoy & Wright, 1976: 310; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Moderately common on outer shelf and upper slope."); Haake, 1980: 12, pl. 2, figs 24–26.

Genus **Praeglobobulimina** Hofker, 1951

Praeglobobulimina pupoides (d'Orbigny, 1846)

d'Orbigny, 1846: 185, pl. 11, figs 11–12 (*Bulimina*); Brady, 1884: 400, pl. L, figs 15a-b; Cushman, 1911: 80, text-figs 132a-b; Cushman, 1921: 161–162 (distrib., etc.), pl. 31, fig. 8; Barker, 1960: 102 (proposed placing in *Protoglobobulimina* following Hofker, 1951); Eade, 1967a: 41 (N.Z. refs, note on syn.); Loeblich & Tappan, 1987: 521, pl. 571.

Praeglobobulimina spinescens (Brady, 1884)

Brady, 1884: 400, pl. L, figs 11–12 (*Bulimina pyrula* d'Orbigny, 1846 var. *spinescens*); Chapman, 1906: 89 (N.Z.); Cushman, 1911: 78, text-figs 128–129; Eade, 1967a: 41; Lewis, 1979: 32, table 5 (off Southern Hawkes Bay: "Moderately common on upper slope" — referred to Loeblich & Tappan, 1964: fig. 144, nos 12–13).

Family BULIMINELLIDAE
Genus **Buliminella** Cushman, 1911

Buliminella elegans (d'Orbigny, 1826)

d'Orbigny, 1826: 270, no. 10, Modèles no. 9 (*Bulimina*); Heron-Allen & Earland, 1922: 127 (N.Z.); Eade, 1967a: 37.

Buliminella elegantissima (d'Orbigny, 1839)

d'Orbigny, 1839c: 52–53, 81, pl. VII, figs 13–14 (*Bulimina*); Brady, 1884: 402, pl. L, figs 20–22; Cushman & Parker, 1947: 67, pl. 17, figs 10–12 (*Buliminella*); Höglund, 1947: 215, text-figs 196–197, pl. 18, fig. 1; Cushman, 1955: 264 (type species,, generic descr.), pl. 22, fig. 3, key pl. 27, fig. 4; Barker, 1960: 104, pl. 50 (L), figs 20–22; Andersen, 1961: pl. 19, fig. 5; Eade, 1967a: 38 (N.Z. refs); Albani, 1968a: 26, fig. 103; Albani, 1968b: 106; Seiglie, 1969: 100, pl. 1, figs 1–28; Murray, 1971: 5, 104–105 (diag. features etc.), pl. 42, figs 1–4; Schnitker, 1971: 169–215, pl. 4, fig. 17; cf. Haynes, 1973: 114–116 (northern form as *B. borealis* n. sp.); Boltovskoy & Wright, 1976: 35, 45, 90, 97, 102, 115–117, 126, 144, 154, 156, 157, 200, 227, 249, 337, 339; Albani, 1979: 35 (features), fig. 63.2; Murray, 1979: 41 (descr.), figs 11K–L; Hayward & Buzas, 1979: 45; Boltovskoy *et al.*, 1980: 21 (descr., etc.), pl. 6, figs 7–10; Hayward, 1981a: 90 (Tutukaka Harbour); Todd & Low, 1981: 31 (in key), 1 fig; Hayward, 1982b: 63 (Hauraki Gulf nearshore sediments); Larsen, 1982: pl. 11, fig. 3; Buzas & Severin, 1982: 31 (refs), pl. 5, fig. 5; Loeblich & Tappan, 1987: 522, pl. 572.

Buliminella cf. **elegantissima** (d'Orbigny, 1839). Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 82 (Foveaux Strait oyster beds, as *B.* cf. *elegantissima* (d'Orbigny, 1839), *q.v.*); Eade, 1967a: 38 (listed).

Buliminella seminuda (Terquem, 1882)

Terquem, 1882: 117, pl. 20, fig. 21 (*Bulimina*); Heron-Allen & Earland, 1922: 129 (N.Z. as *B. elegantissima* var. *seminuda*); Barker, 1960: 104, pl. L, figs 23–24; Eade, 1967a: 38; Thompson, 1975 thesis: 83, pl. 17, fig. 5; Boltovskoy *et al.*, 1980: 21 (descr., etc.), pl. 6, figs 11–15.

Family UVIGERINIDAE
Subfamily UVIGERININAE

Genus Euuvigerina Hofker, 1951

Euuvigerina aculeata (d'Orbigny, 1846)

d'Orbigny, 1846: 191, pl. 11, figs 27–28 (*Uvigerina*); Brady, 1884: 578, pl. LXXV, figs 1–3; Cushman, 1913: 100, pl. 43, fig. 4; Cushman, 1921: 273, pl. 55, fig. 6; Heron-Allen & Earland, 1922: 184; Barker, 1960: 156 (in *Euuvigerina* following Hofker, 1951); Eade, 1967a: 41; Loeblich & Tappan, 1987: 523, pl. 572.

Euuvigerina hollocki (Thalmann, 1950)

Thalmann, 1950b: 45 (*Uvigerina hollocki*, new name for *U. peregrina* var. *bradyana* Cushman, not of Fornasini); Vella, 1957: 10, 14, 34 (as *U. angustiformis*, new name for *U. peregrina* var. *bradyana* of Cushman); Eade, 1967a: 41 (*Euuvigerina*); Boltovskoy & Wright, 1976: 337.

Euuvigerina tenuistriata (Reuss, 1870)

Reuss, 1870: 485 (*Uvigerina*); Brady, 1884: 574, pl. LXXIV, figs 4–7; Cushman, 1913: 95, pl. 42, fig. 4; Cushman, 1921: 269–270, pl. 55, fig. 2; Hornibrook, 1952: 185; Barker, 1960: 154 (status of Brady's (1884) identifications, ref. to *Uvigerina cushmani* Todd, 1948); Eade, 1967a: 41; Kameswara Rao, 1970: 269 (descr., refs. as *Uvigerina*), pl. VI, fig. 60.

Genus **Siphouvigerina** Parr, 1950

Siphouvigerina ampullacea (Brady, 1884)

Brady, 1884: 579, pl. LXXV, figs 10–11 (*Uvigerina asperula* var. *ampullacea*); Cushman, 1913: 102, pl. 42, fig. 3; Cushman, 1921: 274–275, pl. 55, fig. 7; Barker, 1960: 156, pl. 75, figs 10–11 (in *Neouvigerina* following Hofker, 1951); Eade, 1967a: 41 (N.Z. refs as *Neouvigerina*); Albani, 1979: 37 (features, *Siphouvigerina*), fig. 74.1.

Siphouvigerina asperula (Czjzek, 1848)

Czjzek, 1848: 146, pl. 13, figs 14–15(*Uvigerina*); Brady, 1884: 578, pl. LXXV, figs 6–8; Heron-Allen & Earland, 1911: 326 (refs); Cushman, 1913: 101, pl. 43, fig. 1; Cushman, 1921: 274, pl. 54, fig. 5, pl. 55, fig. 8; Barker, 1960: 156, pl. 76, figs 1–3 (in *Euuvigerina* following Hofker, 1951); Eade, 1967a: 41 (N.Z. refs, as *Neouvigerina*); Hayward, 1979b: 185 (*Zostera* pool community, N.Z., as *Uvigerina*); Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Ubiquitous, but common only on Motukura Bank".

Siphouvigerina interrupta (Brady, 1879)

Brady, 1879: 274, pl. VIII, figs 17–18 (*Uvigerina*); Brady, 1884: 580, pl. LXXV, figs 12–14; Cushman, 1913: 103, pl. 44, fig. 1; Barker, 1960: 156, pl. 75, figs 12–14 (in *Neouvigerina* following Hofker, 1951); Cushman, 1919: 620 (*Neouvigerina*); Eade, 1967a: 41 (N.Z. refs as *Neouvigerina*); Thomson, 1975 thesis: 85, pl. 20, fig. 3; Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Abundant on Motukura Bank, common on upper slope."); Adams *et al.*, 1980: 12 (type); Hayward, 1981a: 91 (Tutukaka, in *Siphouvigerina*).

Siphouvigerina vadescens (Cushman, 1933)

Cushman, 1933a: 85, pl. 8, figs 14–15 (*Uvigerina proboscidea* var. *vadescens*); Vella, 1957: 10, 34 (*Uvigerina*); Eade, 1967a: 41 (in *Neouvigerina*); Hayward & Grace, 1981: 54 (off Cuvier Is, in *Siphouvigerina*); Hayward, 1981a: 91 (Tutukaka); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 65 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Genus **Uvigerina** d'Orbigny, 1826

Uvigerina auberiana d'Orbigny, 1839

d'Orbigny, 1839a (in de la Sagra): 106–107, 204, pl. II, figs 23–24; Heron-Allen & Earland, 1922: 184 (N.Z.); Eade, 1967a: 41; Schnitker, 1971: 169–215, pl. 5, fig. 10; Boltovskoy & Wright, 1976: 242; Larsen, 1982: pl. 13, fig. 10.

Uvigerina auberiana var. **glabra** Millett, 1903

Millett, 1903a: 268, pl. 5, figs 8–9; Heron-Allen & Earland, 1922: 185 (N.Z.); Eade, 1967a: 41; Adams *et al.*, 1980: 12 (type).

Uvigerina brunnensis Karrer, 1877

Karrer, 1877: 385, pl. 16b, fig. 49; Brady, 1884: 577, pl. LXXV, figs 4–5; Cushman, 1913: 97, pl. 43, fig. 2; Heron-Allen & Earland, 1922: 184 (N.Z.); Barker, 1960: 156, pl. 75, figs 4–5; Flügel, 1961: 86 (type); Eade, 1967a: 41; Hayward & Buzas, 1979: 55 (Miocene, *Euuvigerina*).

Uvigerina canariensis d'Orbigny, 1839

d'Orbigny, 1839b (in Barker-Webb & Berthelot): 138, pl. I, figs 25–27; Brady, 1884: 573, pl. LXXIV, figs 1–3; Cushman, 1913: 92, pl. 42, fig. 6; Barker, 1960: 154, pl. 74, figs 1–3; Eade, 1967a: 41 (N.Z. refs); Collins, 1974: 33 (Australia), in *Siphouvigerina* Parr, 1950); cf. Hayward & Buzas, 1979: 74 (Miocene, as *Siphouvigerina proboscidea* (Schwager, 1866: 250, pl. 7, fig. 96), refs, cf. Hornibrook, 1961: 65, pl. 8, fig. 143); Larsen, 1982: pl. 13, fig. 11.

Uvigerina cf. **canariensis** d'Orbigny, 1839. Hulme, 1964

Hulme, 1964: 329 (Manukau Harbour, as *U.* cf. *canariensis* d'Orbigny, *q.v.*) (refs); Eade, 1967a: 41 (listed).

Uvigerina peregrina Cushman, 1923

Cushman, 1923: 166, pl. 42, figs 7–10; Brady, 1884: pl. LXXIV, figs 11–12 (as *Uvigerina pygmaea* d'Orbigny); Barker, 1960: 154, pl. 74 (LXXIV) figs 11–12 (identity, status etc.); Hedley *et al.*, 1965: 22; Bandy & Chierici, 1966: 266, fig. 4 (depth/temperature relations); Eade, 1967a: 41 (N.Z. refs, note on syn. as *Euuvigerina*); Murray, 1971: 6, 120–121 (diag. features, etc. in *Uvigerina*), pl. 50, figs 1–7; Bjerkli & Ostmo-Daeter, 1973: 169–178, figs 1–3, pls 1–4; Thompson, 1975 thesis: 85, pl. 19, fig. 7; pl. 20, figs 1–2; Boltovskoy & Wright, 1976: 243, 252, 337, 338; Lewis, 1979: 33, table 5 (off Southern Hawkes Bay, abundance etc.); Hayward, 1979b: 185 (*Zostera* pool community, N.Z., as *Uvigerina*); Hayward & Grace, 1981: 54 (off Cuvier Is); Larsen, 1982: pl. 13, fig. 12; Williams *et al.*, 1988: 153–162 *passim* (isotopes/morphol./environment); Hornibrook *et al.*, 1989: 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence).

Uvigerina pygmaea d'Orbigny, 1826

d'Orbigny, 1826: 269, pl. 12, figs 8–9, Modèles no.

67; Brady, 1884: 575, pl. LXXIV, figs 11–14; Cushman, 1913: 96, pl. 42, fig. 1, pl. 44, fig. 5; Cushman, 1921: 269, pl. 55, fig. 1; Cushman, 1955: 273 (type species, generic descr.), pl. 22, fig. 9, key pl. 28, fig. 9; Barker, 1960: 154, pl. 74, figs 11–14 (status of Brady's (1884) identification); Eade, 1967a: 41 (N.Z. refs); Colom, 1974: 123, fig. 19p; Loeblich & Tappan, 1987: 525, pl. 573; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Uvigerina cf. pygmaea d'Orbigny, 1826

Vella, 1957: 10, 14, 34 (as *U.* cf. *pygmaea* d'Orbigny, *q.v.*); Eade, 1967a: 41 (listed).

Uvigerina sp. Hulme, 1964

Hulme, 1964: 330 (listed from Manukau Harbour as "*Uvigerina* sp. A. costate").

Uvigerina sp. Hulme, 1964

Hulme, 1964: 330 (listed from Manukau Harbour as "*Uvigerina* sp. B. hispid").

Subfamily ANGULOGERININAE
Genus **Angulogerina** Cushman, 1927

Angulogerina vitrea Saidova, 1975

Saidova, 1975: 299, pl. LXXXIII, fig. 9 ("Ob" Stn 354, 266 m); Cushman, 1955: 275 (generic descr.).

Genus **Trifarina** Cushman, 1923

Trifarina angulosa (Williamson, 1858)

Williamson, 1858: 67, pl. V, fig. 140 (*Uvigerina*); Brady, 1884: 576, pl. LXXIV, figs 15–18; Cushman, 1913: 98, pl. 44, fig. 4; Eade, 1967a: 41 (N.Z. refs); Murray, 1971: 7, 122–123 (diag. features etc.), pl. 51, figs 1–6; Schnitker, 1971: 169–215, pl. 5, fig. 13; Haynes, 1973: 127 (diag., descr., remarks, refs), pl. 10, figs 12–13, 16–17, pl. 11, fig. 11; Lankford & Phleger, 1974: 101–132 *passim* (distrib. patterns & ecol.), pl. 3, figs 29–30; Colom, 1974: 123, figs 19q-t; Collins, 1974: 33 (Australia); Boltovksoy & Wright, 1976: 53, 252; Murray, 1979: 42 (descr.), figs 12 H–I; Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Abundant on Motukura Bank, common on slope, rare on shelf."); Adams *et al.*, 1980: 12 (type); Larsen, 1982: pl. 13, fig. 14.

Trifarina bradyi Cushman, 1923

Cushman, 1923: 99 (for *Rhabdogonium tricarinatum* (d'Orbigny) of Brady, 1884, 525, pl. LXVII, figs 1–3, not *Vaginulina tricarinata* d'Orbigny, pl. 22, figs 3a-b, 4a-b, 5–8, 9a-b); Cushman, 1921 [1923]: 99, pl. XXII, figs 3–9 (*Trifarina*); Chapman & Parr, 1937: 98; Cushman, 1942: 59, pl. 15, fig. 13; Parr, 1950: 342; Hofker, 1951: 196 (Brady's figures ref. to *Angulogerina (Trifarina) tricarinata* (d'Orbigny)); Cushman, 1955: 275 (type species, generic descr.), pl. 22, fig. 15, key pl. 28, fig. 15; Kennett, 1966: 44, pl. 3, figs 49–50 (Kapitean Stage, Upper Miocene, remarks etc.); Eade, 1967a: 42 (N.Z. refs, note on syn.); Murray, 1971: 6, 124–125 (diag. features etc.), pl. 52, figs 1–6; Schnitker, 1971: 169–215, pl. 5, fig. 14; Colom, 1974: 123, figs 19u-v; Collins, 1974: 33–34 (Australia); Albani, 1978: 383 (descr., etc.), figs 8K–L; Albani, 1979: 37 (features), fig. 71.1; Hayward, 1979c: 216 (early Miocene); Hayward & Buzas, 1979: 76, pl. 28, fig. 344; Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: Common on Motukura Bank, rare elsewhere.") — referred to Brady, 1884: (as *Rhabdogonium tricarinatum* (d'Orbigny), pl. LXVII, figs 1–3 (see also Barker, 1960: 140, pl. 67, figs 1–3 (identity etc.)); Loeblich & Tappan, 1987: 521, pl. 574.

Trifarina carinata (Cushman, 1927)

Cushman, 1927b: 159, pl. 4, fig. 3 (*Angulogerina*); Hornibrook, 1952: 185; Barker, 1960: 155, pl. LXXIV, fig. 18; Eade, 1967a: 42; Gordon & Ballantine, 1977: 97 (listed from Leigh region after Thompson, 1975 thesis: 85–86, pl. 20, figs 5–6); Hayward, 1981a: 92 (Tutukaka Harbour); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1982b: 65 (off Little Barrier Is); Whittaker, 1988: 78 (new synonymy); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Trifarina carinata var. **bradyana** (Cushman, 1932)

Cushman, 1932b: 45, pl. 6, figs 9–10 (*Angulogerina*); Vella, 1957: 10; Eade, 1967a: 42; Hayward, 1979b: 185 (*Zostera* pool community, N.Z., as *T. bradyana*).

Trifarina gracilis (Vella, 1957)

Vella, 1957: 10, 14, 34, pl. 8, fig. 167 (*Angulogerina*); Eade, 1967a: 42 (listed); Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Rare, on outer shelf."); Hayward, 1981b: 134 (Bay of Islands); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Trifarina n. sp. Hayward, 1982

Hayward, 1982b: 65 (off Little Barrier Is).

Trifarina sp. Hayward, 1981

Hayward, 1981a: 92 (Tutukaka Harbour).

Trifarina sp. Hayward, 1981
Hayward, 1981b: 134 (Bay of Islands).

Trifarina sp. Hayward & Grace, 1981
Hayward & Grace, 1981: 47, 54 (off Cuvier Is).

Family REUSSELLIDAE
Genus **Reussella** Galloway, 1933

Reussella spinulosa (Reuss, 1850)
Reuss, 1850: 374, pl. 47, fig. 12 (*Verneuilina*); Brady, 1884: 384, pl. XLVII, figs 1–3; Cushman, 1911: 55, text-figs 88a-b; Cushman, 1921: 141, pl. 27, fig. 5; Cushman, 1945: 33, pl. 6, figs 8–9 (*Reussella*); Cushman, 1955: 271 (type species, generic descr.), pl. 22, fig. 17, key pl. 28, fig. 4; Barker, 1960: 96, pl. 47, figs 1–3 (status of Brady's (1884) identification); Eade, 1967a: 41; Albani, 1968a: 27, figs 110–111; Albani, 1979: 36 (features), fig. 67.1; Hayward & Buzas, 1979: 73, pl. 27, fig. 330; Larsen, 1982: pl. 13, fig. 9; Loeblich & Tappan, 1987: 527, pl. 575.

Superfamily FURSENKOINACEA
Family FURSENKOINIDAE

Genus **Fursenkoina** Loeblich & Tappan, 1961

Fursenkoina bradyi (Cushman, 1922)
Cushman, 1922b: 115, pl. 24, fig. 1 (*Virgulina*); Cushman, 1919: 606 (N.Z.); Eade, 1967a: 51; Thompson, 1975 thesis: 93, pl. 28, figs 3 & 7.

Fursenkoina davisi (Chapman & Parr, 1937)
Chapman & Parr, 1937: 88, pl. 8, fig. 15 (*Virgulina*); Hulme, 1964: 329; Eade, 1967a: 51.

Fursenkoina fusiformis (Williamson, 1858)
Williamson, 1858: 63, pl. V, figs 129–130 (*Bulimina pupoides* var. *fusiformis*); Heron-Allen & Earland, 1922: 127 (N.Z.); Höglund, 1947: 232, text-figs 219–233, pl. 20, fig. 3; Eade, 1967a: 51; Murray, 1968b: 435–455; Murray, 1971: 6, 7, 184–185 (diag. features etc.), pl. 77, figs 1–5; Schnitker, 1971: 169–215, pl. 10, fig. 1; Murray, 1979: 41 (descr.), figs 12A–C; Haake, 1980: 14–15, pl. 3, figs 13–14; Todd & Low, 1981: 30 (in key), 2 figs; Buzas & Severin, 1982: 40 (refs), pl. 10, fig. 1.

Fursenkoina pauciloculata (Brady, 1884)
Brady, 1884: 414, pl. LII, figs 4–5 (*Virgulina*); Cushman, 1921: 168–169 (note on distrib.); Heron-Allen & Earland, 1922: 132 (N.Z.); Barker, 1960: 106, pl. 52, figs 4–5; Eade, 1967a: 51.

Fursenkoina rotundata (Parr, 1950)
Parr, 1950: 337, pl. 12, fig. 14 (*Virgulina*); Kustanowich, 1965: 52; Eade, 1967a: 51; Lewis, 1979: 36, table 5 (off Southern Hawkes Bay: "Common on upper and mid slope." — ref. to Brady, 1884: pl. LII, figs 10–11, as *Virgulina subsquamosa* Egger, see also Barker, 1960: 106, pl. 52, figs 10–11, identity etc. as *Virgulina*).

Fursenkoina schreibersiana (Czjzek, 1848)
Czjzek, 1848: 147, pl. XIII, figs 18–21 (*Virgulina*); Brady, 1884: 414, pl. LII, figs 1–3; Cushman, 1911: 94, text-figs 148a-b; Heron-Allen & Earland, 1922: 131 (N.Z.); Cushman, 1937: 13, pl. 2, figs 11–20; Parr, 1945: 205; Barker, 1960: 106, pl. 52, figs 1 & 3 (Brady's determinations ref. to *Virgulina davisi* Chapman & Parr, 1937), fig. 2 (ref. to *Cassidella pacifica* Hofker, 1951?); Hornibrook, 1961: 64, pl. 8, fig. 138; Eade, 1967a: 51 (*Fursenkoina*); Murray, 1971: 18, 45 (diag. features etc.), pl. 77, figs 6–10; Collins, 1974: 50 (remarks); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands).

Fursenkoina spinosa (Heron-Allen & Earland, 1932)
Heron-Allen & Earland, 1932: 352, pl. 9, figs 3–4 (*Virgulina schreibersiana* var. *spinosa*); Kustanowich, 1965: 52; Eade, 1967a: 51.

Fursenkoina squammosa (d'Orbigny, 1826)
d'Orbigny, 1826: 267, No. 1 (*Virgulina*); Sherborn, 1955 [1893/96]: 476 (refs); Lewis, 1979: 36, table 5 (off Southern Hawkes Bay : "Common on upper slope" — ref. to Loeblich & Tappan, 1964: fig. 60V, nos 1–4).

Fursenkoina subdepressa (Brady, 1884)
Brady, 1884: 416, pl. LII, figs 14–17 (*Virgulina*); Cushman, 1911: 93, text-fig. 147; Cushman, 1921: 170 (refs); Heron-Allen & Earland 1922: 131; Barker, 1960: 106, pl. 52, figs 14–17 (*Virgulina*); Eade, 1967a: 51.

Fursenkoina subsquamosa Egger, 1857
Egger, 1857: 295, pl. 12, figs 19–21 (*Virgulina*); Chapman, 1906: 89; Heron-Allen & Earland, 1922: 131 (N.Z.); Eade, 1967a: 52.

Genus **Sigmavirgulina** Loeblich & Tappan, 1957

Sigmavirgulina tortuosa (Brady, 1881)
Brady, 1881: 57 (*Bolivina*); Brady, 1884: 420, pl.

LII, figs 31–32 (not 33–34 *fide* Cushman 1936, see also Barker, 1960: 108); Cushman, 1937: 133–135 (descr., distrib., refs & syn.), pl. 17, figs 11–19; Barker, 1960: 108, pl. 52, figs 31–32 (in *Sigmarvirgulina* following Loeblich & Tappan, 1957, discuss. etc.); Hayward, 1980: 186–187 (first N.Z. records); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 61, 65 (off Little Barrier Is); Tappan & Loeblich, 1982: 527–552, pl. 53, fig. 2; Hayward, 1990: 98 (negative record from Bay of Plenty of subtropical form near southerly limit).

Superfamily PLEUROSTOMELLACEA
Family PLEUROSTOMELLIDAE
Subfamily PLEUROSTOMELLINAE

Genus **Pleurostomella** Reuss, 1860

Pleurostomella costata Saidova, 1975

Saidova, 1975: 317–318, pl. CXIII, fig. 4 (distrib., incl. New Zealand); Cushman, 1955: 277 (generic descr.).

Superfamily STILOSTOMELLACEA
Family STILOSTOMELLIDAE

Genus **Orthomorphina** Stainforth, 1952

Orthomorphina challengeriana (Thalmann, 1937).

Thalmann, 1937: 341 (*Nodogenerina*); Brady, 1884: pl. LXIV, figs 25–27 (as *Nodosaria pervesa* Schwager); Hulme, 1964: 326 (*Orthomorphina*); Eade, 1967a: 32; Hayward & Buzas, 1979: 69 (Miocene); Hayward, 1979c: 216 (Miocene).

Orthomorphina georgiana (Cushman, 1935)

Cushman, 1935: 80, pl. XII, fig. 16 (*Nodogenerina*); Lewis, 1973 : 28, table 5 (off Southern Hawkes Bay: "Rare, on shelf and upper slope.").

Genus **Stilostomella** Guppy, 1894

Stilostomella adolphina (d'Orbigny, 1846)

d'Orbigny, 1846: 51, pl. II, figs 18–20 (*Dentalina*); Heron-Allen & Earland, 1922: 172 (N.Z., as *Nodosaria*, refs); Eade, 1967a: 40; Larsen, 1982: pl. 12, fig. 11.

Stilostomella consobrina (d'Orbigny, 1846)

d'Orbigny, 1846: 46, pl. II, figs 1–3 (*Dentalina*); Brady, 1884: 501, pl. LXII, figs 23–24; Barker, 1960: 130, pl. 62, figs 23–24 (*Stilostomella*); Eade, 1967a: 40 (N.Z. refs).

Stilostomella pauperata (d'Orbigny, 1846)

d'Orbigny, 1846: 46, pl. I, figs 57–58 (*Dentalina*); Cushman, 1913: 51, pl. XXV, fig. 7 (*Nodosaria*); Eade, 1967a: 40 (N.Z. refs).

Superfamily ANNULOPATELLINACEA
Family ANNULOPATELLINIDAE

Genus **Annulopatellina** Parr & Collins, 1930

Annulopatellina annularis (Parker & Jones, 1860)

Parker & Jones, 1860: 30–31 (*Orbitolina*); Parker & Jones, 1865: 438 (*Patellina*); Heron-Allen & Earland, 1922: 198 (N.Z. record as *Patellina corrugata* var. *annularis*, refs); Parr & Collins, 1930: 93, pl. IV, figs 8–10 (*Annulopatellina*); Parr, 1950: 352; Cushman, 1955: 285–286 (type species, generic descr.), key pl. 29, fig. 15; Eade, 1967a: 51; Collins, 1974: 50 (Australia); Adams *et al.*, 1980: 9 (type); Loeblich & Tappan, 1987: 540, pl. 437.

Superfamily DISCORBACEA
Family PLACENTULINIDAE
Subfamily ASHBROOKIINAE

Genus **Patellinella** Cushman, 1928

Patellinella inconspicua (Brady, 1884)

Brady, 1884: 357–358, pl. XLI, figs 6a-c (*Textularia*); Cushman, 1928: 5, pl. I, figs 8a-c (*Patellina*); Parr & Collins, 1930: 92, pl. IV, fig. 7; Parr, 1950: 353; Cush-man, 1955: 285 (type species, generic descr.), key pl. 29, fig. 14; Barker, 1960: 86, pl. 42, fig. 6 (as *Patellinella*, refs to generic placing etc.); Hulme, 1964: 332 (Manukau Harbour, ref.); Kennett, 1966a: 55–56 (N.Z. Upper Miocene occurrence, refs etc.), pl. 6, figs 97–98; Eade, 1967a: 43 (N.Z. refs); Albani, 1968a: 28, fig. 109; Hornibrook, 1968: 74, fig. 14; Albani, 1968b: 109 (range etc.), pl. 8, figs 22–23; Gregory, 1973: table 2 (N.Z. marine marsh ecol.); Collins, 1974: 36 (Australia, note on tropical records etc.); Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 86, pl. 20, fig. 8); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Bay); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 5Q; Hayward, 1982b: 64 (off Little Barrier Is); Loeblich & Tappan, 1987:

544, pl. 589; Hornibrook *et al.*, 1989: 97, 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence), fig. 22:27; Hayward, 1990: 96 (in near-shore sediments, Bay of Plenty).

Family BAGGINIDAE
Subfamily BAGGININAE

Genus **Cancris** Montfort, 1808

Cancris auriculus (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 110, pl. XX, figs a-f (*Nautilus auricula* var. *a*); Brady, 1884: 688, pl. CVI, figs 5a-c; Cushman, 1915: 53, pl. 22, fig. 1; Cushman, 1921: 329, pl. 69, figs 3a-c; Cushman, 1931: 72, pl. 15, fig. 1 (*Cancris*); Cushman & Todd, 1942: 74, pl. XVIII, figs 1–11, pl. XXIII, fig. 6; Parr, 1950: 362; Cushman, 1955: 297–298 (type species, generic descr.), pl. 24, fig. 14, key pl. 31, fig. 8; Galhano, 1963: 81–82 (refs etc.), pl. VIII, fig. 11; Todd, 1965: 22, pl. 5, fig. 5; Eade, 1967a: 44 (N.Z. refs, note on syn.); Murray, 1971: 6, 7, 136–137 (diag. features etc.), pl. 57, figs 1–7; Colom, 1974: 137, figs 22a-c (*C. auricula*); Collins, 1974: 38; Albani, 1979: 38 (features), fig. 78.1; Haake, 1980: 13, pl. 3, fig. 2; Larsen, 1982: pl. 16, figs 1–2; Hamsa & Gandhi, 1983: 166 (diag., refs), fig. 1 m; Loeblich & Tappan, 1987: 545, pl. 591.

Cancris aff. auriculus (Fichtel & Moll, 1798). Vella, 1957

Vella, 1957: 11, 14 (as *C.* cf. *auriculus* (Fichtel & Moll, 1798), *q.v.*); Eade, 1967a: 44 (listed).

Cancris hauerii (d'Orbigny, 1846)

d'Orbigny, 1846: 151, pl. 7, figs 22–24 (*Rotalina*); Heron-Allen & Earland, 1922: 214 (*Pulvinulina*); Eade, 1967a: 44.

Cancris maoricus Finlay, 1940

Finlay, 1940: 464 (descr. from off Chicken Is, Hauraki Gulf, 42 fm), pl. 64, figs 102–104; Eade, 1967a: 44 (listed); Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank only.").

Cancris oblongus (Williamson, 1858)

Williamson, 1858: 51, pl. 4, figs 98–100 (*Rotalina*); Brady, 1884: 688, pl. CVI, figs 4a-c (*Pulvinulina*); Cushman, 1919: 630 (*Pulvinulina*); Phleger & Parker, 1951: 1–64, pl. 9, figs 17–19 (*Cancris*); Eade, 1967a: 44 (N.Z. refs); Haynes, 1973: 145–147 (diag., descr., distrib., refs), text-fig. 27 (nos 1–3), pl. 20, fig. 13, pl. 23, figs 5–6; Thompson, 1975 thesis: 87, pl. 22, fig. 3.

Genus **Rugidia** Heron-Allen & Earland, 1928

Rugidia simplex Collins, 1974

Collins, 1974: 38, pl. 2, figs 27a-c; Cushman, 1955: 300 (generic descr.); Hayward & Grace, 1981: 48, 59 (first N.Z. records, off Cuvier Is; "... commonly encountered in shallow sediments around northern New Zealand."), 54, fig. 5g; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1982b: 61, 65 (off Little Barrier Is).

Genus **Valvulineria** Cushman, 1926

Valvulineria laevigata Phleger & Parker, 1951

Phleger & Parker, 1951: 25, pl. 31, figs 11–12; Cushman, 1931: 44, pl. 10, figs 1–2 (as *Eponides exigua* (Brady); Parker, 1948: 240, pl. 4, figs 13a-b (as *V.* sp. *fide* Ellis & Messina, 1951 suppl. no. 3); Cushman, 1955: 289 (generic descr.); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Haake, 1980: 13, pl. 3, fig. 3.

Valvulineria aff. laevigata Phleger & Parker, 1951 Lewis, 1979

Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Test more flaring and apertural flaps larger than *V. laevigata* "... "Common on upper and mid slope, rare on lower slope.").

Valvulineria sadonica Asano, 1951

Asano, 1951: 8, text-figs 55–57; Hulme, 1964: 334 (Manukau Harbour); Eade, 1967a: 44 (listed).

Valvulineria saulcii (d'Orbigny, 1839)

d'Orbigny, 1839c: 42, 78, pl. II, figs 9–11 (*Rosalina saulcyi*); Heron-Allen & Earland, 1922: 202 (N.Z., as *Discorbina*, refs); Eade, 1967a: 44.

Family EPONIDIDAE
Subfamily EPONIDINAE

Genus **Eponides** Montfort, 1808

Eponides berthelotianus (d'Orbigny, 1839)

d'Orbigny, 1839b (in Barker-Webb & Berthelot): 130, pl. 1, figs 31–33 (*Rotalina*); Brady, 1884: 701, pl. CVI, figs 1a-e (*Pulvinulina*); Heron-Allen & Earland, 1922: 218 (N.Z., as *Pulvinulina*); Barker, 1960: 218, pl. 106, fig. (in *Eponides* following Thalmann, 1932); Eade, 1967a: 49; Chave, 1987: 64, pl. 10, fig. 3.

Eponides bradyi Earland, 1934

Earland, 1934: 187, pl. 8, figs 36–38 (new name for Recent forms referred to the fossil species *Truncatulina pygmaea* (Hantken, 1875); Eade, 1967a: 49 (N.Z. refs); Loeblich & Tappan, 1987: 603 (lectotype etc.); Boltovskoy, 1988: 380 (size changes/taxon.); Boltovskoy & Boltovskoy, 1989: 283–316 *passim*.

Eponides patagonica (d'Orbigny, 1839)

d'Orbigny, 1839c: 36, 78, pl. II, figs 6–8 (*Rotalina*); Heron-Allen & Earland, 1922: 215 (N.Z. in *Pulvinulina*); Eade, 1967a: 50.

Eponides cf. **patagonica** (d'Orbigny, 1839). Cushman, 1919

Cushman, 1919: 630 (as *Pulvinulina* cf. *patagonica* (d'Orbigny)); Eade, 1967a: 50 (listed under *Eponides*, *q.v.*).

Eponides punctulatus (d'Orbigny, 1826)

d'Orbigny, 1826: 273, no. 25, Modèles, no. 12 (*Rotalia*); Heron-Allen & Earland, 1922: 214 (N.Z., as *Pulvinulina*, refs); Eade, 1967a: 50.

Eponides pusillus Parr, 1950

Parr, 1950: 360, pl. XIV, figs 16a-c; Lewis, 1979: 35, table 5 (off Southern Hawke's Bay: "Rare on shelf, very common on slope, abundant on Motukura Bank").

Eponides repandus (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 35, pl. III, figs a-d (*Nautilus*); Brady, 1884: 684, pl. CIV, figs 18a-c (*Pulvinulina*); Heron-Allen & Earland, 1911: 340 (refs); Cushman, 1915: 50, pl. 24, fig. 3; Cushman, 1921: 326 (refs); Cushman, 1924: 42, pl. XIII, figs 9–10; Chapman, 1926: 84, pl. 17, fig. 1 (*Pulvinulina*); Cush-man, 1955: 291 (type species, generic descr.), pl. 24, fig. 9, key pl. 30, fig. 6; cf. Barker, 1960: 214; Hornibrook, 1961: 109, pl. 15, fig. 324 (*Eponides*); McKenzie, 1962: 125 (Australian range, refs); Todd, 1965: 20–21 (detailed refs & syn.), pl. 7, figs 3–4; Eade, 1967a: 50 (N.Z. refs); Murray, 1971: 6, 7, 172–173 (diag. features etc.), pl. 72, figs 1-4; Schnitker, 1971: 9, fig. 2; Colom, 1974: 145–146 (discuss.), figs 28a-g; Boltovskoy & Wright, 1976: 104, 214, 242, 250; Hayward & Buzas, 1979: 55 (Miocene); Hayward, 1981b: 132 (Bay of Islands); Larsen, 1982: pl. 20, figs 8–9; Buzas & Severin, 1982: 39 (refs), pl. 9, figs 1–2; Galhano, 1963: 76 (refs etc.), pl. VII, fig. 19; Chave, 1987: 64 (refs & syn.), pl. 10, fig. 4; Loeblich & Tappan, 1987: 549, 552, pl. 594; Hansen & Rögl, 1988c: 118–119 (proposed replacement of neotype of *Nautilus repandus* Fichtel & Moll, 1789: 35, pl. III, figs a-d, type species of *Eponides* de Montfort, 1808, rediscovery of holotype etc.); ICZN, 1990: 62 (neotype replaced by rediscovered holotype).

Eponides repandus (Fichtel & Moll, 1798) var. **concamerata** (Montagu, 1808)

Montagu, 1808: 160 (*Serpula*); Williamson, 1858: 52, pl. IV, figs 102–103 (*Rotalina concamerata* "mature"); Brady, 1884: 684, pl. CIV, figs 19a-c (*Pulvinulina*); Cushman, 1915: 52, pl. 25, fig. 1; Barker, 1960: 214; Galhano, 1963: 76–77 (refs etc.), pl. VII, figs 20–21; Eade, 1967a: 50 (N.Z. refs); Hayward & Grace, 1981: 53 (off Cuvier Is).

Eponides tumidulus (Brady, 1884)

Brady, 1884: 666, pl. XCV, figs 8a-d (*Truncatulina*); Heron-Allen & Earland, 1922: 211 (N.Z.); Parker, 1954: 529, pl. 9, figs 19 & 24 (*Eponides*); Todd, 1965: 21 (refs), pl. 7, fig. 1; Eade, 1967a: 50; Boltovskoy & Wright, 1976: 242; Lewis, 1979: 36, table 5 (off Southern Hawkes Bay: "Rare on upper and mid slope."); Poag, 1981: 64–65, pl. 1, fig. 2, pl. 2, figs 2a-b.

Family MISSISSIPPINIDAE
Subfamily MISSISSIPPININAE

Genus **Mississippina** Howe, 1930

Mississippina concentrica (Parker & Jones, 1864)

Parker & Jones MS*in* Brady, 1864: 470, pl. XLVIII, fig. 14 (*Pulvinulina*); Brady, 1884: 686, pl. CV, figs 1a-b; Cushman, 1915: 51, pl. 28, fig. 4; Cushman, 1921: 327, pl. 68, figs 4a-c; Andersen, 1961: 105–106 (discuss., refs etc. as *Stomatorbina*), pl. 24, figs 3a-c; Todd, 1965: 24–25 (detailed refs & syn. as *Stomatorbina*), pl. 16, figs 1–2; Parr, 1950: 360 (in *Stomatorbina* Dorreen, 1948); Cushman, 1955: 296 (generic descr.); Eade, 1967a: 55 (N.Z. refs); Hornibrook, 1968: 56 (descr., range); Collins, 1974: 56 (records from Victoria in *Stomatorbina*); Thompson, 1975 thesis: 96–97; Hayward & Grace, 1981: 153 (off Cuvier ls); Larsen, 1982: pl. 26, figs 5–6; Hornibrook *et al.*, 1989: 113 (table 2(1), first appearance, N.Z.), 119 (table 3(1), last occurrence, N.Z.); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Mississippina cf. **pacifica** Parr, 1950. Hulme, 1964

Hulme, 1964: 334 (Manukau Harbour, as *M.* cf. *pacifica* Parr, 1950: 361, pl. XIV, figs 17a-c (BANZARE Stns 113, 115, off Tasmania) — see also Collins, 1974: 56); Eade, 1967a: 55 (listed).

Family DISCORBIDAE
Genus **Discorbis** Lamarck, 1804

Discorbis baccata (Heron-Allen & Earland, 1913)

Heron-Allen & Earland, 1913: 124, pl. 12, figs 1–3 (*Discorbina*); Heron-Allen & Earland, 1922: 200 (N.Z.); Cushman, 1955: 286 (generic descr.); Eade, 1967a: 42; Adams *et al.*, 1980: 5 (type).

Discorbis dimidiatus (Jones & Parker, 1862)

Jones & Parker *in* Carpenter *et al.*, 1862: 201, text-fig. 32b (*Discorbina*); Parker & Jones, 1865: 385, 422, 438 (*Discorbina*), pl. XIX, fig. 9; Parr, 1932b: 227, pl. XXI, figs 27a-c, 29a-c (as *Discorbis vesicularis* (Lamarck) var. *dimidiata*); Parr, 1950: 353; Vella, 1957: 10, 14, 35, pl. 8, fig. 166, 172–174; cf. Barker, 1960: 180 (as *Discorbis* n.sp.), pl. LXXXVII, fig. 2; McKenzie, 1962: 125 (Australian range, refs); cf. Kennett, 1966a: 56, pl. 6, figs 99–101 (Upper Miocene); Eade, 1967a: 42 (N.Z. refs); Albani, 1968a: 29, fig. 125; Albani, 1968b: 108, pl. 8, figs 18, 24; Hicks, 1971: 48, 54 (ecol. at Island Bay); Gordon, 1972: 510–511 (fig. 3G) (as member of epifauna on the bryozoan *Crassimarginatella papulifera*, Goat Is Bay, Leigh); Topping, 1973 thesis: 27, pl. 8, figs 4–5 (Puhoi Bay, Auckland); Gregory, 1973: 194, 195, 197 (N.Z. mangrove swamp ecol.), fig. 2.6, table 2; Collins, 1974: 34 (Australia, remarks); Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 86); Albani, 1979: 40 (features, as *Lamellodiscorbis*), fig. 84.1; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Common on inner shelf"); Adams *et al.*, 1980: 5 (type); Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 &c. (Bay of Islands); fig. 3f; Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), figs 5f-g; Hayward, 1982b: 56, 61, 64, fig. 3b (dominant in Hauraki Gulf nearshore sediments); Loeblich & Tappan, 1987: 559; Hornibrook *et al.*, 1989: 91, 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence), fig. 23:24a, b; Hayward, 1990: 93 (dominant species in nearshore sediments, Bay of Plenty), 95, 97, figs 2 (% occurrence), 3a.

Discorbis (?) polyrraphes (Reuss, 1846)

Reuss, 1846: 35, pl. 12, fig. 18 (*Rotalina*); Heron-Allen & Earland, 1922: 201 (*Discorbina*, N.Z.); Eade, 1967a: 42.

Discorbis rosacea (d'Orbigny, 1826)

d'Orbigny, 1826: 273, no. 15, Modèles No. 39 (*Rotalia*); Flint, 1899: 327, pl. LXXII, fig. 3 (*Discorbina*); Heron-Allen & Earland, 1913: 124, pl. XI, figs 7–9; cf. Barker, 1960: 180, pl. 87, fig. 1; Eade, 1967a: 42 (N.Z. refs); Kameswara Rao, 1970: 271 (descr., distrib., refs), pl. VI, fig. 64.

Discorbis cf. subcomplanatus Parr, 1950. Hulme, 1964

Hulme, 1964: 333 (Manukau Harbour, as *D.* cf. *subcomplanatus* Parr, 1950: 355, pl. XIV, figs 1a-c, 2, from BANZARE Stn 41, Antarctic); Eade, 1967a: 42 (listed).

Discorbis turbo (d'Orbigny, 1826)

d'Orbigny, 1826: 274, no. 39 (*Rotalia*); Carpenter *et al.*, 1862: 204, app. p. 311; cf. Barker, 1960: 180, pl. 87, fig. 8; Eade, 1967a: 42 (N.Z. refs).

Genus **Neoeponides** Reiss, 1960

Neoeponides procerus (Brady, 1881)

Brady, 1881: 66 (*Pulvinulina*); Brady, 1884: 698, pl. CV, figs 7a-c; Cushman, 1915: 62, pl. 24, fig. 2; Barker, 1960: 216; Eade, 1967a: 50 (N.Z. refs).

Neoeponides schreibersii (d'Orbigny, 1846)

d'Orbigny, 1846: 154, pl. 8, figs 4–6 (*Rotalina*); Brady, 1884: 697, pl. CXV, figs 1a-c (*Pulvinulina*); Cushman, 1915: 62, text-fig. 59; Eade, 1967a: 50 (N.Z. refs).

Family ROSALINIDAE
Genus **Gavelinopsis** Hofker, 1951

Gavelinopsis hamatus Vella, 1957

Vella, 1957: 10, 13, 35–36, pl. 9, figs 177–180; Hulme, 1964: 334 (Manukau Harbour); Eade, 1967a: 42; Lewis, 1979: 34, table 5 (off Southern Hawkes Bay, abundance); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6t; Hayward, 1982b: 56, 64 (Hauraki Gulf nearshore sediments).

Gavelinopsis isabelleana (d'Orbigny, 1839)

d'Orbigny, 1839c: 43, 81, pl. VI, figs 10–12 (*Rosalina*); Brady, 1884: 646, pl. LXXXVIII, fig. 1 (*Discorbina*); Heron-Allen & Earland, 1922: 199 (N.Z., as *Discorbina*); Eade, 1967a: 42; Boltovskoy *et al.*, 1980: 27 (descr., etc., as *Discorbis*), pl. 11, figs 8–12.

Gavelinopsis cf. isabelleana (d'Orbigny, 1839). Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 82 (as *G.* cf. *isabelleana* (d'Orbigny, 1839), *q.v.*); Eade, 1967a: 42 (listed).

Gavelinopsis lobatulus (Parr, 1950)

Parr, 1950: 354, pl. XIII, figs 23–25 (*Discorbis*) (incl. *D. isabelleana* of Brady, 1884, not of d'Orbigny, 1839); Eade, 1967a: 42 (refs, note on syn.); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Common on upper slope and mid slope, abundant on banks."); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Gavelinopsis cf. **lobatulus** (Parr, 1950). Kustanowich, 1965

Kustanowich, 1965: 53 (as *G.* cf. *lobatulus* (Parr, 1950), *q.v.*); cf. Kennett, 1966: 57, pl. 6, figs 102–105 (Upper Miocene in N.Z., remarks, refs etc.); Eade, 1967a: 42 (listed).

Gavelinopsis praegeri (Heron-Allen & Earland, 1913)

Heron-Allen & Earland, 1913a: 122, pl. 10, figs 8–10 (*Discorbina*); Heron-Allen & Earland, 1922: 199 (N.Z. refs); Eade, 1967a: 43; Murray, 1971: 4, 6, 7, 132–133 (diag. features etc.), pl. 55, figs 1–5; Murray, 1979: 58 (descr.), figs 19A–C; Adams *et al.*, 1980: 5 (type); Todd & Low, 1981: 39 (in key), 3 figs; Larsen, 1982: pl. 14, figs 10–11; Loeblich & Tappan, 1987: 560, pl. 608.

Gavelinopsis cf. **umbonifer** (Parr, 1950). Vella, 1957

Vella, 1957: 10, 36 (as *G.* cf. *umbonifer* (Parr, 1950: 353, pl. XIII, figs 22a-b (*Discorbis*) from BANZARE Stn 115, off Tasmania)); Eade, 1967a: 43 (listed).

Genus **Neoconorbina** Hofker, 1951

Neoconorbina harmeri (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 204–205, pl. VII, figs 12–16 (*Discorbina*); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 61, 64 (Hauraki Gulf nearshore sediments); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty), 98 (southern limit).

Neoconorbina pacifica Hofker, 1951

Hofker, 1951: 438, figs 302–303; Hayward & Grace, 1981: 48, 50 (first N.Z. records, off Cuvier Is; "... very common in shallow sediments around northern New Zealand ..."), 53, fig. 5f; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), figs 6g-h; Hayward, 1982b: 61, 64 (Hauraki Gulf nearshore); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty), 98 (southern limit).

Neoconorbina terquemi (Rzehak, 1888)

Rzehak, 1888: 228 (*Discorbina terquemi*, new name for *Rosalina orbicularis* Terquem, 1876: 166, pl. 9, figs 4a-b, not of d'Orbigny, 1850); Barker, 1960: 182, pl. 88, figs4–8 (*Neoconorbina*); Andersen, 1961: pl. 2, figs 5a-b; Eade, 1967a: 43 (N.Z. refs); Schnitker, 1971: pl. 5, fig. 16; Collins, 1974: 35–36 (remarks, refs etc.), pl. 2, figs 25a-c; Loeblich & Tappan, 1987: 560, pl. 609.

Neoconorbina n.sp. Hayward, 1982

Hayward, 1982b: 56, 61, 64, fig. 3h (off Little Barrier Is).

Neoconorbina sp. Hayward & Grace, 1981

Hayward & Grace, 1981: 53 (off Cuvier Is).

Neoconorbina sp. Hayward, 1981

Hayward, 1981a: 91 (Tutukaka Harbour).

Neoconorbina sp. Hayward, 1981

Hayward, 1981b: 133 (Bay of Islands).

Genus **Planodiscorbis** Bermudez, 1952

Planodiscorbis baconica (Hantken, 1876)

Hantken, 1876: 66, pl. 10, fig. 3 (*Discorbina*); Eade, 1967a: 42 (N.Z. refs).

Planodiscorbis parisiensis (d'Orbigny, 1826)

d'Orbigny, 1826: 271, no. 5 (*Rosalina*); Eade, 1967a: 43 (N.Z. refs).

Planodiscorbis pustulata (Heron-Allen & Earland, 1913)

Heron-Allen & Earland, 1913: 129, pl. 12, figs 5–7 (*Discorbina*); Heron-Allen & Earland, 1922: 203 (N.Z. refs); Eade, 1967a: 43.

Planodiscorbis rarescens (Brady, 1884)

Brady, 1884: 651, pl. XC, figs 2–3, 4 (?) (*Discorbina*); Egger, 1893: 388, pl. XV, figs 45–47; Cushman, 1915: 20, text-fig. 24, pl. 7, fig. 4 (*Discorbis*); Hornibrook, 1961: 117, pl. 14, figs 292–294, 298 (*Discorbinella*); Barker, 1960: 186, pl. 90 (XC), figs 2–3 (in *Planodiscorbis* following Bermudez, 1952); Hulme, 1964: 333 (refs); Eade, 1967a: 43 (N.Z. refs); Colom,

1974: 127, figs 21p-s; Collins, 1974: 36 (Australia, refs); Albani, 1978: 384 (descr.); Hayward & Buzas, 1979: 69–70 (Miocene); Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank, rare on slope."); Tappan & Loeblich, 1982: pl. 51, fig. 3; Loeblich & Tappan, 1987: 560, pl. 609.

Genus **Rosalina** d'Orbigny, 1826

Rosalina araucana d'Orbigny, 1839

d'Orbigny, 1839c: 44, 81, pl. VI, figs 16–18; Brady, 1884: 645, pl. LXXXVI, figs 10–11 (*Discorbina*); Chapman, 1909: 356 (N.Z., as *Discorbina*); Heron-Allen & Earland, 1911: 327 (refs); Sidebottom, 1918: 252; Eade, 1967a: 43.

Rosalina bradyi (Cushman 1915)

Cushman, 1915: 12, pl. 8, figs 1a-c (*Discorbis globularis* var. *bradyi*); Parker, 1958: 268, pl. 3, figs 37–38 (as *Rosalina globularis bradyi*); Parker, 1960: 78, pl. 86; Hulme, 1964: 43; Haman, 1966: 69, pl. 7, figs 15–16 (*Discorbis*); Eade, 1967a: 43 (N.Z. refs, note on syn.); Albani, 1968a: 29, figs 126–127; Albani, 1968b: 109–110 (descr., remarks, distrib. etc.), pl. 9, figs 1–2, 5–6; Hicks, 1971: 48, 54 (ecol. at Island Bay); cf. Haynes, 1973: 153–154; Gregory, 1973: 195, 197 (N.Z. mangrove swamp ecol., as *R.* sp.), fig. 2.7 (*R. bradyi*); Albani, 1979: 39 (features), fig. 82.3; Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Abundant on inner shelf, common on outer shelf."); Hayward, 1979b: 185 (*Zostera* pool community), figs 3f, 3m, 4; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 5y; Hayward, 1982b: 55 (Hauraki Gulf nearshore sediments); Hayward, 1990: 93 (dominant species in nearshore sediments, Bay of Plenty), 96, figs 2 (% occurrence), 3g.

Rosalina cf. **bradyi** (Cushman, 1915); Kustanowich, 1965

Kustanowich, 1965: 53 (as *R.* cf. *bradyi* (Cushman, 1915), *q.v.*); Eade, 1967a: 43 (listed).

Rosalina concinna (Brady, 1884)

Brady, 1884: 646, pl XC, figs 7–8 (*Discorbina*); Earland, 1902: 309–321, pl. 16 (as *Cymbalopora bulloides* d'Orbigny); Cushman, 1934: 96 (*Tretomphalus*); Barker, 1960: 186, pl. 90, figs 7–8 (in *Rosalina* following Bermúdez, 1952); Hornibrook, 1961: 101, pl. 13, figs 273–274 (*Rosalina*); Hulme, 1964: 333 (Manukau Harbour); Eade, 1967a: 43; Todd, 1971: 166, pl. 1, figs 1–2, 4 (as *T. bulloides* (d'Orbigny) *concinnus* form); Collins, 1974: 47 (Australia, as *Tretomphalus*); Hayward & Buzas, 1979: 73 (Miocene), pl. 26, figs 325–326; Poag & Tresslar, 1981: 56 (refs), pl. 11, figs 1–3; Hayward, 1981b: 133 (Bay of Islands); Buzas & Severin, 1982: 34 (characters, refs), pl. 6, figs 1–2; Banner *et al.*, 1985: 164 (in *Neocorbina* as type species of new subgenus *Tretomphaloides*), 165, 166; Chave, 1987: 63, pl. 8, fig. 10.

Rosalina cora d'Orbigny, 1839

d'Orbigny, 1839c: 45, 81, pl. VI, figs 19–21; Sidebottom, 1918: 252 (*Discorbina*); Heron-Allen & Earland, 1922: 199 (N.Z., as *Discorbina*); Eade 1967a: 43.

Rosalina globularis d'Orbigny, 1826

d'Orbigny, 1826: 271, no. 1, pl. 13, figs 1–2; Eade, 1967a: 43 (N.Z. refs); Murray, 1971: 4, 5, 7, 13–15 (diag. features etc.), pl. 56, figs 1–6; Schnitker, 1971: 169–215, pl. 6, fig. 1; Delaca & Lipps, 1972: 68–72 (adhesive organs, test, habitat substrate relationships etc.); cf. Haynes, 1973: 150–153; Boltovskoy & Wright, 1976: 20, 44, 225, 252, 269; Larsen, 1982: pl. 15, figs 8–9; Tappan & Loeblich, 1982: 523–552, pl. 51, fig. 2; Loeblich & Tappan, 1987: 561, pls 610, 611.

Rosalina irregularis (Rhumbler, 1906)

Rhumbler, 1906: 70–71, pl. 5, figs 57–58 (*Discorbina*); Eade, 1967a: 43 (N.Z. refs, note on syn.); Haynes, 1973: 152–153 (diag., descr., remarks on N.Z. material etc., refs & syn.), text-fig. 29 (nos 6–16), pl. 30, figs 9–10; Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Common, on inner shelf."); Hayward, 1979b: 185 (*Zostera* pool community, N.Z.); Hayward, 1981a: Hayward & Grace, 1981: 47, 53 (off Cuvier Is); Hayward, 1981a: 80, 81, 91 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6S; Hayward, 1982b: 55, 56, 65, fig. 3f (Hauraki Gulf nearshore sediments); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Rosalina leei Hedley & Wakefield, 1967

Hedley & Wakefield, 1967: 121–128, text-fig. 1, pl. I–II; Lee *et al.*, 1963: 449–466, pls 1–3 (as *Rosalina floridana* Cushman); Lee & Muller, 1972: 1–23 *passim* (energetics, etc.); Lee & Muller, 1973: 215–223, fig. (salt marsh ecol.); Boltovskoy & Wright, 1976: 54, 75, 264, 272; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 87, pl. 21, figs 6–7, pl. 22, figs 1–2); Bock *et al.*, 1985: 262–273, figs.

Rosalina mediterranensis d'Orbigny, 1826

d'Orbigny, 1826: 271, no. 2; Heron-Allen & Earland, 1922: 201 (N.Z., as *Discorbina*); Eade, 1967a: 43.

Rosalina obtusa d'Orbigny, 1846

d'Orbigny, 1846: 179, pl. 11, figs 4–6; Heron-Allen & Earland, 1922: 202 (N.Z., as *Discorbina*); Eade, 1967a: 42; Colom, 1974: 125, figs 21d-i (as *Discorbis*).

Rosalina paupereques Vella, 1957

Vella, 1957: 10, 35, pl. 9, figs 181–182; Hulme, 1964: 333 (Manukau Harbour); Eade, 1967a: 44; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 65 (Hauraki Gulf nearshore sediments); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Rosalina perlucida (Heron-Allen & Earland, 1913)

Heron-Allen & Earland, 1913a: 139, pl. 13, figs 7–9 (*Rotalia*); Heron-Allen & Earland, 1922: 219 (N.Z. refs); Eade, 1967a: 44; Albani, 1968b: 110 (descr., remarks etc., as *"Rotalia" perlucida*), pl. 9, figs 12, 16; Adams *et al.*, 1980: 10 (type).

Rosalina peruviana d'Orbigny, 1839

d'Orbigny, 1839c: 41, 78, pl. I, figs 12–14; Brady, 1884: 645, pl. LXXXVIII, fig. 2 (as *Discorbina vilardeboana* d'Orbigny, 1839, *q.v.*); Heron-Allen & Earland, 1913: 122, pl. XI, figs 1–3; Heron-Allen & Earland, 1922: 200 (N.Z., as *Discorbina*); Eade, 1967a: 44; Boltovskoy *et al.*, 1980: 27 (descr. etc., in *Discorbis*), pl. 11, figs 16–20.

Rosalina tofuana Saidova, 1975

Saidova, 1975: 212, pl. LV, fig. 8, pl. CV, fig. 11 (distrib., incl. Kermadec Is).

Rosalina valvulata d'Orbigny, 1826

d'Orbigny, 1826: 271, no. 4; d'Orbigny, 1839c: 96, pl. III, figs 21–23; Eade, 1967a: 44 (N.Z. refs); cf. Boltovskoy *et al.*, 1980: 28 (descr. etc., in *Discorbis*), pl. 12, figs 1–4; Hayward, 1981a: 91 (Tutukaka Harbour, as *R.* cf. *valvulata*); Hayward, 1981b: 133 (Bay of Islands).

Rosalina cf. **valvulata** d'Orbigny, 1826. Hayward, 1982

Hayward, 1982b: 65 (off Little Barrier Is as *R.* cf. *valvulata*, *q.v.*).

Rosalina vilardeboana d'Orbigny, 1839

d'Orbigny, 1839c: 44, 81, pl. VI, figs 13–15; cf. Cushman, 1921: 304–305; Hulme, 1964: 333 (Manukau Harbour); Eade, 1967a: 44 (N.Z. refs).

Rosalina vitrizea Hornibrook 1961

Hornibrook, 1961: 101, pl. 13, figs 264, 266, 269; Hulme, 1964: 333 (Manukau Harbour); Eade, 1967a: 44 (listed); Hayward, 1981b: 133 (Bay of Islands).

Rosalina williamsoni (Chapman & Parr, 1932)

Chapman & Parr *in* Parr, 1932: 226, pl. XXI, fig. 25 (*Discorbis williamsoni*, new name for *Rotalina nitida* Williamson, 1858: 54, pl. IV, figs 106–108, not of Reuss, 1844); Heron-Allen & Earland, 199 (N.Z., as *Discorbina nitida*); Eade, 1967a: 44; Haynes, 1973: 162–164 (diag., descr., remarks, refs & syn.), text-fig. 31 (nos 1–4), pl. 17, figs 13–15; Collins, 1974: 47 (Australia); Murray, 1979: 58 (descr.), figs 19G–I; Boltovskoy *et al.*, 1980: 28 (descr. etc., in *Discorbis*), pl. 12, figs 5–12.

Rosalina n.sp. (?) Barker, 1960

Barker, 1960: 178, pl. 86, fig. 12 (from "Challenger" Stn 168, off N.Z., referred by Brady (1884) to *Discorbina vilardeboana* (d'Orbigny, 1839), cf. also notes on Cushman's species); Eade, 1967a: 44 (listed).

Rosalina sp. Hayward, 1979

Hayward, 1979b: 185 (*Zostera* pool community).

Genus **Tretomphalus** Möbius, 1880

Tretomphalus planus Cushman, 1924

Cushman, 1924: 36, pl. 10, fig. 8 (*T. bulloides* (d'Orbigny) var. *plana*); Cushman, 1934: 94, pl. 11, fig. 11, pl. 12, figs 18–22; Cushman, 1955: 310 (generic descr.); Barker, 1960: 210; McKenzie, 1962: 129 (as *T. bulloides* d'Orbigny, 1839: 98, pl. III, figs 2–3 (as *Rosalina*), incl. *T. planus* Cushman); Todd, 1971: 166 (as *T. bulloides* (d'Orbigny) *planus* form); Collins, 1974: 47–48 (remarks); Hayward, 1981a: 84 (first N.Z. records; "This distinctive warm water Pacific species was probably carried to New Zealand on currents from the north as a pseudo-planktic embryonic form." (nearest other localities are Fiji, Samoa and the Tuamotus), 92, fig. 5K; Loeblich & Tappan, 1987: 591.

Tretomphalus sp. (Hedley, Hurdle & Burdett, 1967)

Hedley *et al.*, 1967: 15, 45–46 (as *Rosalina* sp.), pl. 9, figs 6a-c (incl. *Cymbalopora bulloides* of Heron-Allen & Earland, 1922: 199, from "Terra Nova" Stns 96, 134); Eade, 1967a: 44; cf. Todd, 1971: 165–168, pl. 1.

Family BRONIMANNIIDAE

Genus **Bronnimannia** Bermúdez, 1952

Bronnimannia disparilis (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 205, pl. VII, figs 20–22 (*Discorbina*); Eade, 1967a: 42 (listed).

Family SPHAEROIDINIDAE
Genus **Sphaeroidina** d'Orbigny, 1826

Sphaeroidina bulloides bulloides d'Orbigny, 1826

d'Orbigny,1826: 267, no. 1, Modèles no. 65; Cushman, 1914: 18, pl. 10, fig. 7, pl. 12, fig. 1; Cushman, 1924: 36, pl. 7, figs 1-6; Cushman, 1955: 321 (type species, generic descr.), pl. 26, fig. 14, key pl. 33, figs 21–22; Galhano, 1963: 84 (distrib., refs etc.), pl. VIII, fig. 16; Eade, 1967a: 38 (N.Z. refs); Hornibrook, 1968: 58, fig. 9; Collins, 1974: 29 (Australia refs); Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1976 thesis: 83, pl. 17, figs 6–7); Boltovskoy & Wright, 1976: 273; Hayward & Buzas, 1979: 74 (Miocene), pl. 27, fig. 335; Lewis, 1979: 30–31, table 5 (off Southern Hawkes Bay: "Common everywhere except inner shelf ..." — "The difference between *S. bulloides* and *S. compressa* is not clear so all specimens are referred to the first described species *S. bulloides* ..." — see Brady, 1884: pl. LXXXIV, figs 1–2, also Barker, 1960: 174, pl. 84, figs 1–7); Hayward, 1979b: 185 (*Zostera* pool community); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 134 (Bay of Islands); Larsen, 1982: pl. 11, fig. 5; Tappan & Loeblich, 1982: 527–5552, pl. 50, fig. 3; Loeblich & Tappan, 1987: 564, pl. 617; Hornibrook *et al.*, 1989: 110, 115 (table 2(3), first appearance, N.Z.), 119 (table 3(1), last occurrence), fig. 17: 26.

Sphaeroidina bulloides quinqueloba Saidova, 1975

Saidova, 1975: 285, pl. LXXIX, fig. 9 ("Ob" Stn 358, 1418 m).

Sphaeroidina compressa Cushman & Todd, 1949

Cushman & Todd, 1949: 20, pl. 4, figs 15–16 (incl. *S. bulloides* of Cushman, 1919); Eade, 1967a: 38.

Superfamily GLABRATELLACEA
Family GLABRATELLIDAE

Genus **Conorbella** Hofker, 1951

Conorbella clarionensis (McCulloch, 1977)

McCulloch, 1977: 302 (*Earltheeia*), pl. 114, figs 12–13; Hayward, 1981a: 82 (single juvenile, Tutukaka Harbour, Northland; first N.Z. record and first beyond type locality area, Pacific coast of Mexico), 90, fig. 5c.

Genus **Glabratella** Dorreen, 1948

Glabratella australensis (Heron-Allen & Earland, 1932)

Heron-Allen & Earland, 1932: 416 (*Discorbina australensis*, new name for Recent Indo-Pacific forms recorded as *Discorbina pileolus* by Brady, 1884: 469, pl. 89, figs 2-4, not of d'Orbigny); Eade, 1967a: 44 (N.Z. refs); Albani, 1968a: 27, fig. 117; Albani, 1968b: 110; Lankford & Phleger, 1968a: 27, fig. 117; Albani, 1968b: 110; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 4, fig. 26; Albani, 1979: 38 (features), fig. 76.2.

Glabratella margaritaceus (Earland, 1933)

Earland, 1933: 125, pl. 4, figs 23–35 (*Discorbis*); Hulme, 1964: 333 (Manukau Harbour) (*Glabratella*); Eade, 1967a: 44 (listed); Hayward & Grace, 1981: 47, 53 (off Cuvier Is), Hayward, 1982b: 64 (off Little Barrier I).

Glabratella millettii (Wright, 1911)

Wright, 1911b: 13, pl. 2, figs 14–17 (*Discorbina*); Heron-Allen & Earland, 1922: 199 (N.Z.); Eade, 1967a: 44; Murray, 1971: 4, 5, 138–139 (diag. features, etc.), pl. 58, figs 1–4; Murray, 1979: 60 (descr.), figs 20A–C.

Glabratella tabernacularis (Brady, 1881)

Brady, 1881: 652 (*Discorbina*); Brady, 1884: 648, pl. LXXXIX, figs 5–7; Heron-Allen & Earland, 1922: 205 (N.Z.); Barker, 1960: 184, pl. 89, figs 5–7 (in *Pileolina*, cf. also Hornibrook & Vella, 1954: 24–25).

Genus **Pileolina** Bermúdez, 1952

Pileolina calcarata (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 204, pl. VII, figs 12–16 (*Discorbina*); Eade, 1967a: 44 (listed in *Glabratella*); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 9 (Tutukaka Harbour, in *Pileolina*); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), figs 5j-k; Hayward, 1982b: 64 (off Little Barrier Is).

Pileolina harmeri (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 204–205, pl. VII, figs 9–11 (*Discorbina*); Eade, 1967a: 44 (listed in *Glabratella*); Hayward, 1982a: 27–56 passim (off

Cavalli Is, ecol., in *Pileolina*), figs 6e-f.

Pileolina patelliformis (Brady, 1884)

Brady, 1884: 647, pl. LXXXVIII, figs 3a-c, pl. LXI, fig. 1 (*Discorbina*); Barker, 1960: 182, pl. 88, fig. 3 (generic placing discussed, in *Pileolina* (?), see also Hornibrook & Vella, 1954: 25); Eade, 1967a: 44; Albani, 1968a: 28, fig. 116; Albani, 1968b: 110 (distrib., etc.), pl. 9, figs 11, 15; Colom, 1974: 137, figs 22d-g; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Hayward & Grace, 1981: 47, 53 (off Cuvier Is, in *Pileolina* Bermúdez, 1952); Hayward, 1981a: 91 (Tutukaka Harbour, in *Pileolaria*, [sic]); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), figs 5n-o; Hayward, 1982b: 65 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Pileolina radiata Vella, 1957

Vella, 1957: 10, 36 37, pl. 8, figs 170–171 (*Pileolina*); Eade, 1967a: 44 (N.Z. refs, note on syn. as *Glabratella*); Lewis, 1979: 34, table 5 (off Southern Hawkes Bay, as *Glabratella*: "Common on inner shelf."); Hayward & Grace, 1981: 47, 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour, in *Pileolaria*); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), figs 5h-i; Hayward, 1982b: 65 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty), fig. 2 (% occurrence).

Pileolina zealandica Vella, 1957

Vella, 1957: 10, 13, 37, pl. 8, figs 175–176 (*Pileolina*); Eade, 1967a: 45 (N.Z. refs, note on syn., as *Glabratella*); Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: "Common on inner shelf."); Hayward & Grace, 1981: 35 (off Cuvier Is, in *Pileolaria*) Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 &c. (Bay of Islands), fig. 3i; Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol., see also Hoskins, 1978 and Adams, 1979), figs 5l-m; Hayward, 1982b: 55, 61, 65 (off Little Barrier Is), fig. 3a; Hayward, 1990: 93 (in nearshore sediments, Bay of Plenty), 96, 97, figs 2 (% occurrence), 3c.

Genus **Planoglabratella** Sieglie & Bermúdez, 1965

Planoglabratella opercularis (d'Orbigny, 1826)

d'Orbigny, 1826: 271, no. 7 (*Rosalina*); Rhumbler, 1906: 69 (Chatham Is record as *Discorbina*); Heron-Allen & Earland, 1922: 203 (N.Z.); Barker, 1960: 184, pl. 89, figs 8–9 (generic placing, in *Pileolina*?); Eade, 1967a: 44 (as *Glabratella*); Colom, 1974: 136–137, figs 22h-o (as *G. obtusa* var. *opercularis*); Hayward & Grace, 1981: 53 (off Cuvier Is, in *Pileolina*); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol., in *Planoglabratella*), figs 6c-d; Hayward, 1982b: 65 (off Little Barrier Is, as *Planaglabratella* [sic]); Loeblich & Tappan, 1987: 568, 621.

Family HERONALLENIIDAE
Genus **Heronallenia** Chapman & Parr, 1931

Heronallenia lingulata (Burrows & Holland *in* Jones, 1896)

Burrows & Holland *in* Jones, 1896: 297, pl. 7, figs 33a-c (*Discorbina*); Brady, 1884: 653, pl. XCI, fig. 3 (as *D. biconcava, fide* Sidebottom, 1913: 255, but cf. Parker & Jones, 1865: 422, pl. XIX, fig. 10); Heron-Allen & Earland, 1922: 206 (N.Z.); Chapman & Parr, 1931: 236 (*Heronallenia*); Cushman, 1955: 289 (generic descr.); Eade, 1967a: 45; Hayward & Buzas, 1979: 61 (Miocene).

Heronallenia pulvinulinoides (Cushman, 1915)

Cushman, 1915: 23, pl. 6, fig. 3 (*Discorbis*); Heron-Allen & Earland, 1922: 206 (N.Z., as *Discorbina pulvinoides* [sic]); Eade, 1967a: 45; Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1982b: 64 (off Little Barrier Is).

Heronallenia unguiculata (Sidebottom, 1918)

Sidebottom, 1918: 255, pl. VI, figs 12–14 (*Discorbina lingulata* var. *unguiculata*); Heron-Allen & Earland, 1922: 207 (N.Z.); Parr, 1950: 358, pl. XIV, figs 11a-b; Eade, 1967a: 45.

Family BULIMINOIDIDAE
Genus **Buliminoides** Cushman, 1911

Buliminoides madagascariensis (d'Orbigny, 1826)

d'Orbigny, 1826: 270, no. 17 (*Bulimina*); Heron-Allen & Earland, 1932: 351, pl. 8, figs 38-41 (as *B. seminuda*); Earland, 1933: 101, pl. 3, fig. 47 (as *B. elegantissima*); Cushman & Parker, 1947: 68, pl. 17, figs 15–17, *Buliminella*); Eade, 1967a: 38; Seiglie, 1969: 331 (incl. *Bulimina seminuda* of Heron-Allen & Earland, 1932 (not of Terquem) and *B. elegantissima* of Earland, 1933 (not of d'Orbigny)); Seiglie, 1970: 112 (*Buliminoides*); Collins, 1974: 29 (in *Buliminoides* Cushman emend, Seiglie, 1970); Lewis, 1979: 30 (as *Buliminella*), table 5 (off southern Hawkes Bay: "Rare

... "); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6i.

Buliminoides madagascariensis var. **spicata** (Cushman & Parker, 1942)

Cushman & Parker *in* Cushman, 1942: 8, pl. 3, figs 5-6 (*Buliminella m.* var. *spicata*, new name for *Bulimina elegantissima* var. *apiculata* Chapman, 1907, not *B. ovata* var. *apiculata* Egger, 1895); Eade, 1967a: 38 (in *Buliminella*).

Buliminoides williamsoniana (Brady, 1881)

Brady, 1881: 56 (*Bulimina*); Brady, 1884: 408, pl. L1, figs 16–17; Heron-Allen & Earland, 1922: 130 (N.Z.); Barker, 1960: 104, pl. 51, figs 16–17 (in *Buliminoides* following Cushman, 1911); Cushman, 1955: 265 (type species, generic descr.), pl. 22, fig. 5, key pl. 27, figs 6–7; Eade, 1967a: 38; Albani, 1968a: 26, fig. 106; Albani, 1968b: 106 (distrib., etc.); Seiglie, 1969b: 329–330 (as type species, generic descr., etc.); Albani, 1979: 35 (features), fig. 64.2; Hayward & Grace, 1981: 48, 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 6j; Hayward, 1982b: 61, 64 (Hauraki Gulf nearshore sediments, as *B. williamsoni*, [sic]); Tappan & Loeblich, 1982: 527–552, pl. 51, fig. 5; Loeblich & Tappan, 1987: 570, pl. 622; Hayward, 1990: 93 (listed as a dominant species in nearshore sedi-ments, Bay of Plenty), 95, 98 (southernmost limit).

Superfamily SIPHONINACEAE
Family SIPHONINIDAE
Subfamily SIPHONININAE

Genus **Siphonina** Reuss, 1850

Siphonina reticulata (Czjzek, 1848)

Czjzek, 1848: 145, pl. 13, figs 7–9 (*Rotalina*); Brady, 1884: 669, pl. XCVI, figs 5–8 (*Truncatulina*); Cushman, 1915: 43 (*Siphonina*), text-fig. 48, pl. 16, fig. 4, pl. 28, fig. 3; Cushman, 1921: 322, pl. 60, figs 3a-c; Barker, 1960: 198 (Brady's identifications); Eade, 1967a: 45 (N.Z. refs); Murray, 1971: 5, 138–139 (diag. features etc.), pl. 58, figs 5–7; Colom, 1974: 138, figs 22r-s; Loeblich & Tappan, 1987: 571, pl. 624.

Siphonina tubulosa Cushman, 1924

Cushman, 1924: 40, pl. 13, figs 1–2; Parr, 1950: 362; Cushman, 1955: 296–297 (generic descr.), key pl. 31, fig. 2; Barker, 1960: 199, pl. XCVIII, figs 5–7; Thompson, 1975 thesis: 88, pl. 22, fig. 7 (off north-eastern N.Z.); Hayward, 1981a: 91 (Tutukaka Harbour, as *S. tubulosa*); Hayward, 1981b: 133 (Bay of Islands); cf. Tappan & Loeblich, 1982: pl. 52, fig. 1.

Siphonina aff. **tubulosa** Cushman, 1924. Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 82 (as *S.* cf. *tubulosa* Cushman, 1924: 40, pl. 13, figs 1–2); Eade, 1967a: 45 (listed as *S.* aff. *tubulosa*).

Siphonina cf. **tubulosa** Cushman, 1924. Vella, 1957

Vella, 1957: 11 (table 2, listed from Cook Strait as *S.* cf. *tubulosa* Cushman, 1924: 40, pl. 13, figs 1–2); Eade, 1967a: 45 (listed).

Siphonina cf. **tubulosa** Cushman, 1924. Lewis, 1979

Lewis, 1979: 34, table 5 (off Southern Hawkes Bay: — referred to Brady 1884: pl. 96, figs 5–7 (see also Barker, 1960: 198, pl. 96 (XCVI), figs 5–7), — "Frilled keel not as well developed as in Brady's figures ... Common, on Motukura Bank only.").

Superfamily DISCORBINACEA
Family PARRELLOIDIDAE

Genus **Cibicidoides** Brotzen, 1936

Cibicidoides globulus Saidova, 1975

Saidova, 1975: 263, pl. LXXVIII, fig. 10, pl. CX, fig. 4 (distrib., incl. Kermadec Is and New Zealand); Cushman, 1955: 335 (generic descr.).

Cibicidoides vehemenus Saidova, 1975

Saidova, 1975: 265, pl. LXXII, figs 5–6 (distrib., incl. New Zealand).

Cibicidoides wuellerstorfi planus Saidova, 1975

Saidova, 1975: 266, pl. LXXII, fig. 7 (distrib., incl. New Zealand).

Genus **Parrelloides** Hofker, 1956

Parrelloides umbonatus Saidova, 1975

Saidova, 1975: 261, pl. LXXI, fig. 5, pl. CX, fig. 2 ("Ob" Stn 358, 1418 m).

Family PSEUDOPARRELLIDAE
Subfamily PSEUDOPARRELLINAE

Genus **Epistominella** Husezima & Maruhasi, 1944

Epistominella exigua (Brady, 1884)

Brady, 1884: 696, pl. CIII, figs 13–14 (*Pulvinulina*); Parr, 1950: 351 (*Pulvinulinella*); Parker *et al.*, 1953: 43, pl. 9, figs 35–36 (*Epistominella*); Barker, 1960: pl. 103, figs 13–14; Parker, 1964: 625, pl. 99, figs 37–38; Todd, 1965: 30, pl. 10, fig. 1; Eade, 1967a: 42 (N.Z. refs); Collins, 1974: 35 (Australian record); Boltovskoy & Wright, 1976: 30, 35, 97, 102, 103, 144, 227, 339; Hayward & Buzas, 1979: 54 (Miocene), pl. 14, figs 176–177; Lewis, 1979: 33, table 5 (off Southern Hawkes Bay: "Many specimens have more globose chambers and less angular periphery than type figures (Brady 1884, pl. 10, figs 13, 14) ... Abundant on outer shelf, common elsewhere."); Boltovskoy *et al.*, 1980: 31 (descr., etc.), pl. 14, figs 14–17; Haake, 1980: 13, pl. 2, fig. 36; Larsen, 1982: pl. 14, figs 5–6; Mackensen *et al.*, 1989: 315–321.

Epistominella vitrea Parker, 1953

Parker *in* Parker *et al.*, 1953: 9, pl. 4, figs 34–36, 40–41; Hulme, 1964: 334 (Manukau Harbour); Eade, 1967a: 42; Murray, 1971: 7, 130–131 (diagnostic features, etc.), pl. 54, figs 1–6; Boltovskoy & Wright, 1976: 142; Hayward, 1981b: 132 (Bay of Islands); Todd & Low, 1981: 40 (in key), 3 figs.

Family PLANULINOIDIDAE
Genus **Planulinoides** Parr, 1941

Planulinoides biconcavus (Parker & Jones, 1862)

Parker & Jones *in* Carpenter *et al.*, 1862: 201, fig. 32G (*Discorbina*); Parker & Jones, 1865: 422, pl. XIX, figs 10 a-b; Brady, 1884: 653, pl. XCI, figs 2–3; Parr, 1941: 305, text-figs a-c (*Planulinoides*); Parr, 1945: 211 (*Discorbinella*); cf. Barker, 1960: 188; Loeblich & Tappan, 1964: C584, fig. 458, 4–6 (*Planulinoides*); Eade, 1967a: 43 (N.Z. refs); Collins, 1974: 36–37 (Australia, remarks; Albani, 1979: 39 (features), fig. 81.1; Adams *et al.*, 1980: 5 (type); Tappan & Loeblich, 1982: 527–552, pl. 51, fig. 7; Loeblich & Tappan, 1987: 576, pl. 628.

Planulinoides norcotti Hedley, Hurdle & Burdett, 1967

Hedley *et al.*, 1967: 13, 15, 40–42, pl. 11, figs 1a-c; Eade, 1967a: 43 (listed); Thompson, 1975 thesis: 86, pl. 21, figs 1–2; Dawson, 1979: 21–22 (type data).

Planulinoides planoconcava (Chapman, Parr & Collins, 1932)

Chapman, Parr & Collins *in* Parr, 1932: 232, pl. XXII, figs 34a-c (as *Planulina biconcava* (Jones & Parker) var. *planoconcava*); Chapman *et al.*, 1934: 561, pl. II, figs 40a-c (*Discorbis planoconcavus*); Parr, 1945: 211, pl. XI, figs 1–2 (*Discorbinella*); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward & Grace, 1981: 53 (off Cuvier Is).

Family DISCORBINELLIDAE
Subfamily DISCORBINELLINAE

Genus **Discorbinella** Cushman & Martin, 1935

Discorbinella timida Hornibrook, 1961

Hornibrook, 1961: 116 (Lower Miocene, Oamaru), pl. 14, figs 288, 293, 297; Cushman, 1955: 288 (generic descr.); Hayward, 1981a: 90 (Tutukaka Bay).

Discorbinella vitrevoluta Hornibrook, 1961

Hornibrook, 1961: 102 (Miocene to Pleistocene), pl. 13, figs 275–277; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 82, 90 (first Recent records, Tutukaka Harbour), fig. 4 (abundance), fig. 5b; Hayward, 1982b: 64; Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Genus **Laticarinina** Galloway & Wissler, 1927

Laticarinina altocamerata (Heron-Allen & Earland, 1922)

Heron-Allen & Earland, 1922: 209, pl. VII, figs 24–27 (*Truncatulina tenuimargo* var. *altocamerata* for Brady's *T. tenuimargo* (1884: 662, pl. XCIII, fig. 2)); Finlay, 1940: 467 (*Parvicarinina*), pl. 62, figs 30–34; Barker, 1960: 192; Hornibrook, 1961: 118, pl. 14, figs 296, 299, 301, 302, 305; Eade, 1967a: 43 (N.Z. refs etc.); Hayward & Buzas, 1979: 62 (Miocene), pl. 19, figs 242–243; Loeblich & Tappan, 1987: 578, pl. 631.

Laticarinina pauperata (Parker & Jones, 1865)

Parker & Jones, 1865: 395, pl. 16, figs 50–51 (*Pulvinulina repanda* var. *menardii* subvar. *pauperata*); Finlay, 1940: 468, pl. 62, figs 27–29 (*Laticarinina halophora* (Stache); Cushman, 1955: 334 (type species, generic descr.), pl. 28, fig. 4, key pl. 36, fig. 9; Hornibrook, 1961: 119, pl. 14, figs 300, 303–304, not of Stache; Kennett, 1966a: 59 (Upper Miocene in N.Z., distrib. refs, etc.), pl. 7, figs 109; Eade, 1967a: frontispiece, 43 (N.Z. refs); Hornibrook, 1968: 58, fig. 9; Hornibrook, 1971: 45; Dawson, 1979: 21 (figured specimen of Eade (1967a) listed); Hayward & Buzas, 1979: 62 (Miocene); Larsen, 1982: pl. 15, fig. 5; Loe-

blich & Tappan, 1987: 578, pl. 631; Hornibrook *et al.*, 1989: 94, 114 (table 2(2), first appearance, N.Z.), 119 (table 3(1), last occurrence).

Laticarinina (?) planoconcava (Chapman, Parr & Collins, 1932)

Chapman *et al.*, *in* Parr, 1932: 232, pl. 22, fig. 34 (*Planulina biconcava* var. *planoconcava*); Finlay, 1940: 468 (as *Parvicarinina* ?); Eade, 1967a: 43.

Laticarinina tenuimargo (Brady, 1884)

Brady, 1884: 662, pl. XCIII, fig. 2 (*Truncatulina*); Heron-Allen & Earland, 1922: 209, pl. 7, figs 24–27 (as *T. tenuimargo* var. *altocamerata*); Finlay, 1940: 467 (*Parvicarinina altocamerata*); Barker, 1960: 192, pl. XCIII, fig. 2 (*L. tenuimargo*); Eade, 1967a: 43 (as *L. altocamerata*); Thompson, 1975 thesis: 86, pl. 20, fig. 7.

Superfamily PLANORBULINACEA
Family PLANULINIDAE

Genus **Planulina** d'Orbigny, 1826

Planulina ariminensis d'Orbigny, 1826

d'Orbigny, 1826: 280, No. 1, pl. 14, figs 1–3, Modèles No. 49; Brady, 1884: 674, pl. XCIII, fig. 11 (*Anomalina*); Heron-Allen & Earland, 1911a: 336 (refs); Cushman, 1915: 44, text-figs 49a-c, pl. 19, fig. 1; Heron-Allen & Earland, 1922: 212 (N.Z., in *Anomalina*); Barker, 1960: 192, pl. 93, figs 10–11; Phleger *et al.*, 1953: 48, pl. 11, figs 3–4; Cushman, 1955: 334 (type species, generic descr.), pl. 28, fig. 3, key pl. 36, fig. 3; Barker, 1960: 192, pl. 93, figs 10–11; Haake, 1980: 14, pl. 3, fig. 7; Larsen, 1982: pl. 21, figs 5–6; Loeblich & Tappan, 1987: 580, pl. 633.

Planulina aff. ariminensis d'Orbigny, 1826. Lewis, 1979

Lewis, 1979: 36, table 5 (off Southern Hawkes Bay: "... Has more pronounced apertural flaps than *P. ariminensis* (Loeblich and Tappan 1964, fig. 552, no. 1) ... Common on banks, rare, on slope.").

Planulina wuellerstorfi (Schwager, 1866)

Schwager, 1866: 258, pl. 7, figs 105 & 107 (*Anomalina*); Brady, 1884: 662, pl. XCIII, figs 8–9 (*Truncatulina*); Cushman, 1915: 34, text-fig. 36, pl. 12, fig. 3; Cushman, 1921: 314–315, pl. 64, figs 1a-c; Phleger *et al.*, 1953: 49, pl. 11, figs 1–2; Barker, 1960: 192, pl. 93, fig. 9 (*Cibicides*); Todd, 1965: 51–52 (descr., refs etc.), pl. 23, figs 3–5; Bandy & Chierici, 1966: 267, fig. 6 (depth/temperature relations, as *Cibicides*); Eade, 1967a: 50 (N.Z. refs); Kameswara Rao, 1971: 15 (descr., distrib., refs), fig. 84; Douglas, 1973: 607–671, pl. 18, figs 7–9, pl. 25, figs 15–16 (*Cibicidoides*); Thompson, 1975 thesis: 92, pl. 27, figs 1–3; Boltovskoy & Wright, 1976: 242 (*Cibicides*); Lewis, 1979: 36, table 5 (off Southern Hawkes Bay, abundance as *Cibicides*); Hayward & Buzas, 1979: 49 (Miocene, in *Cibicides*), pl. 11, figs 140–142; Haake, 1980: 14, pl. 3, fig. 8; Tappan & Loeblich, 1982: 527–552, pl. 52, fig. 2; Curry & Lohmann, 1982: 218–235 (carbon analysis, dating reconstruction), isotope; Larsen, 1982: pl. 21, figs 7–8; Blanc & Duplessy, 1982: 1391–1414 *passim* (isotope ratios/water-residence tracer); Sen Gupta & Aharon, 1987: 23–32 (as *Cibicides*, climate/environment); Zahn & Sarnthein, 1987: 543–559 *passim* (isotope data/environmental indicator); Hornibrook *et al.*, 1989: 117 (table 2(5), first appearance, N.Z.), 119 (table 3(1), last occurrence).

Family CIBICIDIDAE
Subfamily CIBICIDINAE

Genus **Cibicicoides** Saidova, 1975

Cibicicoides fumeus Saidova, 1975

Saidova, 1975: 235, pl. LXIV, fig. 5 ("Ob" Stn 358, 1418 m).

Cibicicoides tesnersianus Saidova, 1975

Saidova, 1975: 236, pl. LXIV, fig. 6, pl. CVII, fig. 5 ("Ob" Stn 354, 266 m); Loeblich & Tappan, 1987: 581.

Genus **Cibicides** Montfort, 1808

Cibicides aknerianus (d'Orbigny, 1846)

d'Orbigny, 1846: 156, pl. VIII, figs 13–15 (*Rotalina*); Brady, 1884: 663, pl. XCIV, figs 8a-c (*Truncatulina*); Cushman, 1915: 35, text-fig. 38, pl. 16, fig. 6; Cushman, 1921: 316, pl. 63, figs 3a-c; Barker, 1960: 194 (allocation of Brady's identifications); Eade, 1967a: 50 (N.Z. refs); Boltovskoy & Wright, 1976: 103, 242; Boltovskoy *et al.*, 1980: 23–24 (descr., etc.), pl. 8, figs 5–11.

Cibicides cf. cicatricosus (Schwager, 1866). Hornibrook, 1952

Hornibrook, 1952: 185 (cf. *C. cicatricosus* (Schwager, 1866: 260, pl. 7, fig. 108 (*Anomalina*)); Eade, 1967a: 50 (listed).

Cibicides corticatus Earland, 1934

Earland, 1934: 183, pl. 8, figs 46-48 (*C. refulgens*

var. *corticatus*); Vella, 1957: 11, 41, pl. 9, figs 195–197 (as *Cibicides (Cibicidoides)*); Eade, 1967a: 50; Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 45 (Cavalli Is ecol., see also Hoskins, 1978); Hayward, 1982b: 61, 64 (off Little Barrier Is); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Cibicides culter (Parker & Jones, 1865)

Parker & Jones, 1865: 421, pl. 19, fig. 1 (*Planorbulina*); Brady, 1884: 668, pl. XCVI, figs 3a-c (*Truncatulina*); Cushman, 1921: 320-321, pl. 62, figs 4a-c; Heron-Allen & Earland, 1922: 211 (N.Z., in *Truncatulina*); Barker, 1960: 198, pl. 96, fig. 3 (as *Osangularia bengalensis* (Schwager) — see discussion of placing); Eade, 1967a: 50.

Cibicides haidingerii (d'Orbigny, 1846)

d'Orbigny, 1846: 154, pl. 8, figs 7–9 (*Rotalina*); Brady, 1864: 469, pl. XLVIII, fig. 11 (*Planorbulina*); Brady, 1884: 663, pl. XCV, figs 7a-c ; Cushman, 1915: 35, text-fig. 37, pl. 13, fig. 5, pl. 28, fig. 1; Cushman, 1921: 315–316, pl. 64, figs 3a-c; Barker, 1960: 196, pl. 95, fig. 7 (as *C. subhaidingerii* Parr, 1950: 364); Eade, 1967a: 50 (N.Z. refs).

Cibicides ihungia Finlay, 1940

Finlay, 1940: 465, 472 (descr. from Loc. 5846, Pourerere, Middle Ihungia), 472 (Upper Oligocene to Lower Pliocene), pl. 67, figs 201–206; Lewis, 1949: 36, table 5 (off Southern Hawkes Bay: "... no living specimens ... Common on upper slope, rare elsewhere.").

Cibicides lobatulus (Walker & Jacob, 1798)

Walker & Jacob *in* Kanmacher [Adam], 1798: 642, pl. 14, fig. 36 (*Nautilus*); Williamson, 1858: 59, pl. V, figs 121–123 (*Truncatulina*); Brady, 1884: 660, pl. XCII, fig. 10, pl. XCIII, figs 1, 4–5, pl. XCV, figs 4–5 (*Truncatulina*); Cushman, 1915: 31, text-fig. 34, pl. 15, fig. 1; Cushman, 1921: 313, pl. 63, figs 2a-c; Cushman, 1931: 118, pl. 21, fig. 3 (*Cibicides*); Parr, 1950: 364; Phleger *et al.*, 1953: 49, pl. 11, figs 9 & 14; Todd & Bronnimann, 1957: 1–43, pl. 12, fig. 11; Barker, 1960: pl. 92, fig. 10, pl. 93, fig. 1 (taxon. notes on Brady, 1884); Nyholm, 1961: 157–196, figs 1–21, pls 1–5; McKenzie, 1962: 129 (Australian range, refs); Galhano, 1963: 94 (refs etc.), pl. IX, figs 7–8; Hulme, 1964: 339 (Manukau Harbour; refs & syn.); Todd, 1965: 52–53 (refs & syn.), pl. 22, fig. 1; Haman, 1966: 69–70, pl. 7, figs 24–26; Eade, 1967a: 50 (N.Z. refs); Kameswara Rao, 1971: 14–15 (descr., refs, distrib.), fig. 82; Murray, 1971: 4, 6, 174–175 (diag. features etc.), 177, pl. 73, figs 1–7; Haynes, 1973: 173–177 (diag., descr., detailed distrib., remarks, refs & syn.), text-fig. 35 (nos 4–10), pl. 20, figs 1–2, pl. 21, figs. 3, 5–6, pl. 33, figs 1–7; Colom, 1974: 147–149 (discuss.), figs 29–32; Collins, 1974: 48; Gordon *in* Gordon & Ballantine, 1976: 96 (listed from Leigh region); Boltovskoy & Wright, 1976: 86, 91, 97, 200, 202, 221, 249, 253; Murray, 1979: 62 (descr.), figs 21A–C; Hayward & Buzas, 1979: 49 (Miocene), pl. 10, figs 124–126; Hayward, 1979c: 214 (cf. early Miocene, Auckland); Boltovskoy *et al.*, 1980: 24 (descr., etc.), pl. 9, figs 1–4; Todd & Cox, 1981: 42 (in key), 3 figs; Larsen, 1982: pl. 22, figs 1–2; Miller *et al.*, 1983: 107–124 (amino acid ratios/palaeotemperature estimations); Moore, 1985: 129–133 (epizoic on isopod crustacean); Chave, 1987: 65 (refs), pl. 10, fig. 8; Vilks & Deonarine, 1988: 1240–1255, figs (chemical composition/environmental indicator); Haugen *et al.*, 1989: 38 *et seq.* (protein content/chemotaxonomy)

Cibicides marlboroughensis Vella, 1957

Vella, 1957: 11, 12, 40, pl. 9, figs 189–191; Eade, 1967a: 50 (refs); Thompson, 1975 thesis: 92, pl. 27, figs 4–6; Hayward, 1979b: 184 (*Zostera* pool community); Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 &c. (Bay of Islands), fig. 3K; Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol., see also Hoskins, 1978 and Adams, 1979), fig. 5r-s; Hayward, 1982b: 61, 64 (off Little Barrier Is); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Cibicides praecinctus (Karrer, 1868)

Karrer, 1868: 189, pl. 5, fig. 7 (*Rotalia*); Brady, 1884: 667, pl. XCV, figs 1–3 (*Truncatulina*); Cushman, 1915: 39, text-fig. 42, pl. 26, fig. 2; Barker, 1960: 195, pl. 95, figs 1–3 (*Cibicides*); Eade, 1967a: 50 (N.Z. refs).

Cibicides cf. **pseudoungerianus** (Cushman, 1922), Vella, 1957

Vella, 1957: 11 (cf. *C. pseudoungerianus* (Cushman, 1922d: 97, pl. XX, fig. 9 (*Truncatulina*)); Cushman, 1931a: 123, pl. 22, figs 3–7; cf. Galhano, 1963: 94, pl. IX, figs 9–10; Eade, 1967a: 50 (listed); cf. Murray, 1971: 4, 6, 176–177, pl. 74, figs 1–6 (for *C. pseudoungerianus*); cf. Schnitker, 1971: pl. 9, fig. 7; cf. Colom, 1974: 149, figs 31g-i; cf. Boltovskoy & Wright, 1976: 121,242, 249 and Haake, 1980: 14, pl. 3, fig. 11 and Larsen, 1982: pl. 22, figs 3–4.

Cibicides refulgens Montfort, 1808

Montfort, 1808: 123, text-fig. on p.122; Brady,

1884: 659, pl. XCII, figs 7–9 (*Truncatulina*); Heron-Allen & Earland, 1911: 335–336; Cushman, 1915: 30, text-fig. 33, pl. 12, fig. 2; Cushman, 1921: 312, pl. 63, figs 1a-c; Cushman, 1931: 116, pl. XXI, fig. 2; Parr, 1950: 363; Barker, 1960: 190, pl. 192, figs 7–9; McKenzie, 1962: 129 (Australian range); Hornibrook & Schofield, 1963: 48; Galhano, 1963: 93 (refs), pl. IX, fig. 6; Todd, 1965: 53–54 (refs); Haman, 1966: 70, pl. 7, figs 27–28; Eade, 1967a: 50 (N.Z. refs); Albani, 1968a: 30, fig. 135; Albani, 1968b: 115 (refs etc.); Scott, 1970: 385–398, fig. 5, no. 5; Kameswara Rao, 1971: 14 (descr., refs, distrib.), figs 81a-b; Sissingh, 1973: 362, pl. I, fig. 2; Colom, 1974: 150, figs 31o-t; Boltovskoy & Wright, 1976: 250; Albani, 1979: 41 (features), fig. 90.3; Hayward & Buzas, 1979: 48 (Miocene), pl. 10, figs 130–131; Boltovskoy *et al.*, 1980: 24–25 (descr., etc.), pl. 9, figs 9–11; Hayward, 1981b: 132 (Bay of Islands); Alexander & DeLaca, 1987: 136–159, figs (feeding adaptations/phoresis/morphol.); Loeblich & Tappan, 1987: 582, pl. 634; Chave, 1987: 65, pl. 10, fig. 9.

Cibicides robertsonianus (Brady, 1881)

Brady, 1881: 65 (*Truncatulina*); Brady, 1884: 664, pl. XCV, fig. 4; Barker, 1960: 196, pl. 95, fig. 4; Eade, 1967a: 50 (N.Z. refs).

Cibicides subhaidingerii Parr, 1950

Parr, 1950: 364, pl. XV, figs 7a-c; Barker, 1960: 196, pl. XCV, fig 7; Thompson, 1975 thesis: 92, pl. 27, figs 7–8.

Cibicides temperata Vella, 1957

Vella, 1957: 11, 13, 40, pl. 9, figs 201–203; Hulme, 1964: 338 (Manukau Harbour); Eade, 1967a: 50.

Cibicides tenuimargo (Brady, 1884)

Brady, 1884: 662, pl. XCIII, fig. 3 (*Truncatulina*); Egger, 1893: 379, pl. XVI, figs 7–9; Sidebottom, 1918: 257, pl. 6, figs 20–21; Chapman, 1906: 102; McKenzie, 1962: 129 (Australian range); Eade, 1967a: 50 (other N.Z. refs).

Cibicides ungerianus (d'Orbigny, 1846)

d'Orbigny, 1846: 157, pl. 8, figs 16–18 (*Rotalina*); Brady, 1864: 469, pl. 48, fig. 12 (*Planorbulina*); Brady, 1884: 664, pl. XCIV, figs 9a-d (*Truncatulina*); Cushman, 1915: 36, text-fig. 39, pl. 17, fig. 2; Cushman, 1921: 317, pl. 65, figs 3a-c; Barker, 1960: 194 (as *C. pseudoungerianus* (Cushman, 1922)); Eade, 1967a: 50 (N.Z. refs); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Cibicides cf. **ungerianus** (d'Orbigny, 1846). Hayward & Grace, 1981

Hayward & Grace, 1981: 52 (records from off Cuvier Is as *C.* cf. *ungerianus* (d'Orbigny, 1846: 157, pl. 8, figs 16–18 (as *Rotalina*)); Hayward, 1981a: 90 (Tutukaka Bay); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), figs 6V–W; Hayward, 1982b: 64 (off Little Barrier Is).

Cibicides n.sp. aff. **deliquatus** Finlay, 1940. Vella, 1957.

Vella, 1957: 11, 40 (aff. *C. deliquatus* Finlay, 1940: 465; "possibly Recent" *fide* Hornibrook, 1968: 72); see also Kennett, 1966: 74, pl. 12, figs 196–197, 201 (Upper Miocene, N.Z.); Eade, 1967a: 50 (listed).

Cibicides sp. Phleger, 1970

Phleger, 1970: 522 *et seq.* (N.Z. marine marsh ecol., localities on fig. 9), tables 4–5.

Cibicides sp. Gregory, 1973

Gregory, 1973: 197 (N.Z. mangrove swamp ecol.), table 2.

Genus **Lobatula** Fleming, 1828

Lobatula novazealandica Saidova, 1975

Saidova, 1975: 232, pl. LXIV, fig. 2 ("Ob" Stn 352, 300 m).

Subfamily STICHOCIBICIDINAE
Genus **Dyocibicides** Cushman & Valentine, 1930

Dyocibicides biserialis Cushman & Valentine, 1930

Cushman & Valentine, 1930: 31, pl. 10, figs 1–2; Cushman, 1931a: 126, pl. 24, fig. 2; Cushman & Parker, 1931: 22, pl. 4, fig. 8; Cushman, 1950: pl. 36, fig. 12; Cushman, 1955: 338 (type species, generic descr.), pl. 28, fig. 7, key pl. 36, fig. 12; Hornibrook, 1961: 165, pl. 26, fig. 516; McKenzie, 1962: 129; Galhano, 1963: 95–96 (refs), pl. IX, fig. 13; Eade, 1967a: 51 (N.Z. refs, note on syn.); Albani, 1968a: 30–31, fig. 130; Albani, 1968b: 116 (refs etc.); Schnitker, 1971: 169–215, pl. 9, fig. 8; Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 93, pl. 28, figs 1–2); Hayward & Buzas, 1979: 52 (Miocene), pl. 12, fig. 155; Albani, 1979: 41 (features), fig. 92.1; Hayward, 1979b: 184 (*Zostera* rock pool community); Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is);

Loeblich & Tappan, 1987: 585, pl. 639.

Dyocibicides primitiva Vella, 1957

Vella, 1957: 11, 41, pl. 9, figs 198–200; Hornibrook, 1961: 165, pl. 26, fig. 517; Eade, 1967a: 51 (listed); Hayward & Buzas, 1979: 52 (Miocene); Lewis, 1979: 36–3, table 5 (off Southern Hawkes Bay, abundance).

Dyocibicides uniserialis Thalmann, 1933

Thalmann, 1933: 254; (?) Vella, 1957: 11 (table 2) (as "*Dyocibicides* sp. (uniserial)" from Cook Strait); Eade, 1967a: 51 (listed).

Dyocibicides sp. Hayward, 1990

Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty, Stn 3, 7 m, NZGS 202205 grid ref. W15/587638).

Family PLANORBULINIDAE
Genus **Planorbulina** d'Orbigny, 1826

Planorbulina acervalis Brady, 1884

Brady, 1884: 657, pl. XCII, fig. 4; Cushman, 1915: 29, pl. 14, fig. 3; Barker, 1960: 190, pl. 92, fig. 4; Todd, 1965: 54–55 (refs), 101, pl. 22, fig. 2; Eade, 1967a: 51 (N.Z. refs); Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 6, figs 22–24; Colom, 1974: 158, figs 41a-f; Spindler, 1980: 569–580 (habitat/oceanic weed); Hayward & Grace, 1981: 53 (off Cuvier Is); Todd & Low, 1981: 42 (in key), 3 figs; Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1982b: 65 (off Little Barrier Is).

Planorbulina mediterranensis d'Orbigny, 1826

d'Orbigny, 1826: 280, no. 2, pl. XIV, figs 4–6, Modèles no. 79; Brady, 1884: 656, pl. XCII, figs 1–3; Rhumbler, 1906: 67 (Chatham Is record); Heron-Allen & Earland, 1909: 678; Cushman, 1915: 28; Heron-Allen & Earland, 1922: 207 (N.Z.); Cushman, 1931a: 129, pl. 24, figs 5–8; Barker, 1960: 190, pl. 92, figs 1–3; Cushman, 1955: 340 (type species, generic descr.), pl. 29, fig. 1, key pl. 37, figs 1–2; Galhano, 1963: 96–97 (refs etc.), pl. IX, fig. 5; Eade, 1967a: 51; Albani, 1968a: 31, fig. 137; Albani, 1968b: 116 (refs etc.), pl. 10, figs 12, 16; Cifelli & Smith, 1970: 5 *et seq.* (ecol. etc.), 42 (growth pattern); Murray, 1971: 4, 6, 178–179 (diag. features etc.), pl. 75, figs 1–6; Schnitker, 1971: 169–215, pl. 9, fig. 11; Colom, 1974: 158–159, figs 39-40; Collins, 1974: 49; Boltovskoy & Wright, 1976: 28, 117; Albani, 1979: 42 (features), fig. 94.1; Murray, 1979: 62 (descr.), figs 21D–E; Boltovksoy *et al.*, 1980: 43 (descr., etc.), pl. 25, figs 1–3; Larsen, 1982: pl. 22, figs 5–6; Buzas & Severin, 1982: 39 (refs), pl. 9, fig. 7; Loeblich & Tappan, 1987: 588, pls 645–646.

Planorbulina variabilis (d'Orbigny, 1826)

d'Orbigny, 1826: 279, no. 8 (*Truncatulina*); Brady, 1884: 661, pl. XCIII, figs 6–7; Cushman, 1915: 33, text-fig. 35; Cushman, 1921: 314, pl. 65, fig. 2; Cushman, 1931a: 127, pl. 24, fig. 3; Cushman, 1950: pl. 76, figs 20–21; Cushman, 1955: 339 (type species, generic descr.), pl. 28, fig. 10, key pl. 36, figs 20–21; Barker, 1960: 192; Galhano, 1963: 96, pl. IX, fig. 4; Eade, 1967a: 51 (N.Z. refs); Albani, 1968a: 30, fig. 132; Albani, 1968b: 116 (refs etc.); Colom, 1974: 150, figs 33–34; Albani, 1979: 41 (features), fig. 91.1; Loeblich & Tappan, 1987: 588, pl. 645.

Family CYMBALOPORIDAE
Subfamily CYMBALOPORINAE

Genus **Cymbaloporetta** Cushman, 1928

Cymbaloporetta bradyi (Cushman, 1924)

Cushman, 1924: 34, pl. 10, figs 2-4 (*Cymbalopora*); McKenzie, 1962: 129; Todd, 1965: 37–38 (descr., refs & syn. *Cymbaloporetta*), pl. 19, figs 1–4, pl. 20, fig. 4; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is); Chave, 1987: 65 (refs), pl. 11, fig. 1; Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Cymbaloporetta squammosa (d'Orbigny, 1826)

d'Orbigny, 1826: 272, no. 8 (*Rotalia*); Cushman, 1921: 308, pl. 59, figs 2a-c (as *Cymbalopora poeyi* (d'Orbigny, 1839), incl. *Rotalia squammosa* d'Orbigny, 1826, as *nomen nudum*; and Brady, 1884: 636, pl. CII, figs 13a-c; Cushman, 1915: 24, pl. 10, fig. 1, pl. 14, fig. 5); Heron-Allen & Earland, 1922: 198 (*Cymbalopora squammosa*); Cushman, 1955: 308–309 (type species, generic descr.), pl. 25, fig. 8, key pl. 32, fig. 15; Barker, 1960: 210, pl. 102, fig. 13; Todd, 1965: 38 (descr., refs & syn.), pl. 20, fig. 3; Eade, 1967a: 51; Boltovskoy & Wright, 1976: 69; Le Calvez, 1977: 1 *et seq.* (lectotype designation etc.); Larsen, 1982: pl. 22, figs 8–9; Chave, 1987: 65, pl. 11, fig. 2; Loeblich & Tappan, 1987: 591, pl. 649.

Family VICTORIELLIDAE
Subfamily RUPERTININAE
Genus **Biarritzina** Loeblich & Tappan, 1964

Biarritzina proteiforma (Goës, 1882)

Goës, 1882: 94, pl. 6, figs 208–214, pl. 7, figs 215–219 (*Carpentaria balaniformis* var. *proteiformis)*; Brady, 1884: 679, pl. XCVII, figs 8–14 (*C. proteiformis*); Cushman, 1915: 49, pl. 20, fig. 2, pl. 21, fig. 1; Cushman, 1921: 361–362, pl. 73, figs 2–3; Barker, 1960: 200, pl. 97, figs 8–14; Eade, 1967a: 46 (N.Z. refs).

Subfamily VICTORIELLINAE
Genus **Victoriella** Chapman & Crespin, 1930

Victoriella sp. Thompson, 1975

Thompson, 1975 thesis: 93–94, pl. 28, figs 8–9(off northeastern N.Z., Stns 46 and 59); Cushman, 1955: 345–346 (generic descr.).

Superfamily ACERVULINACEA
Family ACERVULINIDAE

Genus **Acervulina** Schulze, 1854

Acervulina inhaerens Schulze, 1854

Schulze, 1854: 68, pl. 6, fig. 12; Brady, 1884: 718, pl. CII, figs 1–6 (*Gypsina*); Cushman, 1915: 74, pl. 21, figs 6–7; Cushman, 1931a: 134, pl. XXV, fig. 2; Parr, 1950: 368; Cushman, 1955: 343 (type species, generic descr.), pl. 29, fig. 3, key pl. 37, figs 8–10; Barker, 1960: 210, pl. 102, figs 1–6 (*Acervulina*); Galhano, 1963: 97, pl. IX, figs 17–18; Todd, 1965: 55 (refs etc.); Eade, 1967a: 51 (N.Z. refs); Murray, 1971: 4, 6, 180–181 (diag. features etc.), pl. 76, figs 1–2; Collins, 1974: 50 (refs, etc.); Eade *in* Gordon & Ballantine, 1977: 96 (listed from Leigh region); Albani, 1979: 42 (features), fig. 94.1; Murray, 1979: 62 (descr.), fig. 21F; Poag & Tresslar, 1981: 38–39 (species concept), pl. 1, figs 1–2; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 63 (off Little Barrier Is); Hayward, 1990: 95 (in nearshore sediments, Bay of Plenty).

Genus **Gypsina** Carter, 1877

Gypsina vesicularis (Parker & Jones, 1860)

Parker & Jones, 1860: 31 (*Orbitolina*); Brady, 1884: 718 (refs etc.), pl. CI, figs 9–12; Cushman, 1955: 343 (type species, generic descr.), pl. 29, fig. 4, key pl. 37, fig. 11; Barker, 1960: 208, pl. 101, figs 9–12; Galhano, 1963: 98 (refs etc.), pl. IX, fig. 20; Todd, 1965: 55–56 (incl. in *Gypsina globula* (Reuss)), pl. 22, fig. 5 — see under *Sphaerogypsina*; Eade, 1967a: 51 (N.Z. refs); Collins, 1974: 50 (Australia, refs); Boltovskoy *et al.*, 1980: 34–35 (descr., etc.), pl. 18, figs 1–3; Adams *et al.*, 1980: 9 (type); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982b: 64 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty), 96 (southern limit).

Genus **Sphaerogypsina** Galloway, 1933

Sphaerogypsina globulus (Reuss, 1848)

Reuss, 1848: 33, pl. V, fig. 7 (*Ceriopora*); Brady, 1884: 717, pl. CI, fig. 8 (*Gypsina*); Cushman, 1921: 360 (refs); Heron-Allen & Earland, 1922: 221 (N.Z.); Barker, 1960: 208, pl. 101, fig. 8 (*Sphaerogypsina*, following Galloway, 1933); Galhano, 1963: 97–98 (refs etc.), pl. IX, fig. 19; Todd, 1965: 55–56 (as *Gypsina*, refs & syn., incl. *Gypsina vesicularis*), pl. 22, fig. 5; Eade, 1967a: 51.

Family HOMOTREMATIDAE
Genus **Miniacina** Galloway, 1933

Miniacina alba (Carter, 1877)

Carter, 1877: 213, pl. 13, fig. 14 (*Polytrema miniaceum* var. *alba*); Brady, 1884: 721–722, pl. CI, figs 2–3; Heron-Allen & Earland, 1922: 221, pl. VIII (N.Z.); Parr, 1950: 368; Eade, 1967a: 51.

Miniacina miniacea (Pallas, 1766)

Pallas, 1766: 251 (*Millepora*); Brady, 1884: 721, pl. C, figs 5–9 (*Polytrema*); Cushman, 1915: 75, pl. 18, fig. 6, pl. 20, fig. 4; Hickson, 1911: 453, pl. 30, fig. 1, pl. 31, fig. 8, pl. 32, fig. 18, 23, 27, 31; Cushman, 1921: 363–364 (refs etc. as *P. miniaceum* (Linnaeus, 1788: 3784); Heron-Allen & Earland, 1922: 221, pl. VIII, figs 1–31; (detailed discuss., refs etc.); Cushman, 1955: 347 (type species, generic descr.), key pl. 37, figs 33–36; Barker, 1960: 206, pl. 100, figs 5–9 (in *Miniacina*, following Galloway, 1933 *nom. nov.*); Gordon & Ballantine, 1977: 96 (as *Homotrema rubrum*, from Leigh region); Chave, 1987: 66 (refs etc.), pl. II, fig. 3; Loeblich & Tappan, 1987: 599, pl. 663–664.

Superfamily ASTERIGERINACEA
Family ALFREDINIDAE

Genus **Epistomaroides** Uchio, 1952

Epistomaroides colligera (Chapman & Parr, 1937)

Chapman & Parr, 1937: 117, pl. 9, fig. 26 (incl. *Anomalina ammonoides* of Brady, 1884: 672, pl. XCIV,

figs 2–3); Rhumbler, 1906: 67–68 (Chatham Is record as *Anomalina ammonoides* (Reuss) of Brady, 1884); Parr, 1950: 362, pl. XV, figs 3a-c; Cushman, 1955: 332 (generic descr.); Eade, 1967a: 54 (listed); Kameswara Rao, 1971: 13 (Brady (1884) and Chatham Is records included in *Anomalina ammonoides* (Reuss)); Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis: 96); Chave, 1987: 68, pl. 12, fig. 4.

Epistomaroides cf. **globulosa** (Chapman & Parr, 1937). (Thompson, 1975)

Thompson, 1975 thesis: 96 (as *Anomalina* cf. *globulosa* Chapman & Parr, 1937: 117); Thalmann, 1932: 309 (as *Anomalina* aff. *grosserugosa* Gümbel, 1868: 660, pl. II, figs 104a-b, *q.v.*).

Epistomaroides grosserugosa (Gümbel, 1868)

Gümbel, 1868: 660, pl. II, fig. 104 (*Truncatulina*); Brady, 1884: 673, pl. XCIV, figs 4–5 (*Anomalina*); Cushman, 1915: 45, pl. 20, fig. 1; Cushman, 1921: 323, pl. 62, fig. 3; Barker, 1960: 194; Eade, 1967a: 54 (N.Z. refs).

Epistomaroides sinuosa (Sidebottom, 1918)

Sidebottom, 1918: 258, pl. 6, figs 22–25; Heron-Allen & Earland, 1922: 213 (N.Z.); Eade, 1967a: 54.

Family AMPHISTEGINIDAE
Genus **Amphistegina** d'Orbigny, 1826

Amphistegina papillosa Said, 1949

Said, 1949: 39, pl. 4, fig. 12 (as *A. radiata* var. *papillosa*); Cushman, 1955: 302 (generic descr.); Hornibrook, 1968: 11–15 (N.Z. fossil occurrence and Tertiary temperatures), fig. 1; Todd, 1976: 382–394 *passim*; Larsen, 1976: 1–26 *passim*; Hayward, 1980: 184 (first N.Z. record), fig. 4; Larsen, 1982: pl. 21, figs 2-4.

Superfamily NONIONACEA
Family NONIONIDAE
Subfamily NONIONINAE

Genus **Nonion** Montfort, 1808

Nonion commune (d'Orbigny, 1826)

d'Orbigny, 1826: 294, no. 20 (*Nonionina*); Heron-Allen & Earland, 1922: 228 (N.Z., refs); Cushman, 1955: 232 (generic descr., incl. *Florilus* Montfort, 1808); Eade, 1967a: 53.

Nonion depressulum (Walker & Jacob, 1798)

Walker & Jacob *in* Kanmacher [Adam], 1798: 641, pl. XIV, fig. 33 (*Nautilus*); Brady, 1884: 725-726 (refs & syn. etc.), pl. CIX, figs 6–7 (*Nonionina*); Sidebottom, 1918: 262; Cushman, 1955: 232 (generic descr. incl. *Florilus* Montfort, 1808); McKenzie, 1962: 129; Eade, 1967a: 53 (N.Z. refs); Murray, 1971: 5, 168–169 (diag. features etc.), pl. 71, figs 1–7 (European records as *Protelphidium anglicum* Murray, 1965); Haynes, 1973: 209–210 (diag., descr., distrib., neotype desig., refs), text-fig. 44 (nos 1–3), pl. 22, figs 8–11, pl. 29, fig. 9; Collins, 1974: 53; Boltovskoy & Wright, 1976: 45, 97, 103, 116, 117, 140–142, 145–147, 200, 227, 233; Murray, 1979: 54 (descr.), figs 17C–D; Boltovskoy *et al.*, 1980: 39 (descr., etc.), pl. 22, figs 1–5.

Nonion pacificum (Cushman, 1924)

Cushman, 1924: 48, pl. 16, fig. 3 (*Nonionina umbilicatula* var. *pacificum*); Vella, 1957: 11, 14 (*Nonion*); Eade, 1967a: 53.

Nonion pauperatum (Balkwill & Wright, 1885)

Balkwill & Wright, 1885: 353, pl. 13, figs 25–26 (*Nonionina*); Heron-Allen & Earland, 1911: 342, pl. XI, figs 16–17; Heron-Allen & Earland, 1922: 228 (N.Z.); Cushman, 1930: 13, pl. V, figs 4, 5, 7; Parr, 1950: 370; Eade, 1967a: 53; Haynes, 1973: 210–211 (diag., descr., distrib., refs), text-fig. 44 (nos 4–7), pl. 22, figs 13–14, pl. 23, fig. 4; Boltovskoy & Wright, 1976: 103, 144.

Nonion cf. **simplex** (Karrer, 1864). Hayward & Grace, 1981

Hayward & Grace, 1981: 53 (records from Cuvier Is as *N.* cf. *simplex* (Karrer, 1865: 83, pl. XVI, fig. 17 (as *Nonionina*)); Hayward, 1982b: 64 (off Little Barrier Is).

Nonion subturgidum (Cushman, 1924)

Cushman, 1924: 47, pl. 16, fig. 2; Kustanowich, 1965: 53 (N.Z.); Eade, 1967a: 53.

Nonion umbilicatulum (Walker & Jacob, 1798)

Walker & Jacob *in* Kanmacher [Adam], 1798: 641, pl. 14, fig. 33 (*Nautilus*); Brady, 1884: 726, pl. CIX, figs 8–9 (*Nonionina*); Cushman, 1914: 24, pl. 17, fig. 1; Cushman, 1921: 365–366, pl. 74, figs 3a-b (as of Montagu, 1803: 191 as *Nautilus*); cf. Barker, 1960: 224, pl. 109, figs 8–9; Eade, 1967a: 53 (N.Z. refs).

Genus **Nonionella** Cushman, 1926

Nonionella bradyi (Chapman, 1917)

Chapman, 1917: 71, fig. 42 (*Nonionina scapha* var. *bradii*); Brady, 1884: 731, pl. CIX, fig. 16 as *Nonionina scapha* (Fichtel & Moll.); Parr, 1950: 37 (as *Nonionella bradii*); Cushman, 1955: 233 (generic descr.); Barker, 1960: fig. 16, pl. 109 (CIX) (systematic placing); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay: "Common at some stations on slope.")

Nonionella magnalingua Finlay, 1940

Finlay, 1940: 456, pl. 65, figs 144 & 146; Vella, 1957: 11 (Cook Strait); Hornibrook, 1961: 94, pl. 12, figs 226, 232–233; Kennett, 1966: 55, pl. 6, figs 91–92; Eade, 1967a: 53; Hayward & Buzas, 1979: 67 (Miocene).

Nonionella aff. translucens Cushman, 1933. Lewis, 1979

Lewis, 1979: 37, table 6 (off Southern Hawkes Bay: "Common on mid and lower slope, rare on outer shelf and upper slope."); cf. Cushman, 1933: 45–46, table 25, pl. 11, figs 2a-c.

Nonionella turgida (Williamson, 1858)

Williamson, 1858: 50, 51, pl. IV, figs 95–97 (*Rotalina*); Brady, 1884: 731 (refs & syn.) pl. CIX, figs 17–19; Cushman, 1914: 29, pl. XV, fig. (*Nonionina*); Mestayer, 1916: 130 (*Nonionina*); Heron-Allen & Earland, 1922: 228 (*Nonionella*); Barker, 1960: 224, pl. 109, figs 17–19 (in *Nonionella*, following Cushman, 1939: pl. 9, figs 2–3); Eade, 1967a: 53 (N.Z. refs); Murray, 1971: 6, 7, 192–193 (diag. features etc.), pl. 81, figs 1–5; Schnitker, 1971: 169–215, pl. 10, fig. 10; Haynes, 1973: 213–214 (diag., descr., distrib., refs), text-fig. 45 (no. 4), pl. 22, fig. 12; Thompson, 1975 thesis: 95; Boltovskoy & Wright, 1976: 251; Lewis, 1979: 37–38, table 5 (off Southern Hawkes Bay); Larsen, 1982: pl. 24, fig. 5.

Nonionella cf. **turgida** (Wililamson, 1858). Vella, 1957

Vella, 1957: 11 (Cook Strait, as *N.* cf. *turgida* (Williamson, 1858), *q.v.*); Eade, 1967a: 53 (listed).

Nonionella cf. **turgida** (Williamson, 1858). Hulme, 1964

Hulme, 1964: 332 (Manukau Harbour, as *N.* cf. *turgida* (Williamson, 1858), *q.v.*); Eade, 1967a: 53 (listed).

Genus **Zeaflorilus** Vella, 1962

Zeaflorilus flemingi (Vella, 1957)

Vella, 1957: 11, 13, 37–38, pl. 9, figs 183–184 (*Nonion*); Vella, 1962: 293 (ecol. and stratigraphic range, as *Florilus* "... it may be a *Nonionellina*, but no *Nonionella*-like juveniles have been seen"); Hulme, 1964: 331 (*Florilus*); Kennett, 1966: 53–54, pl. 5, figs 83–34; Eade, 1967a: 53 (refs, as *Florilus*); Hornibrook, 1968: 73, fig. 13; Lewis & Jenkins, 1969: 1–12 (geogr. var.), text-figs 1–9, pl. 1, tables 1–2 (*Nonionella*); Topping, 1973 thesis: 33, pl. 10, fig. 8 (Puhoi Estuary, Auckland); Gordon & Ballantine, 1977: 96 (listed from Leigh region as *Florilus* after Thompson, 1975 thesis, 95); Boltovskoy & Wright, 1976: 54, 92, 231, 365 (*Nonionellina*); Dawson, 1979: 21 (figured specimen of Lewis & Jenkins (1969) listed); Lewis, 1979: 38, table 5 (off Southern Hawkes Bay, as *Nonionella*); Hayward, 1981a: 90 (Tutukaka Harbour, in *Florilus*); Hayward, 1981b: 132 (Bay of Islands); Hayward 1982b: 65 (off Little Barrier Is, in *Zeaflorilus*); Hornibrook *et al.*, 1989: 97, 117 (table 2(5), first appearance), 119 (table 3(1), last occurrence), fig. 22:18; Hayward, 1990: 96 (as *Nonionella*, in nearshore sediments, Bay of Plenty).

Subfamily ASTRONONIONINAE

Genus **Astrononion** Cushman & Edwards, 1937

Astrononion novozealandicum Cushman & Edwards, 1937

Cushman & Edwards, 1937: 35, pl. 3, figs 18a-b; Cushman, 1939: 37, pl. X, fig. 12; Parr, 1950: 371; Hornibrook, 1964: 333–338, pl. 1; Eade, 1967a: 53 (N.Z. refs, note on syn.); Collins, 1974: 53 (Australia); Saidova, 1975: 252, 253, pl. LXIX, fig. 4 (in new genus *Astronoides*); Thompson, 1975 thesis: 95 (*Astrononion*); Gordon & Ballantine, 1977: 96 (listed from Leigh region after Thompson, 1975 thesis); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay, abundance); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 131 (Bay of Islands); Loeblich & Tappan, 1987: 602, 620.

Astrononion stelligerum (d'Orbigny, 1839)

d'Orbigny, 1839b (*in* Barker-Webb & Berthelot), 128, pl. III, figs 1–2 (*Nonionina*); Brady, 1884: 728–729, pl. CIX; Heron-Allen & Earland, 1916: 280, pl. XLIII, figs 8–10; Heron-Allen & Earland, 1922: 227 (N.Z.); Cushman, 1939: 36, pl. X, figs 3–5; Parr, 1950: 371; Cushman, 1955: 233 (type species, generic descr.), key pl. 49, fig. 3; cf. Barker, 1960: 224, pl. 109, figs 3–4; Eade, 1967a: 53; Tappan & Loeblich, 1982: 527–552 pl. 53, fig. 6; Loeblich & Tappan, 1987: pls 619, 694.

Astrononion cf. tumidum Cushman & Edwards, 1937. Lewis, 1979

Lewis, 1979: 37, table 5 (off Southern Hawkes Bay, referred to Brady, 1884: 728–729, pl. CIX, fig. 5 (as *Nonionina stelligera* d'Orbigny), pl. CIX, fig. 5 (see also Barker, 1960: pl. 109 (CIX), fig. 5 and Cushman & Edwards, 1937: 33)); Loeblich & Tappan, 1987: pl. 620.

Subfamily PULLENIINAE

Genus **Melonis** Montfort, 1808

Melonis cf. barleeanum (Williamson). Lewis, 1979

Lewis, 1979: 39, table 5 (off Southern Hawkes Bay: "Common on mid and lower slope" — referred to cf. Brady, 1884: 726, pl. CIX, fig. 8 (as *Nonionina umbilicatula* (Montagu)) "Less open umbilicus than Brady's figure [see also Barker, 1960: 224, pl. 109 (CIX), fig. 8 (systematic placing etc. in *Gavelinonion*)]); cf. Williamson, 1858: 32, pl. III, figs 68–69 (*Noniona*); Cushman, 1930: 11, pl. 4, figs 4–5; Cushman, 1939: 23, pl. 6, fig. 11; see also Galhano, 1963: 57–58 (refs etc., in *Nonion*); Caralp, 1989a: 37–43 *passim;* Caralp, 1989b: 235–245 *passim;* Loeblich & Tappan, 1987: 621, pl. 696.

Melonis sphaeroides Voloshinova, 1958

Voloshinova, 1958: 117; Lewis, 1979: 39, table 3 (off Southern Hawkes Bay: "Rare, only at deepest station [2469 m]" — "The name *M. pompiloides* is retained for Albanian, Pliocene specimens and the name *M. sphenoides* is used for more globose, more coarsely perforated Recent specimens" — incl. *Melonis pompiloides* (Fichtel & Moll, 1798) — Fichtel & Moll, 1798 [1803]: 31, pl. 2, figs 3a-c (*Nautilus*); Brady, 1884: 727, pl. CIX, figs 10–11 (*Nonionina*); Cushman, 1914: 25, pl. 17, fig. 2; Cushman, 1921: 366 (refs); Heron-Allen & Earland, 1922: 227 (N.Z.); Cushman, 1930: 4, pl. 1, figs 7–11, pl. 2, figs 1–2; Cushman, 1933: 41, pl. 10, figs 1–2; Cushman, 1939: 19, pl. 5, figs 9–12; Phleger *et al.*, 1953: 30, pl. 6, figs 7–8; Barker, 1960: pl. 109, figs 10–11 (*Nonion*, taxon. notes on Brady, 1884); Galhano, 1963: 58 (refs etc.), pl. VI, fig. 2; Eade, 1967a: 54; Eade, 1970: 34–37 (present-day ecology of Upper Miocene occurrence), tables II–III; Murray, 1971: 7, 198–199 (diag. features etc.), pl. 84, figs 1–7; Schnitker, 1971: 169–215, pl. 10, fig. 14; Douglas, 1973: pl. 9, figs 8–9 (*Melonis*); Hayward & Buzas, 1979: 65 (Miocene); Haake, 1980: 18, pl. 3, fig. 24; Larsen, 1982: pl. 25, fig. 11; see also Loeblich & Tappan, 1987: 621, pl. 696.

Genus **Pullenia** Parker & Jones, 1862

Pullenia bulloides (d'Orbigny, 1826)

d'Orbigny, 1826: 293, no. 2 (*Nonionina*); d'Orbigny, 1846: 107, pl. V, figs 8–10; Brady, 1884: 615–616 (refs & syn.), pl. LXXXIV, figs 12–13; Cushman & Todd, 1943: 13, pl. 2, figs 15–18 (*Pullenia*); Cushman, 1955: 320 (type species, generic descr.), pl. 26, fig. 13, key pl. 33, figs 18–20; cf. Barker, 1960: 174; Hornibrook, 1961: 90, pl. 11, figs 205–206; Vella, 1963: 12 (ecol. etc., refs), pl. 1, figs 7–8; Todd, 1965: 48, pl. 18, fig. 6; Kennett, 1966a: 51–52 (Upper Miocene), pl. 5, figs 73–74; Eade, 1967a: 53 (N.Z. refs, note on syn.); Gibson, 1967: 45, pl. 10, figs 168–169; Collins, 1974: 54 (Australia); Hayward, 1979c: 216 (early Miocene, Auckland); Hayward & Buzas, 1979: 72 (Miocene), pl. 24, figs 303–304; Lewis, 1979: 38, table 5 (off Southern Hawkes Bay: "Common on mid and lower slope."); Boltovskoy *et al.*, 1980: 43 (descr., etc.), pl. 25, figs 9–11; Larsen, 1982: pl. 24, figs 6–7; Loeblich & Tappan, 1987: 696; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Pullenia notalnella Saidova, 1975

Saidova, 1975: 256–257 pl. LXX, fig. 1 ("Ob" Stn 354, 266 m).

Pullenia quinqueloba (Reuss, 1851)

Reuss, 1851b: 71, pl. 5, figs 31a–b (*Nonionina*); Brady, 1884: 617 (refs & syn. etc.), pl. LXXXIV, figs 14–15 (*Pullenia*); Cushman, 1914: 21, pl. 13, fig. 2; Cushman & Todd, 1943: 10, pl. 2, fig. 5, pl. 3, fig. 8; Barker, 1960: 174; Kennett, 1966: 51 (Upper Miocene in N.Z., see also Hornibrook, 1961: 90; pl. 11, figs 207–208 and Vella, 1963: 12 (*P. quinqueloba*), 12, pl. I (*P. quadriloba*)); Todd, 1965: 48–49 (refs etc.), pl. 18, fig. 7; Eade, 1967a: 53 (N.Z. refs); Vella, 1963: 12 (ecol., range etc., refs, as *P. quinqueloba*), 12, pl. 1, figs 9–10 (as *P. quadriloba* Reuss, 1867); Gibson, 1967: 46, pl. 10, figs 172–173 (*P. quinqueloba* Reuss), 46, pl. 10, figs 170–171 (*P. quadriloba* Reuss)); Schnitker, 1971: pl. 10, fig. 11; Collins, 1974: 54; Hayward, 1979c: 216 (early Miocene, Auckland); Hayward, 1982b: 65 (off Little Barrier Is).

Pullenia subcarinata (d'Orbigny, 1839)

d'Orbigny, 1839: 28, pl. VI, figs 23–24 (*Nonionina*); Reuss, 1851b: 71, pl. 5 (*Nonionina quinqueloba*); Brady, 1884: 617, pl. LXXXIV, fig. 14 (as *Pullenia quinqueloba* (Reuss, 1851)); Heron-Allen & Earland, 1932: 403 (*Pullenia*); Barker, 1960: 174 (systematic placing etc.), pl. LXXXIV, figs 14–15; Hornibrook 1961: 90, pl. 11, figs 207–208 (as *P. quinqueloba* (Reuss)); Sissingh, 1973: 362 (Antarctic, remarks etc.); Thomp-

son, 1975 thesis: 95; Lewis, 1979: 38, table 5 (off Southern Hawkes Bay: "Rare on shelf, common on slope.").

Superfamily CHILOSTOMELLACEA
Family CHILOSTOMELLIDAE

Genus **Chilostomella** Reuss, 1850

Chilostomella cushmani Chapman, 1941

Chapman, 1941: 177 (including *C. ovoidea* of Cushman, 1919), pl. 8, fig. 9, pl. 9, fig. 6; Cushman, 1919: 621 (as *Chilostomella ovoidea* Reuss, 1850); Cushman, 1921: 662; Cushman, 1926a: 75, pl. 11, fig. 12 (as *C. grandis*); Eade, 1967a: 52; Lewis, 1979: 37, table 5 (off Southern Hawkes Bay: "Common on upper slope, rare elsewhere" — referred to Brady, 1884: pl. LVI, fig. 13 [*sic*].

Chilostomella cf. oolina Schwager, 1878. Lewis, 1979

Lewis, 1979: 37, table 5 (off Southern Hawkes Bay, abundance — referred to Brady, 1884: pl. LV, figs 14 & 17 (see also Barker, 1960: 112, pl. 55, figs 14 & 17; and Schwager, 1866 = 1878: 521, pl. 1, fig. 16)).

Chilostomella ovoidea Reuss, 1850

Reuss, 1850: 380, pl. 48, fig. 12; Brady, 1884: 436, pl. LV, figs 12–23 (*Chilostomella*, cf. Barker, 1960: 112); Cushman, 1914: 2, pl. 1, figs 1–5; Cushman, 1921: 283; Cushman, 1924: 2, pl. 1, figs 1–10; Cushman, 1926a: 74, pl. 11, figs 1a-c; Cushman, 1955: 319 (type species, generic descr.), pl. 26, fig. 8, key pl. 33, figs 9–11; cf. Barker, 1960: 112, pl. 55, figs 12–23 (status etc.); Hornibrook, 1961: 89, pl. 11, fig. 209; Galhano, 1963: 84; Kennett, 1966a: 50–51 (Upper Miocene in N.Z., remarks etc.), pl. 4, figs 69–71; Eade, 1967a: 52 (N.Z. refs); Gibson, 1967: 45, pl. 10, fig. 166; Thompson, 1975 thesis: 94 (off northeastern N.Z., as *C. oolina* Schwager); Hayward & Buzas, 1979: 47 (Miocene), pl. 9, figs 117–118; Loeblich & Tappan, 1987: 625, pl. 701.

Family QUADRIMORPHINIDAE
Genus **Quadrimorphina** Finlay, 1939

Quadrimorphina allomorphinoides (Reuss, 1860)

Reuss, 1860: 223, pl. 11, fig. 6 (*Valvulina*); Brady, 1884: 654, pl. XCI, figs 5 & 8 (*Discorbina*); Chapman, 1909: 357 (N.Z. in *Discorbina*); Cushman, 1915: 21, text-figs 25a-c, pl. 9, fig. 1; Cushman, 1955: 318 (type species, generic descr.), key pl. 53, fig. 13; cf. Barker, 1960: 188 (status etc.); Eade, 1967a: 53; Loeblich & Tappan, 1987: 627, pl. 705.

Quadrimorphina pescicula Saidova, 1975

Saidova, 1975: 246, pl. LXVII, fig. 9, pl. CVIII, fig. 3 ("Vityaz" Stn 3840, 1235 m).

Family ALABAMINIDAE
Genus **Svratkina** Pokorny, 1956

Svratkina australiensis (Chapman, Parr & Collins, 1934)

Chapman *et al.*, 1934: 563, pl. 8, fig. 9 (*Discorbis tuberculata* (Balkwill & Wright) var. *australiensis*); Todd, 1965: 14–15 (characters etc., refs); Hayward & Grace, 1981: 54 (off Cuvier Is); Hayward, 1981a: 84 (first N.Z. record), 92, fig. 5j; Hayward, 1982b: 65 (off Little Barrier Is).

Family OSANGULARIIDAE
Genus **Osangularia** Brotzen, 1940

Osangularia bengalensis (Schwager, 1866)

Schwager, 1866: 259, pl. VII, fig. 111 (*Anomalina*); Brady, 1884: 668, pl. XCVI, fig. 3 (as *Truncatulina cultter* (Parker & Jones); Chapman & Parr, 1937: 119 (Brady's form from the Pacific = *Anomalina bengalensis* Schwager); Finlay, 1939: 523 (n.g. *Parrella* with *A. bengalensis* as type species); Thalmann & Graham, 1952: 31–32 (reinstatement of *Osangularia* for *Parrella* Finlay, 1939, not of Ginsburg, 1938); Barker, 1960: 198 (*Osangularia* to be used for *Parrella* preoccupied (Ginsburg, 1938), pl. 96 (XCVI), fig. 3); Lewis, 1979: 38, table 5 (off Southern Hawkes Bay: "Common on mid and lower slope."); Loeblich & Tappan, 1987: 630, pl. 708.

Osangularia sp. Lewis, 1979

Lewis, 1979: 38, table 5 (off Southern Hawkes Bay: "Smaller and more thin-walled than *O. bengalensis* ... Rare, on slope.").

Family ORIDORSALIDAE
Genus **Oridorsalis** Andersen, 1961

Oridorsalis tenerus (Brady, 1884)

Brady, 1884: 665, pl. XCV, figs 11a-c (*Truncatulina*); Cushman, 1915: 37, pl. 15, fig. 2; Cushman, 1921: pl. 64, figs 2a-c; Barker, 1960: 196, pl. 95, fig. 11; Kennett, 1966a: 60 (Upper Miocene (Kapitean Stage), N.Z., remarks), pl. 7, figs 118–119; Eade,

1967a: 54 (N.Z. refs); Lewis, 1979: 38, table 5 (off Southern Hawkes Bay, abundance); Tappan & Loeblich, 1982: pl. 53, fig. 9.

Oridorsalis umbonatus (Reuss, 1851)

Reuss, 1851b: 75, pl. 5, fig. 35 (*Rotalia*); Brady, 1884: 695, pl. CV, figs 2a-c (*Pulvinulina*); Cushman, 1915: 60, pl. 27, fig. 2; Cushman, 1921: 339–340, pl. 71, figs 1a-c; Barker, 1960: 216; Eade, 1967a: 54 (N.Z. refs); Vincent *et al.*, 1981: 221–230 *passim* (palae-oceanogr./isotopes etc.); Larsen, 1982: pl. 24, figs. 11–12.

Family HETEROLEPIDAE
Genus **Anomalinoides** Brotzen, 1942

Anomalinoides glabrata (Cushman, 1924)

Cushman, 1924: 39, pl. 12, figs 5–7 (*Anomalina*); Cushman, 1955: 333 (generic descr.); Todd, 1965: 49–50; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1981b: 131 (Bay of Islands); Hayward, 1982b: 63 (off Little Barrier Is).

Anomalinoides nipponicus (Ishizaki, 1944)

Ishizaki, 1944: 102, pl. III, fig. 3 (*Gyroidina*); Lewis, 1979: 38, table 5 (off Southern Hawkes Bay, abundance).

Anomalinoides sphericus frigindex Vella, 1957

Vella, 1957: 11, 13, 39, pl. 9, figs 192–194; Hulme, 1964: 338; Kustanowich, 1965: 53; Eade, 1967a: 54; Hornibrook, 1968: 73.

Anomalinoides sphericus sphericus (Finlay, 1940)

Finlay, 1940: 460, pl. 6, figs 166–171 (*Anomalina*); Vella, 1957: 39; Eade, 1967a: 54 (refs); Hornibrook, 1968: 73 (descr., range), fig. 13; Lewis, 1979: 38, table 5 (off Southern Hawkes Bay: "Common shelf, rare on upper slope." — "Many specimens ... closely resemble *A. pinguiglabra*."); Hornibrook *et al.*, 1989: 117 (table 2(5), first appearance), 119 (table 3(1), last occurrence).

Anomalinoides sp. Lewis, 1979

Lewis, 1979: 38–39, table 5 (off Southern Hawkes Bay: "Smaller and more compressed than *A. nipponicus* " — "Common on upper slope, occurs at isolated stations elsewhere.").

Genus **Heterolepa** Franzenau, 1884

Heterolepa aff. dutemplei (d'Orbigny, 1846). Lewis, 1979

d'Orbigny, 1846: 157, pl. VIII, figs 19–21 (*Rotalia*); Lewis, 1979: 39, table 5 (off Southern Hawkes Bay: "Common on Motukura Bank, rare elsewhere" — referred to Loeblich & Tappan, 1964: fig. 623, no. 3); cf. also Reuss, 1865: 160, pl. IV, fig. 16 (*Truncatulina*); Terrigi, 1880: 202, pl. II, fig. 49 (*Planorbulina*); Brady, 1884: 665, pl. XCV, figs 5a-c (*Truncatulina*); Andreae, 1884: 213, pl. VIII, fig. 10 (*Pseudotruncatulina*); Franzenau, 1885: 151, pl. VII, figs 1–4 (*Heterolepa*); Terrigi, 1889: 118, pl. VIII, figs 10–11.

Heterolepa palpatio Saidova, 1975

Saidova, 1975: 262, pl. LXXI, fig. 6 (distrib., incl. Kermadec Is); Loeblich & Tappan, 1987: 63, pl. 709.

Family GAVELLINELLIDAE
Subfamily GYROIDINOIDINAE

Genus **Gyroidinoides** Brotzen, 1942

Gyroidinoides neosoldanii (Brotzen, 1936)

Brotzen, 1936: 158 (*Gyroidina;* incl. *Rotalia soldanii* of Brady, 1884: pl. CVII, figs 6a-c, 7a-c, as listed by Murray, 1895: 605); Cushman, 1955: 290 (generic descr.); Vella, 1957: 10 (Cook Strait); Barker, 1960: 220, pl. CVII, figs 6–7; Todd, 1965: 19–20 (refs & syn. incl. in *Gyroidina soldanii* d'Orbigny, 1826); Kennett, 1966a: 57–58 (Upper Miocene (Kapitean), N.Z.); Eade, 1967a: 54; Murray, 1971: 7, 196–197 (diag. features, in *Gyroidina*), pl. 83, figs 1–5; Thompson, 1925 thesis: 96; Larsen, 1979: 38, table 5 (off Southern Hawkes Bay: "A few specimens at many stations"); Larsen, 1982: pl. 25, figs 5–6.

Gyroidinoides soldanii (d'Orbigny, 1826)

d'Orbigny, 1826: 278, no. 5, Modèles No. 36 (*Rotalia (Gyroidina)*); Brady, 1884: 706, pl. CVII, figs 6–7, cf. Barker, 1960: 220; Cushman, 1915: 71, pl. 29, fig. 1, pl. 31, fig. 4; Sidebottom, 1918: 261, pl. VI, figs 27–28; Cushman, 1921: 349–350, pl. 71, figs 2a-c; Cushman, 1931: 38, pl. VIII, figs 3–8; Parr, 1950: 360; Todd, 1965: 19–20 (refs & syn. incl. *Gyroidina neosoldanii* Brotzen, 1936), pl. 6, fig. 4; Eade, 1967a: 54 (N.Z. refs); Collins, 1974: 54 (Victoria record, as *Gyroidina*); Boltovskoy & Wright, 1976: 337.

Subfamily GAVELLINELLINAE
Genus **Anomalinulla** Saidova, 1975

Anomalinulla marina Saidova, 1975

Saidova, 1975: 278, pl. LXXVI, fig. 9 ("Ob" Stn 354, 266 m).

Genus **Discanomalina** Asano, 1951

Discanomalina coronata (Parker & Jones, 1857)

Parker & Jones, 1857: 294, pl. 10, figs 15–16 (*Anomalina*); Brady, 1884: 91, 675, pl. XCVII, figs 1–2; Cushman, 1915: 47, pl. 18, fig. 5; Cushman, 1921: 326, pl. 61, figs 2a-c; Loeblich & Tappan, 1957: 230 (*Paromalina*); Barker, 1960: 200, pl. 97, figs 1–2; Eade, 1967a: 54 (N.Z. refs).

Discanomalina semipunctata (Bailey, 1851)

Bailey, 1851: 11, pls 17–19 (*Rotalina*); Brady, 1884: 676, pl. XCVII, figs 3–7 (*Anomalina*); Barker, 1960: 200; Todd, 1965: 50 (refs & syn. as *Anomalina*); Eade, 1967a: 54 (N.Z. refs, note on syn.).

Genus **Gyroidella** Saidova 1975

Gyroidella planata Saidova, 1975

Saidova, 1975: 277, pl. CXI, fig. 3 (distrib., incl. Kermadec Is).

Genus **Gyroidina** d'Orbigny, 1826

Gyroidina orbicularis d'Orbigny, 1826

d'Orbigny, 1826: 278, no. 1, Modèles No. 13; Brady, 1864: 470, pl. 48, fig. 16; Brady, 1884: 706, pl. CVII, fig. 5, pl. CXV, fig. 6; Cushman, 1915: 68, text-figs 62a-c, pl. 29, fig. 3; Sidebottom, 1918: 261; Cushman, 1955: 290 (type species, generic descr.), pl. 24, fig. 7, key pl. 30, figs 3–4; Barker, 1960: pl. 115, figs 6a-c (taxon. notes on Brady, 1884); Eade, 1967a: 54 (N.Z. refs); Schnitker, 1971: 169–215, pl. 9, fig. 9; Boltov-skoy & Wright, 1976: 121; Lewis, 1979: 38, table 5 (off Southern Hawkes Bay: "Common everywhere" — referred to Brady, 1884: 706 (in *Rotalia*), pl. CXV, fig. 6 (see (as *Rotalia*) also Barker, 1960: 238, pl. 115, fig. 6)), cf. Hayward & Buzas, 1979: 60 (Miocene)); Chave, 1987: 68, pl. 12, fig. 6; Loeblich & Tappan, 1987: 638, 639, pl. 716, 719.

Gyroidina tropica Saidova, 1975

Saidova, 1975: 275–276, pl. LXXVI, fig. 7 (distrib., incl. New Zealand).

Gyroidina sp. Hayward, 1990

Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

* Note Hansen & Rögl (1988b: 106–108) re. proposed conservation of *Hanzawaia* Asano, 1944, by suppression of senior synonyms *Florilus* de Montfort, 1808, and *Nonionina* d'Orbigny, 1826.

* Genus **Hanzawaia** Asano, 1944

Hanzawaia asterizans (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 37, pl. III, figs e-h (*Nautilus*); Brady, 1884: 728, pl. CIX, figs 1–2 (as *Nonionina*, refs &c. syn.); Heron-Allen & Earland, 1913: 143, pl. XIII, figs 12-13; Eade, 1967a: 53 (N.Z. refs).

Hanzawaia auricula (Heron-Allen & Earland, 1930)

Heron-Allen & Earland, 1930b: 192–193, pl. V, figs 68–70 (*Nonionella*); Hulme, 1964: 332; Eade, 1967a: 53; Schnitker, 1971: 169–215, pl. 10, fig. 9.

Hanzawaia bertheloti (d'Orbigny, 1839)

d'Orbigny, 1839 (in Barker-Webb & Berthelot): 135, pl. I, figs 28–30 (*Rosalina*); Brady, 1864: 469, pl. 48, figs 10a-b (*Discorbina*); Brady, 1884: 650, pl. LXXXIX, figs 10–12; Rhumbler, 1906: 70 (Chatham Is); Chapman, 1909: 356; Cushman, 1915: 20, pl. VII, fig. 3 (*Discorbis*); Cushman, 1921: 305–306, pl. 59, figs 1a-c; Cushman, 1931: 16, pl. III, fig. 2; Cushman & Parr, 1937: 102; Parr, 1945: 210; Parr, 1950: 355; Phleger & Parker, 1951: 20, pl. 10, figs 1a-b, 2a-b; Hofker, 1951: 359 (type species of new genus *Discopulvinulina*); cf. Hornibrook & Vella, 1954: 28 (*Hanzawaia* for *Rosalina bertheloti* group, see also Andersen, 1961: 124); Parker, 1954: 523, pl. 8, figs 22–23 (*Rosalina*); Vella, 1957: 10 (*Discopulvinulina*); Boltovskoy, 1959: 104, pl. 17, figs 4a-b (*Cibicides*); Barker, 1960: 184, pl. 89, fig. 10 (*Discopulvinulina*); Andersen, 1961: 126–127 (generic status, syn. etc.), pl. 21, figs 3a-c (*Discopulvinulina*); Galhano, 1963: 75 (refs etc., as *Discorbis*), pl. VII, fig. 18; Hulme, 1964: 334 (N.Z. refs); Eade, 1967a: 42 (refs to N.Z. records, as *Discorbinella*); Albani, 1968b: 109 (range etc.), pl. 8, figs 19–20, 25–26; Schnitker, 1971: 169–215, pl. 5, fig. 17; cf. Haynes, 1973: 149–150; Colom, 1974: 126, figs 211-n, t-w; Thompson, 1975 thesis: 87, pl. 21, figs 3–5 (*Rosalina*); Gordon & Ballantine, 1977: 96 (listed from Leigh region (after Thompson 1975 thesis: 41, 87, pl. 21, figs 3–5) as *Rosalina berthelloti* [sic]); Hayward & Buzas, 1979: 50–51 (Miocene), pl. 8, figs 103–105, pl. 12, figs 151–152; Albani, 1979: 39 (features), fig. 80.1; Hayward, 1979b: 184 (*Zostera* pool community, N.Z.), figs 3e & 4; Boltovskoy *et al.*, 1980: 27 (descr., etc. in *Discorbis*), pl. 11, figs 5–7; Hayward & Grace, 1981: 52 (off Cuvier Is); Hayward, 1982b: 64 (N.Z. occurrence as *Hanzawaia*); Finger 1982: 160 (*Rosalina/Discorbina/Hanzawaia*); Larsen, 1982: pl. 14, figs 3–4; Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Hanzawaia cf. **bertheloti** (d'Orbigny, 1839).

Hornibrook, 1952

Hornibrook *in* Fleming, 1952: 82 (as *Discorbis* cf. *bertheloti* (d'Orbigny, 1839), *q.v.*); Eade, 1967a: 42 (listed under *Discorbinella*).

Hanzawaia cf. **bertheloti** (d'Orbigny, 1839). Kustanowich, 1965

Kustanowich, 1965: (as *Discopulvinulina* cf. *bertheloti* (d'Orbigny, 1839), *q.v.*); Eade, 1967a: 42 (listed under *Discorbinella*).

Hanzawaia cf. **bertheloti** (d'Orbigny, 1939). Lewis, 1979

Lewis, 1979: 33, table 5 (off Southern Hawkes Bay, referred to Loeblich & Tappan, 1964: fig. 453, no. 3: "... some specimens tend towards shape of *D. baconica* var. *baconica* as illustrated by Brady, 1884, pl. 90, fig. 1 (cf. also Barker, 1960: 186 pl. 90 (XC), fig. 1), abundance).

Hanzawaia boueanus (d'Orbigny, 1846)

d'Orbigny, 1846: 108, pl. 5, figs 11–12 (*Nonionina*); Brady, 1884: 729, pl. CIX, figs 12–13; Cushman, 1914: 28, pl. 16, fig. 1; cf. Barker, 1960: 224 (status etc.); Galhano, 1963: 57 (distrib., refs etc. as *Nonion*), pl. VI, fig. 1; Eade, 1967a: 53 (N.Z. refs); Chave, 1987: 68 (as *Nonion*), pl. 12, fig. 2.

Hanzawaia complanata (Sidebottom, 1918)

Sidebottom, 1918: 253, pl. VI, figs 1–3 (*Discorbina bertheloti* (d'Orbigny) var. *complanata*); Parr, 1950: 356; Hayward, 1982b: 64 (N.Z.).

Hanzawaia cf. **complanata** (Sidebottom, 1918). (Vella, 1957)

Vella, 1957: 10 (as *D.* cf. *complanata* (Sidebottom, 1918: 253, pl. 6, figs 1–3, as *Discorbina bertheloti* var. *complanata*)); Eade, 1967a: 42 (listed under *Discorbinella*).

Hanzawaia cf. **grateloupii** (d'Orbigny, 1826). (Hulme, 1964)

Hulme, 1964: 332 (Manukau Harbour) (*Nonion*); cf. d'Orbigny, 1826: 294, no. 19 (*Nonionina*) and d'Orbigny, 1839: 46, pl. VI, figs 6–7; Eade, 1967a: 53 (listed); cf. Seiglie, 1968: 2231 *et seq.*; Seiglie, 1971: figs 7–8; Seiglie, 1973: 3 *et seq.*; cf. Collins, 1974: 53 (Australian specimens); cf. Boltovskoy & Wright, 1976: 33; cf. Boltovskoy *et al.*, 1980: 33 (descr. etc.), pl. 16, figs 11–14.

Hanzawaia lucida Saidova, 1975

Saidova, 1975: 268–269, pl. LXXIII, figs 7–8 (distrib., incl. New Zealand).

Hanzawaia parri (Cushman, 1936)

Cushman, 1936b: 89, pl. 13, figs 17a-c (*Nonionella*); Vella, 1957: 11 (*Pseudononion*); Vella, 1962: 294 (ecol. and stratigraphic range; in new genus *Zeaflorilus*); Kennett, 1966: 54 (Upper Miocene in N.Z., distrib., refs), pl. 6, figs 89–90; Eade, 1967a: 53 (N.Z. refs, as *Zeaflorilus*); Hornibrook, 1968: 76, fig. 14 (*Florilus*); Collins, 1974: 54 (as *Nonionella*, comparison with Australian material); Thompson, 1975 thesis: 95; Lewis, 1979: 38, table 5 (off Southern Hawkes Bay, as *Zeaflorilus*, abundance); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.), figs 3j, 4; Hayward, 1981a: 81, 92 (Tutukaka Harbour, in *Zeaflorilus*), fig. 4 (abundance); Hayward, 1982a: 45 (off Cavalli Is, see also Hoskins, 1978); Hornibrook *et al.*, 1989: 103 (as *Zeaflorilus*), 117 (table 2(5), first appearance, N.Z.), 119 (table 3(1), last occurrence), fig. 22:11.

Hanzawaia scaphum (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 105, pl. XIX, figs d-f (*Nautilus*); Brady, 1884: 730–731 (refs & syn.), pl. CIX, figs 14, 15 (?16); Cushman, 1914: 28, pls 15, 16, figs 1, 3 & 4; Eade, 1967a: 53 (N.Z. refs); Lewis, 1979: 37, table 5 (off Southern Hawkes Bay, abundance, referred to Brady, 1884: pl. CIX, pl. 14–15 (*Nonionina*); see also Barker, 1960: 224, pl. 109, figs 14–15; Hamsa & Ghandi, 1983: 163 (as *Nonionina*, diag., refs etc.), fig. 1d.

Hanzawaia turea Saidova, 1975

Saidova, 1975: 269, pl. LXXIV, fig. 1 (distrib., incl. Kermadec Is and New Zealand).

Hanzawaia sp. (Gregory, 1973)

Gregory, 1973: 197 (N.Z. mangrove ecol., *Florilus*).

Family KARRERIIDAE

Genus **Karreria** Rzehak, 1891

Karreria maoria (Finlay, 1939)

Finlay, 1939b: 326, pl. 29, figs 148–151, 158 (*Vagocibicides*); Parr, 1950: 365, pl. 15, figs 8a-c (as *Dycocibicides laevis*); Collins, 1953: 103, pl. 1, figs 9a-c (as *V.* cf. *maoria*); Vella, 1957: 11 (Cook Strait records); Hornibrook, 1961: 165, pl. 26, fig. 515; Carter, 1964: 90, pl. 6, figs 116–120; Loeblich & Tappan, 1964: C670, fig. 623, 19 (*Karreria*); Eade, 1967a: 54; Hayward & Buzas, 1979: 61 (Miocene), pl. 19, figs 233–234; Hayward, 1982b: 64 (off Little Barrier Is).

Family TRICHOHYALIDAE
Genus **Buccella** Anderson, 1952

Buccella cf. **depressa** Anderson, 1952. Hulme. 1964
Hulme, 1964: 334 (Manukau Harbour, as *B.* cf. *depressa* Anderson, 1952: 145, text-figs 7–8; Eade, 1967a: 42 (listed).

Buccella frigida (Cushman, 1922)
Cushman, 1922c: 12 (144) (*Pulvinulina*, incl. Recent forms attributed to the Cretaceous *P. karsteni*); Heron-Allen & Earland, 1922: 218 (N.Z. record as *Pulvinulina karsteni*); Anderson, 1952: 147, text-fig. 6 (*Buccella*); Hulme, 1964: 334 (Manukau Harbour) (refs); Eade, 1967a: 42; Murray, 1971: 7–9, 128–129 (diag. features etc.), pl. 53, figs 1–5; Hayes, 1973: 193–194 (diag., descr., distrib., refs), text-fig. 42 (nos 1–5), pl. 18, fig. 13; Boltovskoy & Wright, 1976: 30, 38, 45, 50, 75, 117, 144, 154, 227, 243; Murray, 1979: 54 (descr.), figs 17E–G; Hayward, 1981a: 90 (Tutukaka Harbour); Todd & Low, 1981: 41 (in key), 3 figs.

Superfamily ROTALIACEA
Family ROTALIIDAE
Subfamily ROTALIINAE

Genus **Rotalia** Lamarck, 1804

Rotalia craticulata Parker & Jones, 1865
Parker & Jones, 1865: 387, pl. 19, fig. 12; Heron-Allen & Earland, 1922: 220 (N.Z.); Eade, 1967a: 46.

Subfamily AMMONIINAE
Genus **Ammonia** Brünnich, 1771

Ammonia beccarii (Linnaeus, 1758)
Linnaeus, 1758: 710 (*Nautilus*); d'Orbigny, 1826: 275, no. 40, Modèles no. 74 (*Rotalia (Turbinulina);* Williamson, 1858: 48, pl. IV, figs 90–92 (*Rotalina*); Parker & Jones, 1865: 388, pl. 16, figs 29–30 (*Rotalia*); Brady, 1884: 704, pl. CVII, figs 2–3 (cf. Barker, 1960: 220); Cushman, 1915: 67, pl. 30, fig. 3; Cushman, 1921: 345 (as of Linnaeus, 1767), pl. 70, figs 3a-c; Cushman, 1928: 103–107; Finlay, 1940: 461 (*Streblus aoteanus*, new name for *Rotalia beccarii* (Linnaeus, 1767) of N.Z. records); Parker *et al.*, 1953: 13, pl. 4, figs 20–22, 25–30; Barker, 1960: 220, pls. 107, fig. 2; Cifelli, 1962: 119–126 (morphol.); Wood *et al.*, 1963: 156–157, pl. 14–15 (structure etc.); Galhano, 1963: 79–80, pl. VIII, figs 4–5 (refs etc.); Huang, 1964: 52, pl. 2, fig. 6; Kennett, 1966a: 60–61, pl. 7, figs 115–117 (Upper Miocene (Kapitean), N.Z.); Hedley *et al.*, 1967: 47, text-figs 56–60, pl. 11, figs 4a-c; Eade, 1967a: 46 (N.Z. refs); Murray, 1968a: 83–96; Gregory, 1973: 194, 195 (N.Z. mangrove swamp as *A. beccarii* (Linnaeus, 1758)), figs 2.1–2.3, table 2; cf. Colom, 1974: 140, figs 23–25 (discuss. of forms of *Ammonia beccarii* (L.) —see also Phleger & Ewing, 1962: 145–181, pl. 5, figs 22–23 (*Streblus*); Parker *et al.*, 1953: 13, pl. 4, figs 20–22, 25–30 ("*Rotalia*" *beccarii*) variants); Phleger, 1964: 37–38, table I (ecol. and population var.); Haman, 1966: 69, pl. 7, figs 17–19; Vedantam & Subba Rao, 1970: 325–344; Phleger, 1970: 522 *et seq.*, 529, 530, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9; Meischner, 1970: 83–86, 9 pls (Siamese twinning); Parvati, 1971: 3–16 (detail acc. of morphol.), text-fig. 2, pl. 2, figs 1a-b, pl. 5, figs 1–4; Lamb, 1972: 1–12 (salinity and distrib. in habitat); Haynes, 1973: 184–192 (variants); Collins, 1974: 40 (remarks etc.), pl. 3, figs 30a-c; cf. Schnitker, 1974: 217–223, text-figs 1–5, pl. 1 (ecotypic var.); Chang & Kaesler, 1974: 1–23, text-figs 1–4 (morphol. var.); Gordon & Ballantine, 1977: 96 (listed from Leigh region as *A. beccarii* after Thompson, 1975 thesis: 88); Boltovksoy & Wright, 1976: 50, 86, 95, 143, 145, 225, 226, 233, 234, 237, 244, 258, 265 (*Ammonia*), 35, 65, 103, 116–119, 141–143, 146–148, 152–156, 227, 233, 236, 247, 251, 253, 363 (*Rotalia*); Albani, 1979: 40 (features), fig. 88.1; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay, as *A. aoteanus* (Finlay): "Moderately common on inner shelf, rare on outer shelf."); Hay-ward, 1979b: 184 (*Zostera* pool community, N.Z., as *A. beccarii*), figs 3a, 4; Murray, 1979: 56 (descr., variants, etc.), figs 18A–L, table 2; Boltovskoy *et al.*, 1980: 15 (descr., etc.), pl. 1, figs 4–7; Scott & Medioli, 1980: 35 (refs & syn., *A. beccarii* (L.)), pl. 5, figs 8–9; Todd & Low, 1981: 39 (in key, variant forms), 9 figs; Hayward, 1981a: 80, 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 131 (Bay of Islands); Cann & De Decker, 1981: 660–670 (variant forms etc.); Haig & Burgin, 1982: 359–366 (living assemblages); Hayward, 1982b: 63 (off Little Barrier Is); Larsen, 1982: pl. 17, figs 1–2; Buzas & Severin, 1982: 36 (refs & syn.), pl. 7, figs 9–10; Malmgren, 1984: 737–746 (morphol./environment); Levy *et al.*, 1986: 63–70, pls 1–2; McMillan, 1987: 32–42 (mo-phol/stratigr.); Miranda & Parada Ruffinati, 1987: 49–60 (distrib./sediments/nitrogen); Loeblich & Tappan, 1987: 677, pl. 767; Jorissen, 1988: 1 *et seq.* (distrib., ecol. var./taxon.); Chandler, 1989: 354–360 *passim* (interspecific compet./sediment colonisation etc.); Hornibrook *et al.*, 1989: 84, 118 (table 2(6), first appearance, N.Z.), 119 (table 3(1), last occurrence), fig. 23:22a; Walton & Sloan, 1990: 128–156, figs.

Ammonia gaimardii (d'Orbigny) var. **compressiuscula** (Brady, 1884)

Brady, 1884: 708, pl. CVII, figs 1a-c, pl. CVIII, figs 1a-c (*Rotalia papillosa* var. *compressiuscula*); Cushman, 1915: 70, pl. 30, fig. 1; Cushman, 1921: 348–349, pl. 72, figs 2a-c; Barker, 1960: 220, pl. 107, fig. 1 (as *Streblus* following Ishizaki, 1940); Eade, 1967a: (N.Z. refs).

Family CALCARINIDAE

Genus **Baculogypsina** Sacco, 1894

Baculogypsina sphaerulata (Parker & Jones, 1860)

Parker & Jones, 1860: 33 (*Orbitolina concava* Lamarck var. *sphaerulata*); Brady, 1884: 716, pl. CI, figs 4–7(as *Tinoporus baculatus* (Montfort?)); Sacco, 1894: 206 (incl. *T. baculatus* of Brady, 1884); Cushman, 1919: pl. 44, fig. 6; Cushman, 1921: 359–360 (descr., etc.), pl. 75, fig. 6; Cushman, 1955: 304, type species, generic desc.), pl. 25, fig. 5, key pl. 32, figs 5–6; Barker, 1960: 208 (note on syn. and *T. baculatus* Carpenter and of Brady), pl. 101, figs 4–7; Jell *et al.*, 46; Boltovskoy & Wright, 1976: 75, 112; Adams *et al.*, 1980: 9 (type).

Family ELPHIDIIDAE
Subfamily ELPHIDIINAE

Genus **Elphidium** Montfort, 1808

Elphidium advenum (Cushman, 1922)

Cushman, 1922a: 56, pl. 9, figs 11–12 (*Polystomella*); Cushman, 1939: 60, pl. 16, figs 31–35 (*Elphidium*); Finlay, 1952: 61, 62; Todd & Bronnimann, 1957: 1–43, pl. 6, figs 5–7; McKenzie, 1962: 127 (Australia, range, refs); Eade, 1967a: 46 (refs); Albani, 1968a: 33, fig. 150; Albani, 1968b: 111 (descr., distrib. etc.), pl. 10, fig. 6; Schnitker, 1971: 169–215, pl. 7, fig. 2; Collins, 1974: 41; Albani, 1979: 44 (features), fig. 106.1; Hayward & Buzas, 1979: 52 (Miocene), pl. 12, fig. 157; Todd & Low, 1981: 35 (in key), 2 figs; Buzas & Severin, 1982: 36–37 (refs), pl. 8, fig. 1; Buzas *et al.*, 1985: 1075–1090 *passim* (statistical analysis/morphol.); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty, as *E. advenum depressulum* Cushman).

Elphidium aff. **advenum** (Cushman, 1922). Kustanowich, 1965

Kustanowich, 1965: 53 (as *E.* cf. *advenum* (Cushman, 1922), *q.v.*) Eade, 1967a: 46 (listed).

Elphidium argenteum Parr, 1945

Parr, 1945: 216, pl. XII, figs 7a-b (*Elphidium*), Hedley *et al.*, 1967: 48, pl. 12, figs 2a-b; Eade, 1967a: 47 (refs, note on syn. in *Cribroelphidium* Cushman & Bronnimann, 1948); Lewis, 1979: 35, table 5 (off Southern Hawkes Bay, in *Cribrononion*: "Common on outer shelf, rare elsewhere."); Hayward, 1979b: 1[illegible] (*Zostera* pool community, N.Z., as *Elphidium*), Hayward & Grace, 1981: 47, 52 (off Cuvier Is, in *Elphidium*); Hayward, 1981a: 80, 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 &c. (Bay of Islands).

Elphidium aff. **bosoense** Fujita, 1956. Hulme, 1964

Hulme, 1964: 338 (Manukau Harbour, as *E.* cf. *bosoense* Fujita, 1956: 232, pl. 8, figs 6a-b); Eade, 1967a: 46 (listed).

Elphidium charlottensis (Vella, 1957)

Vella, 1957: 11, 13, 38, pl. 9, figs 187–188 (*Elphidiononion*); Eade, 1967a: 47 (refs, in *Cribroelphidium* Cushman & Bronnimann, 1948, note on syn.); Thompson, 1975 thesis: 88 (see also Topping, 1973 thesis); Lewis, 1979: 35, table 5 (off Southern Hawkes Bay, as *Cribrononion*: "Common on shelf, in few dead specimens on slope."); Hayward, 1979b: 184 (*Zostera* pool community, N.Z., as *Elphidium*), figs 3h, 4; Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 80–82, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 &c. (Bay of Islands), fig. 3b; Hayward, 1982a: 27–56 *passim* (Cavalli Is, ecol., see also Adams, 1979), fig. 5a; Hayward, 1982b: 55, 56, 61, 64, fig. 3d (off Little Barrier Is); Hayward, 1990: 93 (a dominant species in nearshore sediments, Bay of Plenty), 95, 97, fig. 2 (% occurrence), 3b.

Ephidium crispum (Linnaeus, 1758)

Linnaeus, 1758: 709 (*Nautilus*); Williamson, 1858: 41, pl. III, fig. 80 (*Polystomella*); Brady, 1884: 736, pl. CX, figs 6–7 (*Polystomella*); Cushman, 1914: 32, pl. 18, fig. 1; Cushman, 1921: 368 (as of Linnaeus, 1767: 1162); Cushman & Grant, 1927: 73 (*Elphidium*); Cushman, 1939: 50, pl. 13, figs 17–21; Jepps, 1956: 73, text-fig. 34; Barker, 1960: 226, pl. 110, figs 6–7; McKenzie, 1962: 127 (Australia, range, refs); Galhano, 1963: 59 (distrib., refs), pl. II, fig. 4; Haman, 1966: 69, pl. 7, figs 20–21; Eade, 1967a: 46 (N.Z. refs); Albani, 1968a: 33, fig. 153, Albani, 1968b: 111 (distrib.), pl. 10, fig. 7; Kameswara Rao, 1970: 264 (descr., distrib., refs), pl. IV, fig. 46; Murray, 1971: 7, 154–155 (diag. features), pl. 64, figs 1–6; Lankford & Phleger, 1973: 101–132 *passim* (distrib. patterns & ecol.), pl. 3, figs 25; Colom, 1974: 143, fig. 27;

Collins, 1974: 42 (refs etc.); Boltovskoy & Wright, 1976: 15, 17, 20, 26, 28, 29, 34, 41, 86, 91, 97, 116, 119, 141, 142, 233–235, 246, 248, 250, 253, 266, 396; Albani, 1979: 44 (features), fig. 106.2; Murray, 1979: 45 (table 1, morphol. features), 46 (in key), 48 (descr.), figs 13A–B; Tappan & Loeblich, 1982: 527–552, pl. 52, fig. 9; Loeblich & Tappan, 1987: 674, pls 786, 787; cf. Jorissen, 1988: 1 *et seq.* (distrib., ecol., var./taxon.).

Elphidium decipiens (Costa, 1856)

Costa, 1856: 220, pl. XIX, fig. 13A–B (*Polystomella*); Heron-Allen & Earland, 1922: 229 (N.Z., refs); Eade, 1967a: 46.

Elphidium gunteri Cole, 1931

Cole, 1931: 34, pl. 4, figs 9–10; Parker *et al.*, 1953: 8, pl. 3, figs 18–19; Parker & Athearn, 1959: 342 (marsh ecol.), pl. 50, fig. 36; Hulme, 1964: 337; Eade, 1967a: 46; Lamb, 1972: 1–12 (salinity and distrib. in habitat); cf. Collins, 1974: 44; Boltovskoy & Wright, 1976: 30, 45, 86, 142–144, 148, 154, 155, 227, 233, 236, 250, 268; Boltovskoy *et al.*, 1980: 30 (descr., etc.), pl. 13, figs 15–18; Poag, 1981: 61–62, pl. 37, fig. 1, pl. 38, figs 1a-h; Todd & Low, 1981: 35 (in key), 2 figs; Buzas & Severin, 1982: 37 (refs), pl. 8, fig. 4.

Elphidium cf. **[excavatum** forma] **lidoense** Cushman, 1936. Hulme 1964

Hulme, 1964: 338 (Manukau Harbour, as *E.* cf. *lidoense* Cushman, 1936b: 86, pl. 15, figs 6a-b); Eade, 1967a: 46 (listed); see also comprehensive review of *E. excavatum* (Terquem) forma *lidoensis* Cushman, 1936, by Miller *et al.*, 1982: 116–144 *passim* esp. pp. 134–138, see also Painter & Spencer, 1984: 123 etc. (as form of *E. excavatum*).

Elphidium macellum (Fichtel & Moll, 1798)

Fichtel & Moll, 1798: 66, pl. X, figs h-k (*Nautilus*); Cushman, 1939: 51, pl. XIV, figs 1–3; Parr, 1950: 372; Cushman, 1955: 234 (type species, generic descr.), pl. 19, fig. 3, key pl. 23, fig. 5; Barker, 1960: 226, pl. 10, figs 8 & 11; McKenzie, 1962: 127 (Australia, range, refs); Galhano, 1963: 59–60, pl. VI, fig. 7 (refs etc.); Eade, 1967a: 46 (N.Z. refs); Tappan & Loeblich, 1969: 527–532, text-fig. 1; Haynes, 1973: 201–202 (diag., descr., distrib., refs), pl. 24, figs 1–3, pl. 25, figs 1–5, 7–8, pl. 27, figs 4–5; Colom, 1974: 44, figs 26o-p, 27; Collins, 1974: 42 (refs etc.); Boltovskoy & Wright, 1976: 30, 45, 72, 102, 103, 119, 126, 200, 219, 253, 258; Albani, 1979: 45 (features), fig. 106.5; Murray, 1979: 45 (table 1, morphol. features), 46 (in key), 48 (descr.), figs 13C–D; Boltovskoy *et al.*, 1980: 30 (descr., etc.), pl. 14, figs 1–6; Haake, 1980: 13, pl. 3, fig. 4.

Elphidium milletti (Heron-Allen & Earland, 1915)

Heron-Allen & Earland, 1915: 735, pl. 53, fig. 38 (*Polystomella*); Cushman, 1919: 633 (N.Z.); Eade, 1967a: 46; Albani, 1968a: 34, fig. 156; Albani, 1968b: 112 (range etc.).

Elphidium novozealandicum Cushman, 1936

Cushman, 1936b: 85, pl. 15, figs 4a-b; Eade, 1967a: 46 (refs, note on syn.); Hornibrook, 1968: 77, fig. 14; Gregory, 1973: 194, 197 (N.Z. mangrove swamp ecol.), fig. 2.8, table 2; Thompson, 1975 thesis: 88; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay): "Common on inner shelf."); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.); Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 90 (Tutukaka Harbour); Hayward, 1981b: 132 &c. (Bay of Islands), fig. 3e; Hayward, 1982a: 27–56 *passim* (Cavalli Is, ecol., see also Adams, 1979), fig. 5e; Hayward, 1982b: 61, 64 (off Little Barrier Is); Hornibrook *et al.*, 1989: 92, 118 (table 2(1), first appearance), 119 (table 3(1), last occurrence), fig. 23:9; Hayward, 1990: 93 (a dominant species in nearshore sediments, Bay of Plenty), 96, fig. 2 (% occurrence), 3f.

Elphidium oceanicum Cushman, 1933

Cushman, 1933: 52, pl. 12, fig. 7; Hayward, 1981a: 80–82, 90 (Tutukaka Harbour, as *E. oceanicum*), fig. 4 (abundance); Hayward, 1981b: 132 etc. (Bay of Islands), fig. 3c; Hayward, 1982a: 27–56 *passim* (Cavalli Is, ecol.), fig. 56; Hayward, 1982b: 64 (off Little Barrier Is).

Elphidium cf. **oceanicum** Cushman, 1933. Vella, 1957

Vella, 1957: 11 (cf. Cushman, 1933b: 52, pl. 12, fig. 7); see also Kennett, 1966: 62, pl. 8, figs 125–126 (Upper Miocene, N.Z.); Eade, 1967a: 46 (listed).

Elphidium aff. oceanicum Cushman, 1933. Hayward, 1990

Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty), 98 (southernmost limit), cf. Cushman, 1933b: 52, pl. 12, fig. 7).

Elphidium [excavatum forma] **selseyense** (Heron-Allen & Earland, 1911)

Heron-Allen & Earland, 1911: 448 (*Polystomella striatopunctata* (Fichtel & Moll) var. *selseyense*); Heron-Allen & Earland, 1922: 229 (N.Z., refs); Eade, 1967a: 46; Murray, 1971: 159 (subsumed under *E. excavatum*, but see Haynes, 1973: 244–245); Haynes, 1973: 204–206 (diag., descr., distrib., refs), 245 (comments on Murray's (1971) placing of *E. selseyense*

under *E. excavatum*), pl. 22, fig. 304, pl. 24, fig. 11, pl. 25, figs 4–5, 7, 9–10, pl. 29, figs 1–3; Collins, 1974: 41–42 (remarks, refs); Boltovskoy & Wright, 1976: 141, 142, 147, 227, 233; Miller *et al.*, 1982: 116, 119, 120, 121, 123 *passim*, esp. pp. 132–134 (diag., status, refs & syn.), table 4, pl. 1, figs 13–16, pl. 5, figs 10–13, pl. 6, figs 9–13, and also Painter & Spencer, 1984: 123 etc. (as form of *E. excavatum*).

Elphidium cf. **[excavatum forma] selseyense** (Heron-Allen & Earland, 1911. Hulme, 1964
Hulme, 1964: 338 (Manukau Harbour, cf. Heron-Allen & Earland, 1911: 695, pl. 21, figs 2a-c); Eade, 1967a: 46 (listed).

Elphidium simplex Cushman, 1933
Cushman, 1933b : 52–53, pl. 12, figs 8–9 (*Elphidium*); Cushman, 1939: 62, pl. 17, fig. 10; cf. Parr, 1945: 216, pl. IX, fig. 8; Eade, 1967a: 47 (as *Cribroelphidium*, refs, note on syn. with *Elphidiononion simplex aoteanus* Vella, 1957: 38, pl. 9, figs 185–186); Albani, 1968b: 113, pl. 10, fig. 4 (*Elphidium*); Topping, 1973 thesis: 32, pl. 9, figs 6–8; Gregory, 1973: 194, figs 2.4–2.5, table 2 (N.Z. marine marsh ecol.); Collins, 1974: 42; Thompson, 1975 thesis: 88–89; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay, in *Cribrononion*, abundance); Hayward, 1979b: 184 (*Zostera* pool community, N.Z.), figs 3g, 4; Hayward & Grace, 1981: 47, 52 (off Cuvier Is); Hayward, 1981a: 80, 81, 90 (Tutukaka Harbour), fig. 4 (abundance); Hayward, 1981b: 132 &c. (Bay of Islands), fig. 3d; Hayward, 1982a: 27–56 *passim* (Cavalli Is, ecol.), fig. 5d; Hayward, 1982b: 64 (off Little Barrier Is).

Elphidium striatopunctatum (Fichtel & Moll, 1798)
Fichtel & Moll, 1798: 61, pl. IX, figs a-c (*Nautilus*); Rhumbler, 1906: 73 (Chatham Is record as *Polystomella*), pl. 5, figs 61–62; Eade, 1967a: 46 (N.Z. refs); Boltovskoy & Wright, 1976: 140.

Elphidium subnodosa (Münster, 1838)
Münster *in* Roemer, 1838: 391, pl. 3, fig. 61 (*Robulina*); Brady, 1884: 734, pl. CX, figs 1a-b (*Polystomella*); Cushman, 1914: 32, pl. 14, fig. 8; Mestayer, 1916: 130 (N.Z.); Eade, 1967a: 46.

"Elphidium" cf. translucens Natland, 1938
Natland, 1938: 144, pl. 5, figs 3–4; Phleger & Ewing, 1962: 145, pl. 4, fig. 17; Phleger, 1970: 522, 529, 530, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9).

Elphidium sp. Morton & Miller, 1968
Morton & Miller, 1968: 508, fig. 188.

"Elphidium" sp. Phleger, 1970
Phleger, 1970: 522, 529, 530, tables 4–5 (N.Z. marine marsh ecol., localities on fig. 9); for status of *"Elphidium"* see Haynes, 1973: 196.

Elphidium spp. Gregory, 1973
Gregory, 1973: table 2 (N.Z. mangrove swamp ecol.).

Elphidium sp. Hayward, 1982
Hayward, 1982b: 64 (off Little Barrier Is).

Subfamily NOTOROTALIINAE
Genus **Notorotalia** Finlay, 1939

Notorotalia aucklandica Vella, 1957
Vella, 1957: 57–58, pl. 3, figs 39–43; Eade, 1967a: 47 (listed); Lewis, 1979: 35, table 5 (off Southern Hawkes Bay: "Rare, on shelf and upper slope.").

Notorotalia clathrata (Brady, 1884)
Brady, 1884: 709, pl. CVII, fig. 8 (*Rotalia*); Finlay, 1939: 517 (note under *Notorotalia zelandica* Finlay); Parr, 1950: 374–375 (remarks etc.); Barker, 1960: 220, pl. 107, fig. 8; Eade, 1967a: 47 (N.Z. refs); Collins, 1974: 44 (Australia); Boltovskoy & Wright, 1976: 103; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay: "Rare, on inner shelf only"); Boltovskoy *et al.*, 1980: 40–41 (descr., etc.), pl. 23, figs 1–3.

Notorotalia cf. clathrata (Brady, 1884). Kustanowich, 1965
Kustanowich, 1965: 53 (Milford Sound, as *N.* cf. *clathrata* (Brady, 1884), *q.v.*); Eade, 1967a: 47 (listed).

Notorotalia depressa Vella, 1957
Vella, 1957: 47–48, pl. 1, figs 13, 19–20; Eade, 1967a: 47 (refs); Hornibrook 1968: 101; Hayward, 1979b: 185 (*Zostera* pool community); Hayward & Grace, 1981: 53 (off Cuvier Is); Hayward, 1981b: 133 (Bay of Islands); Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol.), fig. 5x; Hayward, 1982b: 64 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Notorotalia finlayi Vella, 1957
Vella, 1957: 49, pl. 1, figs 4–5, 9–10; Eade, 1967a: 47 (refs, note on syn.); Hornibrook, 1968: 101; Collen 1973: 113–132 *passim* (morphol. and develop. of test surface, and descr., pp. 120, 123), pl. I, figs 8, 11, pl. II, figs 1–11, pl. III, figs 1–2; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay: "Common on outer shelf and upper slope"); Hornibrook *et al.*, 1989: 118

table 2(6), first appearance), 119 (table 3(1), last occurrence), 156, fig. 36:13a-b.

Notorotalia inornata Vella, 1957

Vella, 1957: 11, 13, 54, pl. 2, fig. 29, pl. 3, figs 36–38; Eade, 1967a: 47 (refs); Hornibrook, 1968: 101; Lewis, 1979: 35, table 5 (off Southern Hawkes Bay: "Rare, on shelf and upper slope").

Notorotalia olsoni Vella, 1957

Vella, 1957: 50, pl. 2, figs 22–23; Eade, 1967a: 47 (listed); Collen, 1973: 113–132 *passim* (morphol. and develop., descr., p. 124), pl. III, figs 6–11; Hayward & Grace, 1981: 47, 53 (off Cuvier Is); Hayward, 1981a: 91 (Tutukaka Harbour); Hayward, 1981b: 133 &c. (Bay of Islands), fig. 3j; Hayward, 1982a: 27–56 *passim* (off Cavalli Is, ecol., see also Adams, 1979), figs 5u-v; Hayward, 1982b: 61, 64 (off Little Barrier Is); Hayward, 1990: 96 (in nearshore sediments, Bay of Plenty).

Notorotalia profunda Vella, 1957

Vella, 1957: 48–49, pl. 1, figs 6–8; Eade, 1967a: 47 (listed); Lewis, 1979: 35, table 5 (off Southern Hawkes Bay, abundance).

Notorotalia zelandica Finlay, 1939

Finlay, 1939a: 518; Cushman, 1955: 236 (type species, generic descr.), key pl. 49, fig. 5; Vella, 1957: 52, 55, text-fig. 2a-e, pl. 2, figs 31, 33, 34; Eade, 1967a: 47 (refs, note on syn.); Hornibrook, 1968: 101, fig. 21; Topping, 1973 thesis: 32, pl. 10, figs 1–3; Collen, 1973: 113–132 *passim* (morphol. and develop., descr., p. 125, as *N. z. zelandica*), pl. V, figs 1–6, 9; Gordon & Ballantine, 1976: 96 (listed from Leigh region after Thompson, 1975 thesis: 89, pl. 23, figs 1–3); Lewis, 1979: 35, table 5 (off Southern Hawkes Bay: Common on shelf, rare on upper slope".); Hayward, 1982a: 44 (Cavalli Is ecol., see also Hornibrook, 1952, Foveaux Strait); Loeblich & Tappan, 1987: 676, pl. 792; Hornibrook *et al.*, 1989: 118 (table 2(6), first appearance), 119 (table 3(1), last occurrence), 156, fig. 36:14a-c.

Notorotalia aff. **zelandica** Finlay, 1939. Hornibrook, 1952

Hornibrook, 1952: 185; Eade, 1967a: 47 (listed).

Superfamily NUMMULITACEA
Family NUMMULITIDAE

Genus **Operculina** d'Orbigny, 1826

Operculina ammonoides (Gronovius, 1781)

Gronovius, 1781: 282, pl. XIX, figs 5–6 (*Nautilus*); Brady, 1884: 745, pl. CXII, figs 1–2 (*Operculina*); Heron-Allen & Earland, 1909c: 697; Cushman, 1914: 37, pl. 14, fig. 7; Heron-Allen & Earland, 1922: 230 (N.Z., as *Operculina*); Cushman, 1955: 239 (generic descr.); Barker, 1960: 230, pl. 112, figs 3–9, 11–13 (discuss. of Brady's determinations etc.); Eade, 1967a: 47 (N.Z. occurrence as *Nummulites* Lamarck, 1801); Chave, 1987: 66, pl. 10, fig. 2.

Superclass ACTINOPODA
[* RADIOLARIA]
Class ACANTHARIA
Order ARTHRACANTHIDA
Suborder SPHAENACANTHINA

Family ACANTHOMETRIDAE
Genus **Acanthometra** Müller, 1855

Acanthometra pellucidum J. Müller, 1858

Müller, 1858a: 47, pl. XI, figs 1–3; Haeckel, 1862: 378; Haeckel, 1887: 744 (*Acanthometron*, descr., distrib.); Bottazzi *et al.*, 1971: 677–684, tables 1–3; Taylor [1976] *in* Gordon & Ballantine, 1977: 97 (listed from Leigh region); Taylor, 1978: 217 (listed); Cachon & Cachon, 1985: 281 (family and generic diag., *Acanthometra*).

Family DORATASPITIDAE [DORATASPIDIDAE]
Genus **Dodecaspis** Haeckel, 1887

Dodecaspis trizonia Haeckel, 1887

Haeckel, 1887: 837 ("Challenger" Stn 169, off East Cape, surface); Hutton, 1904: 340 (listed); Campbell, 1954a: D38 (generic diag.).

Suborder PHYLLACANTHINA
Family STAURACANTHITIDAE

Genus **Pristacantha** Haeckel, 1887

Pristacantha polyodon Haeckel, 1887

Haeckel, 1887: 766, pl. 130, fig. 7 ("Challenger" Stn 169, off East Cape, surface); Hutton, 1904: 340 (listed); Cachon & Cachon, 1985: 282 (generic diag.).

* Haeckelian meaning includes Acantharia, Polycystina and Phaeodaria (see Cachon & Cachon in Parker, 1982: 553); cf. also history of classification and comparative schemes for the Radiolaria by Boltovskoy (1981: 280–284) and Anderson (1983: 17–45).

Genus **Stauracantha** Haeckel, 1881
Subgenus **Stauracantha** s. str.
[= *Stauracanthonium* Haeckel, 1887]

Stauracantha (Stauracantha) orthostaura Haeckel, 1887

Haeckel, 1887: 759 (as *Xiphacantha emarginata*), 762, pl. 130, fig. 5 (*S. (Stauracanthonium) orthostaura*, "Challenger" Stn 169, off East Cape surface), 765, pl. 130, fig. 6 (as *Phatnacantha icosaspis*), 843, pl. 136, fig. 2 (as *Tignisphaera tabulata*); Hutton, 1904: 339 (listed); Popofsky, 1904: 36, pl. II, figs 5a-c (*Icosaspis*); Popofsky, 1906: 87–87, text-fig. 29 (*Tignisphaera*); Campbell, 1954: D34 (generic diag.), fig. 9, 12; Bottazzi & Vannucci, 1964: 321, 325 *et seq.* (range), 375, 376; Bottazzi & Vannucci, 1965b: 159, 241 *et seq.* (range).

Order INCERTAE SEDIS : ACTINELIDA
Suborder ACTINELINA
Family ASTROLOPHIDAE

Genus **Actinelius** Haeckel, 1865
Subgenus **Actinelidium** Haeckel, 1887

Actinelius (Actinelidium) protogenes Haeckel, 1887

Haeckel, 1887: 730–731 ("Challenger" Stn 165, Tasman Sea, surface); Hutton, 1904: 339 (listed); Campbell, 1954a: D32 (generic and subgeneric diag.); Cachon & Cachon, 1985: 300 (generic diag.).

* [Radiolaria]
** Class POLYCYSTINA
Order SPUMELLARIDA
Family SPHAEROIDAE/COLLOSPHAERIDAE

Genus **Collozoum** Haeckel, 1862
Subgenus **Collozoum** s. str.
[= *Collodinum* Haeckel, 1887]

Collozoum (Collozoum) inerme Haeckel, 1862

Haeckel, 1862: 522, pl. XXV; Haeckel, 1887: 25 (descr., refs & syn., in subgenus *Collodinum*), pl. 3, figs 10–12 ("Challenger" Stn 165, Tasman Sea); Hamilton, 1896: 28 (listed); Hutton, 1904: 339 (listed); Haswell, 1907: 274; Päutau, 1937: 667–680 (chromosomes of *Merodinium* sp., dinoflagellate parasite — see also Sournia *et al.*, 1975: 11); Jepps, 1956: 125, figs 62, A1–23; Campbell, 1954a: D44 (generic diag.); Cachon & Cachon, 1985: 285, fig. 36.

Genus **Siphonosphaera** Müller, 1858
Subgenus **Siphonosphaera** s. str.

Siphonosphaera (Siphonosphaera) fragilis Haeckel, 1887

Haeckel, 1887: 106 ("Challenger" Stn 165) (in subgenus *Holosiphonia*); Hutton, 1904: 339 (listed); campbell, 1954a: D52 (generic diag.).

Family THECOSPHAERIDAE
Genus **Actinomma** Haeckel, 1860

Actinomma antarcticum (Haeckel, 1887)

Haeckel, 1887: 90 (*Spongoplegma*); Riedel, 1958: 223–224, pl. I, figs 3-4 (as *Diploplegma banzare* n.sp. *fide* Hays, 1965, but cf. Petrushevskaya, 1967 [1968: 18]); Nakaseko, 1959: 8, pl. II, figs 7, 10a-b (as *Thecosphaera (Thecosphaeromma) antarctica* n.sp., *fide* Hays, 1965); Hays, 1965: 126, 127, 131, 165–167 text-fig. 4 (distrib. in N.Z. region), pl. I, fig. I; Nigrini, 1967: 26–27 (descr., distrib.), pl. 2, figs 1a-d; Nigrini & Moore, 1979: vii, S25–S26 (descr., distrib., syn.), pl. 2, figs 1a-d, pl. 3, figs 1a-b, 2a-b, 3; Boltovskoy & Reidel, 1980: 107 (descr., as *Spongoplegma antarcticum* Haeckel), pl. 1, fig. 18, 109, pl. 2, fig. 2 (descr., as *Actinomma antarcticum* (Haeckel), syn. incl. *Diploplegma (?) aquatica* Popofsky, 1908: 214, pl. XXIII, figs

* Deflandrean meaning includes Polycystina and Phaeodaria — see Cachon & Cachon in Parker, 1982: 553. See also classification etc. in Anderson, 1983: 17–45, and Cachon & Cachon *in* Lee *et al.*, 1985: 274–302.

** The classification of the Polycystina (= Porulosida + Osculosida (incl. Spumellaria and Nassellaria)) is not as in Parker (1982) but largely follows the simplified version adopted by Nigrini & Moore (1979) based on Riedel (1967) with later overall regrouping following Boltovskoy (1981).

Note reviews of distribution and ecology of polycystine radiolarians by Casey (1971a: 151–159), particularly as indicators of water masses by Casey (1971b: 331–342) in plankton and bottom sediments in the Pacific by Petrushevskaya (1971a: 309–317) and in the Indian Ocean and the Antarctic by Petrushevskaya (1971b: 319–329), also the bibliography by Riedel (1967a: 1–220).

A loose-leaf catalogue of original descriptions and later references to the species of this order, similar to the Ellis & Messina catalogue of Foraminifera, is now appearing under the authorship of Foreman & Riedel (1972). Series 1 covers the literature from 1934 to 1900. See also Nigrini & Moore's (1979) guide to modern Radiolaria. Note also review of ecology and biogeography of radiolarians in the South Pacific by Funnell (1970) and of Pacific assemblages including New Zealand by Moore (1978).

3–4 *Cladoccus*); Riedel, 1958: 223–224, pl. 1, figs 3–4 (as *Diplopleqma banzare* n.sp., *fide* Petrushevskaya, 1967); Petrushevskaya, 1967 [1968, transl.: 14–18, figs 9 (L-III), 91 (I) (distrib. in N.Z. region), tables 2–5 (incl. *Spongoplegma antarcticum* Haeckel, 1887)]; Boltovskoy, 1981: 285, 295 (in key), fig. 160.15.

Genus **Axoprunum** Haeckel, 1887

Axoprunum stauraxonium Haeckel, 1887

Haeckel, 1887: 298, pl. 48, fig. 4; Hays, 1965: 126, 127, 140, 170–171, text-fig. 13 (distrib. in N.Z. region), pl. I, fig. 3; Nigrini & Moore, 1979: viii, S57–S58 (descr., distrib.), pl. 7, figs 2–3; Boltovskoy, 1981: 285, 296 (in key), fig. 160.19.

Genus **Cenosphaera** Ehrenberg, 1854

Cenosphaera compacta Haeckel, 1887

Haeckel, 1887: 65, pl. XII, fig. 7; Boltovskoy & Riedel, 1980: 105–106, pl. 1, fig. 13 [syn. incl. (?) *C. cristata* Haeckel, 1887 of Petrushevskaya (1967) — Haeckel, 1887: 66; Riedel, 1958: 223, pl. 1, figs 1–2 (in part); Petrushevskaya, 1967 [1968, transl.: 10–11, figs 7 (I-IV), 93 (II) (distrib. in N.Z. region), tables 2–5]; (?) Riedl, 1958: 223, pl. 1, figs 1–2 (Antarctic); and *Cenosphaera nagatai* of Nakaseko, 1959: 6–7 (in sub-genus *Cyrtidosphaera*), pl. II, figs 1a-b, 2; cf. Haeckel, 1887: 62, pl. 12, fig. 10 (*C. favosa*); Hays, 1965: 126, 127, 145, 165, text-fig. 18 (distrib. in N.Z. region), pl. II, fig. 6); Nigrini & Moore, 1979: S41–S42 (descr., distrib.), pl. 4, figs 2a-b]; Boltovskoy, 1981: 216–315.

Cenosphaera sp. Petrushevskaya, 1967

Petrushevskaya, 1967 [1968, transl.: 11, fig. 7 (V)]; Riedel, 1958: 223 (as *C. cristata* (?) Haeckel, 1887, in part).

Genus **Cromyechinus** Haeckel, 1862
[= *Actinomma* Haeckel, 1860, as amended by Bjørklund, 1977]

Cromyechinus antarctica (Dreyer, 1889)

Dreyer, 1889: 24–25, fig. 75 (*Prunopyle*); Popofsky, 1908: 209–210, pl. XX, fig. 5 (as *Hexalonche minuta*), 215, pl. XXIV, fig. 4 (as *Actinomma imperfecta*); Riedl, 1958: 224 (as *A. imperfecta* Popofsky), pl. 1, fig. 5; Petrusheskaya, 1967 [1968, transl.: 22–27, figs 13 (I–VI), 93 (I) (distrib. in N.Z. region), tables 2–5]; cf. Nigrini & Moore, 1979: S127–S512 (descr., distrib., remarks, as (?) *Prunopyle*); Boltovskoy, 1981: 286 (footnote re. synonymy by Bjørklund (1977): *Actinomma* incl. *Cromyechinus* and *Echinomma*), 297 (in key), figs 155a, a & 160.30).

Genus **Echinomma** Haeckel, 1882
[= *Actinomma* Haeckel, 1860, as amended by Bjørklund, 1977]

Echinomma delicatulum (Dogiel, 1952)

Dogiel *in* Dogiel & Reshetnyak, 1952: 7–8, fig. 2 (*Heliosoma*); Riedl, 1958: 225, pl. 1, fig. 6 (in part) (as *Echinomma* sp.); Petrushevskaya, 1967 [1968, transl.: 18–20, figs 11 (I–III), 98 (I) (distrib. in N.Z. region), tables 3–5].

Echinomma leptodermum Jörgensen, 1900

Jörgensen, 1900: 5–7; Jörgensen, 1905: 115–116, pl. VIII, figs 33a-c; Schröder, 1909: 27–28 (descr.), text-figs 17a-c; Hays, 1965: 126, 127, 141, 169–170, text-fig. 14 (distrib. in N.Z. region), pl. I, fig. 2; cf. Bjørklund, 1977 (*Actinomma haysi* n.n. for *E. leptodermum* of Hays, 1965, not of Jörgensen, 1900); Nigrini & Moore, 1979: vii, S35 (*A. haysi*), S35–S36, pl. 3, fig. 7 (*A. leptodermum*), (descr., distrib., refs & syn.); Boltovskoy & Riedel, 1980: 111 (descr., dis-trib., refs & syn.), pl. 2, fig. 9; Boltovskoy 1981: 286, 297 (in key), fig. 160.32 (*E. leptodermum*), 297, fig. 160.16 (*Actinomma haysi*);.

Echinomma popofskii Petrushevskaya, 1967

Petrushevskaya, 1967 [1968, transl.: 20–22, fig. 12 (I–III)]; Boltovskoy, 1981: 286, 297 (in key), fig. 160.33.

Genus **Stylatractus** Haeckel, 1887
Subgenus **Stylatractium** Haeckel, 1887

Stylatractus (Stylatractium) disetanius Haeckel, 1887

Haeckel, 1887: 331 ("Challenger" Stn 169, off East Cape); Hamilton, 1896: 28 (listed); Hutton, 1904: 339 (listed); Campbell, 1954a: D73 (generic and subgeneric diag.).

Stylatractus sp. Petrushevskaya, 1967

Petrushevskaya, 1967 [1968, transl.: 27–28, figs 15 (I–IV), 32 (III), 98 (II) (distrib. in N.Z. region), tables 2–4]; Nigrini & Moore, 1979: S55–S56 (descr., distrib.), pl. 7, figs 1a-b.

Family THALASSICOLLIDAE

Genus **Thalassicolla** Huxley, 1851
Subgenus **Thalassicolla** s.str
[= *Thalassicollidium* Haeckel, 1887]

Thalassicolla (Thalassicolla) australis Haeckel, 1887
Haeckel, 1887: 20 ("Challenger" Stn 171, off Kermadec Is); Hamilton, 1896: 28 (listed); Hutton, 1904: 339 (listed); Campbell, 1954a: D44 (generic diag.); Cachon & Cachon, 1985: 284 (generic diag.).

Family SPHAEROZOIDAE

Genus **Raphidozoum** Haeckel, 1862
Subgenus **Raphidiceras** Haeckel, 1887

Raphidozoum (Raphidiceras) australe Haeckel, 1887
Haeckel, 1887: 48–49 ("Challenger" Stn 165, Tasman Sea); Hamilton, 1896: 28 (listed); Hutton, 1904: 339 (listed); Campbell, 1954a: D47 (generic and subgeneric diag.).

Family PHACODISCIDAE
Genus **Heliodiscus** Haeckel, 1862

Heliodiscus asteriscus Haeckel, 1887
Haeckel, 1887: 445, pl. 33, fig. 8; Hays, 1965: 126, 127, 142, 171, text-fig. 15 (distrib. in N.Z. region), pl. II, fig. 7; Nigrini, 1967: 32–33 (descr., distrib. discuss.), pl. 3, figs 1a-b; Petrushevskaya, 1971b: 31 *et seq.*, fig. 22.2a (N.Z. distrib.), table 22.1; Riedel *et al.*, 1974: 707, pl. 56, fig. 4; Renz, 1976: 92 (ecol.), pl. 2, fig. 1; Riedel & Sanfilippo, 1978: 108, pl. 3, fig. 6; Sanfilippo & Riedel, 1979: 503 (at DSDP Site 403, NE Atlantic); Nigrini & Moore, 1979: viii, S73–S74 (descr., distrib., refs), pl. 9, figs 1–2; Boltovskoy & Riedel, 1980: 115 (descr., refs), pl. 3, fig. 8.

Family SPONGODISCIDAE
Genus **Spongodiscus** Ehrenberg, 1854

Spongodiscus (?) osculosus (Dreyer, 1889)
Dreyer, 1889: 42–43, pl. VI, figs 99–100 (*Spongopyle*); Riedel, 1958: 226–227 pl. 1, fig. 12; Petrushevskaya, 1967 [1968, transl.: 39–40, figs 20 (I–II), 94 (I) (distrib. in N.Z. region), tables 3, 4 –5].

Spongodiscus resurgens Ehrenberg, 1854
Ehrenberg, 1854a: 246; Ehrenberg, 1854b: 60, pl. XXXVB, B, iv, fig. 16 (Atlantic Ocean, 12,000 ft); Ehrenberg, 1860a: 769 (3 specimens off Philippine Is, 19,800 ft (3,300 fm)); Ehrenberg, 1860b: 824 (Pacific Ocean, 15,600 ft (2,600 fm)); Ehrenberg, 1861a: table opp. p. 240 (Gulf of Mexico and Straits of Florida); Ehrenberg, 1861b: 282 (off Greenland); Haeckel, 1887: 576, 577 (as type species of *Spongodisculus* n. subgen); Petrushevskaya, 1971b: 319, 32–328, table 22.1, fig. 22.3a (N.Z. distrib.); Foreman & Riedel, 1972: entry under "*Spongodiscus resurgens*" (original descriptions and translations of Ehrenberg's Latin, etc.); Boltovskoy & Riedel, 1980: 116 (descr., refs), pl. 3, fig. 13; Boltovskoy, 1981: 288, 299 (in key), fig. 160.66.

Genus **Spongopyle** Dreyer, 1889

Spongopyle (?) setosa Dreyer, 1889
Dreyer, 1889: 43, pl. VI, figs 97–98, 55 (as *Spongotrochus antarcticus*); Popofsky, 1908: 226–227, pl. XXVI, fig. 4 (as *Spongodiscus favus* Ehrenberg, var. *maxima* n. var.); Riedel, 1958: 227–228 (in part as *Spongotrochus (?) glacialis* Popofsky, 1908); Petrushevskaya, 1967 [1968, transl.: 36–39, figs 20 (II–V), 87 (II) (distrib. in southern N.Z. region), tables 2–5]; Boltovskoy & Riedel, 1980: 116–117, pl. 3, figs 14 (cf. *Spongodiscus osculus* Dreyer, *q.v.*); Boltovskoy, 1981: 288, 299 (in key), fig. 160.68.

Genus **Spongotrochus** Haeckel, 1860

Spongotrochus glacialis Popofsky, 1908
Popofsky, 1908: 228–229, pl. XXVI, figs 7–8, pl. XXVII, fig. 1, pl. XXVIII, fig. 2 (not *S. (?) glacialis* Popofsky, 1912: 145, *fide* Petrushevskaya, 1967 [1968, transl: 40]), 227–228, pl. XXVI, figs 5–7, pl. XXVIII, fig. 1 (as *Stylotrochus arachnius* Haeckel, 1862: 464; Haeckel, 1887: 583); Riedel, 1958: 227–228 (in part), text-fig. 1, pl. 2, figs 1–2; not of Hülsemann, 1963: 18–22, figs 10–11 (as *Spongotrochus glacialis* Popofsky); Petrushevskaya, 1967 [1968, transl.: 40–44, 48–50, figs 21 (I–VII), 22 (I–VII), 26 (II), 87 (I) (distrib. in N.Z. region), tables 2–55]; Petrushevskaya, 1971b: table 22.1 (ecol. occurrence); Casey, 1971b: 332 (table 23.1), pl. 23.1, figs 4–5; Petrushevskaya, 1975: 575, pl. 5, fig. 8, pl. 35, figs 1–6; Nigrini & Moore, 1979: ix, S117–S118 (descr., distrib.), pl. 15, figs 2a-d; Boltovskoy & Riedel, 1980: 117 (descr., remarks, refs & syn. incl. *S. arachnius* Haeckel and *S. multispinus* (Haeckel), pl. 3, fig. 15; Boltovskoy, 1981: 288, 299 (in key), fig. 160.69.

Family PORODISCIDAE
Genus **Stylochlamidium** Haeckel, 1882

Stylochlamidium sp. Petrushevskaya, 1967
Petrushevskaya, 1967 [1968, transl: 34–36, fig. 19 (I–II), table 5].

Genus **Stylodictya** Ehrenberg, 1847

Stylodictya validispina Jörgensen, 1905
Jörgensen, 1905: 119, pl. X, fig. 40; Schröder, 1909: 45-46 (descr.), text-figs 27a-b; Petrushevskaya, 1967 [1968, transl.: 30–31, fig. 17 (IV–V), table 5]; Nigrini & Moore, 1979: ix, S103–S104 (descr., distrib., remarks incl. transfer by Petrushevskaya (1975) to *S. stellata* Bailey), pl. 13, figs 5a-b.

Stylodictya sp. Petrushevskaya, 1967
Petrushevskaya, 1967 [1968, transl.: 34 fig. 18 (III) (differentiated from *S.* sp. of Petrushevskaya, 1967 [1968, transl.: 33–34, tables 2–5])].

Family LITHELIIDAE
Genus **Lithelius** Haeckel, 1862

Lithelius nautiloides Popofsky, 1908
Popofsky, 1908: 230–231, pl. XXVII, fig. 4 (in part); Riedel, 1958: 228–229 (in part), text-fig. 2, pl. 2, fig. 3; Hays, 1965: 126, 127, 133, 173, text-fig. 6 (distrib. in N.Z. region); Petrushevskaya, 1967 [1968, transl.: 50–52, figs 27, 28 (I–II), (?) 29, (?) 86 (I), (distrib. in N.Z. region), tables 2–5]; Nigrini & Moore, 1979: x, S137–S138 (descr., distrib., remarks), pl. 17, fig. 5; Boltovskoy & Riedel, 1980: 118 (descr.), pl. 4, fig. 5; Boltovskoy, 1981: 288, 300 (in key), fig. 160.78.

Lithelius (?) **riedeli** Petrushevskaya, 1967
Petrushevskaya, 1967 [1968, transl.: 53, pl. 28 (II), 29 (II), 94 (II), (distrib.), tables 3–51]; Riedel, 1958: 229 (in part, as *Lithelius nautiloides* Popofsky, 1908), text-fig. 2, pl. 2, fig. 4.

Lithelius (?) sp. Petrushevskaya, 1967
Petrushevskaya, 1967 [1968, transl.: 53–54]; Popofsky, 1908: 230–231, pl. XXVII, figs 2–3 (in part, as *L. nautiloides*), 231–232, pl. XXVII, fig. 6, pl. XXVIII, fig. 3 (in part, as *L. obscurus*).

Genus **Tholospira** Haeckel, 1887

Tholospira (?) sp. Petrushevskaya, 1967
Petrushevskaya, 1967 [1968, transl.: 54–56, figs 31 (I–VI), 89 (II) (distrib. in N.Z. region), tables 2–3, 5].

Family PYLONIIDAE
Genus **Phorticium** Haeckel, 1882

Phorticium clevei (Jörgensen, 1900)
Jörgensen, 1900: 64 (*Tetrapylonium clevei*), 64 (as *Octopyle octosytel* Haeckel f. *minor*); Cleve, 1899: 31, pl. III, fig. 2 (as *Phorticum pylonium* Haeckel, 1887: 709, pl. 49, fig. 10); Jörgensen, 1905: 120–121, pl. X, figs 42 a-b, pl. XI, figs 42e-f, 43–45 (as *P. pylonium* Haeckel (?)); Popofsky, 1908: 219, pl. XXXIII, fig. 4 (as *Cromyocarpus quadrifarius* Haeckel, 1887: 318); Schröder, 1909: 54–55 (descr., as *Octopyle octostyle* Haeckel, 1887, incl. forma *minor* Jörgensen,1899), 55–56, text-figs 33a-c (descr., as *P. pylonium* (Haeckel, 1887), incl. *T. Clevei* Jörgensen, 1899); Riedel, 1958; 229, pl. 2, fig. 5 (as *P. pylonium* Haeckel); Petrushevskaya, 1967 [1968, transl.: 56-60, figs 32 (I–II), 33 (I–III), 34 (K–V), 89 (I) (distrib.), tables 2–5]; Boltovskoy & Riedel, 1980: 119–120 (descr., comparison with *P. pylonium* Petrushevskaya, 1967), pl. 4, fig. 10; Boltovskoy, 1981: 288, 300–301 (in key), fig. 160.84.

* Order NASSELLARIDA
Suborder PLECTELLARINA
Superfamily PLECTOIDEA

Family PLAGONIDAE
Genus **Antarctissa** Petrushevskaya, 1967

Antarctissa denticulata (Ehrenberg, 1844)
Ehrenberg, 1844a: 187, 189, 190 (listed), 203 (*Lithobotrys*); Ehrenberg, 1873: pl. 12, fig. 7 (*Lithopera*); Haeckel, 1887: 1083 (*Pylospyris*); Haecker, 1907: 123–124 fig. 8; Haecker, 1908: 448–452, text-fig. 83, pl. 84, figs 582–583, 591 (*Peromelissa*); Popofsky, 1908: 281–282 pl. XXXIII, fig. 1 (in part, as *Helotholus histricosa* Jörgensen var. *clausa* n. var); Riedl, 1958: 236, text-fig. 7, pl. 3, fig. 9; Hays, 1965: 126, 127, 132, 176–177, text-fig. 5 (distrib. in N.Z. region); Petrushevskaya, 1967 [1968, transl.: 84–86 (in new genus *Antarctissa*), figs 49 (I–IV), 92 (I) (distrib. in N.Z. region), tables 2, 4–5]; Petrushevskaya, 1968b: 1296–1309, figs; Petru-

* Note discussion of relationships of Nassellaria and key to genera by Petrushevskaya (1971c: 1133–1142); see Cachon & Cachon (1985: 290–291).

shevskaya, 1971b: 319, table 22.1, fig. 22.5a (N.Z. distrib.); Nigrini & Moore, 1979: X, N1–N3 (descr., distrib), pl. 18, figs 1a-b; Boltovskoy, 1981: 290, 306 (in key), fig. 160.106; Granlund, 1985: 31 (morphometry etc.).

(?) **Antarctissa denticulata** (Ehrenberg) var. **cylindrica** Petrushavskaya, 1967

Petrushevskaya, 1967 [1968, transl.: 86, figs49 (V), 50 (I), table 5].

Antarctissa longa (Popofsky, 1908)

Popofsky, 1908: 282–283, pl. XXIV, fig. 2 (*Helotholus*); Riedel, 1958: 234–235 (in part as *H. histricosa* Jörgensen, 1905 *q.v.*); Petrushevskaya, 1967 [1968, transl.: 90, fig. 51 (I), tables 2–5].

Antarctissa strelkovi Petrushevskaya, 1967

Petrushevskaya, 1967 [1968, transl.: 88–90, fig. 51 (III–VI), 86 (II), (distrib.), tables 2–5]; Popofsky, 1908: 279–281 pl. XXXII, figs 1–5, pl. XXVI, fig. 2 (as *Helotholus histricosa* Jörgensen, 1905: 137, pl. XVI, figs 86–88); Riedl, 1958: 234–235 (in part as *H. histricosa* Jörgensen), text-fig. 6, pl. 3, fi.g 8; Petrushevskaya, 1971b: 319, table 22.1, fig. 22.5b (N.Z. distrib.); Nigrini & Moore, 1979: x, N5–N7 (descr., distrib., remarks), pl. 18, figs 2a-b; Boltovskoy, 1981: 290, 306 (in key), fig. 160.107; Granlund, 1985: 31 (morphometry).

Genus **Helotholus** Jörgensen, 1905

Helotholus histricosa Jörgensen, 1905

Jörgensen, 1905: 137, pl. XVI, figs 86–88; Popofsky, 1908: 279–281, pl. XXXII, figs 1–5, pl. XXXVI, fig. 2 (*H. histricosa*), 282, pl. XXXIII, figs 2–3 (as *H. histricosa* var. *micropora* n. var.), 282–283, pl. XXXIV, fig. 2 (as *H. longus*); Schröder, 1911: 108 (descr.), text-fig. 68–70; Riedel, 1958: 234–235, text-fig. 6, pl. 3, fig. 8; Hays, 1965: 126, 127, 130, 175–176, text.fig. 3 (distrib. in N.Z. region); Petrushevskaya, 1967 [1968, transl.: 83, 88 (part of Riedel, 1958: 234–235 to *Antarctissa strelkovi* Petrushevskaya, 1967), 90 (part of Riedel, 1958: 234–235 to *A. longa* (Popofsky), *q.v.*)]; Petrushevskaya, 1971b: 329 (*H. histricosa* = A. *strelkovi*).

Genus **Hexaplagia** Haeckel, 1881

Hexaplagia collaris Haeckel, 1887

Haeckel, 1887: 916 ("Challenger" Stn 169, off East Cape); Hamilton, 1896: 28 (listed); Hutton, 1904: 340 (listed); Campbell, 1954a: D104 (generic diag.).

Superfamily STEPHOIDEA
Family SEMANTIDAE

Genus **Semantis** Haeckel, 1887

Semantis (?) **micropora** Popofsky, 1908

Popofsky, 1908: 268, pl. XXX, fig. 4; Petrushevskaya, 1967 [1968, transl.: 61–62, figs 36 (I–III), 88 (distrib.), tables 2, 4, 5]; Cachon & Cachon, 1985: 292 (generic diag.).

Family THEOPERIDAE
Genus **Cornutella** Ehrenberg, 1838

Cornutella profunda Ehrenberg, 1854

Ehrenberg, 1854[b]: 241 (*C. clathrata f. profunda*); Nigrini, 1967: 60–63 (descr., distrib. detailed refs & syn.), pl. 6, figs 5a-c; Petrushevskaya, 1967 [1968, transl.: 107–108, figs 58 (II–III), 61 (I–VI), 101 (I–I) (distrib. etc. as *C. verrucosa* Ehrenberg, 1872)]; Petrushevskaya, 1971b: 319, table 22.1, fig. 22.2b (N.Z. distrib.); Petrushevskaya, 1971c: 1139 (generic key); Renz, 1976: 149 (ecol.), pl. 7, fig. 11; Boltovskoy & Riedel, 1980: 123 (descr., refs & syn. (based on Riedel (1958) and Nigrini (1967)) incl. *C. distenta, C. longiseta, C. stylophaena, C. trochus, C. tumens* and *C. verrucosa* all of Ehrenberg, 1872), pl. 5, fig. 6; Boltovskoy, 1981: 290, 306 (in key), fig. 160.117.

Genus **Dictyocephalus** Ehrenberg, 1860

(?) **Dictyocephalus** (?) **papillosus** (Ehrenberg, 1872)

Ehrenberg, 1872: 310–311 (*Eucyrtidium*); Ehrenberg, 1873: pl. VII, fig. 10; Haeckel, 1887: 1307 (*Dictyocephalus papillosus* (Ehr.)), 1307 (as *D. tabulatus*); Riedl, 1958: 236–238, text-fig. 3, pl. 3, fig. 10; Petrushevskaya, 1967 [1968, transl.: 12–113, fig. 66 (I–III), tables 4–5].

Suborder CYRTELLARINA
Superfamily CYRTOIDEA
Family STICHOCYRTOIDAE

Genus **Eucyrtidium** Ehrenberg, 1847

(?) **Eucyrtidium** (?) **teuscheri** Haeckel, 1887

Haeckel, 1887: 1491–1492, pl. 77, fig. 5; Petrushevskaya, 1967 [1968, transl.: 119–120, fig. 68 (I–II), table 4–5]; Boltovskoy, 1981: 291, 306 (in key), fig. 120–126; Cachon & Cachon, 1985: 294 (generic diag.).

Eucyrtidium tumidulum (?) Bailey, 1856

Bailey, 1856: 5, pl. I, fig. 11; (?) Ehrenberg, 1861b: 299 (and *E. increscens*); Haeckel, 1862: 318 (*L. tumidulum*) 318 (? as *L. increscens*); Ehrenberg, 1872: 293, pl. 2, fig. 12 (*Eucyrtidium*); Haeckel, 1887: 1506 (*Lithocampe*); Schröder, 1911: 139–140 (descr.), text-fig. 119; Hays, 1965: 126, 127, 144, 181–182, text-fig. 17 (distrib. in N.Z. region), pl. III, fig. 7; Petrushevskaya, 1967 [1968, transl.: 139, 141 (relationships)]; Foreman & Riedel, 1972: entry under *"Eucyrtidium tumidulum"* (original descr., transl. of Ehrenberg etc.); Nigrini, 1977: 246 (syn.), pl. 1, fig. 1; Nigrini & Moore, 1979: N99–N100 (descr., distrib., as *Botryostrobus aquilonaris* (Bailey, 1856: 4, pl. 1, fig. 9), pl. 27, fig. 1; Boltovskoy, 1981: 291, 306–307 (in key), fig. 160.127.

Genus **Lampromitra** Haeckel, 1881

Lampromitra huxleyi (Haeckel, 1879)

Haeckel, 1879: pl. XVI, fig. 9 (*Eucecryphalus*); Haeckel, 1887: 1215, pl. 59, fig. 1 ("Challenger" Stn 169, off East Cape); Hamilton, 1896: 28 (listed); Hutton, 1904: 340 (listed); Campbell, 1954a: D122 (generic diag.), fig. 61, 13.

Genus **Lithocampe** Ehrenberg, 1838

Lithocampe (?) **eupora** (Ehrenberg, 1872)

Ehrenberg, 1872 291, pl. IV, fig. 20 (*Eucyrtidium*); Haeckel, 1887: 1502 (*Lithocampe* (?)); Schröder, 1911: 138–139 (descr.), text-fig. 17; Petrushevskaya, 1967 [1968, transl.: 139--41, fig. 80 (I–V)]; Nigrini & Moore, 1979: N102 (may refer to *Botryostrobus lithobotrys* Haeckel — see remarks under *B. auritus /australis*).

Lithocampe (?) **furcaspiculata** (Popofsky, 1908)

Popofsky, 1908: 295-6, pl. XXXVI, figs 6-8 (*Lithamphora furcaspiculata*), 294, pl. XXXVI, fig. 5 (as *Poroamphora paradoxa*), 293, pl. XXXVI, fig. 3 (as *Dictyomitra meridionalis*); Riedel, 1958: 243-4, text fig. 12, pl, 4, figs 99-10 (as *Siphocampium* sp.); (?) Hulsemann, 1963: 34 (Arctic); Petrushevskaya, 1967 [1968, transl.: 127-133, 135, figs 73 (I–III), 74 (I–IV), 90 (II), (distrib.), tables 2-5]; Casey, 1971b: 332 (table 23.1), pl. 23.3, figs 9-10 (in *Lithamphora*).

(?) **Lithocampe** (?) **platycephala** (Ehrenberg, 1873)

Ehrenberg, 1873: 293, pl. III, fig. 16 (*Eucyrtidium*); Haeckel, 1887: 1502 (*Lithocampe*); Schröder, 1911: 138 (descr.), text-fig.16; Petrushevskaya, 1968 [1968, transl.: 134-137, figs 73 (VII–IX), 77 (I–IX), 78 (IV)].

Genus **Lithostrobus** Bütschli, 1882

(?) **Lithostrobus** (?) **botryocyrtis** Haeckel, 1887

Haeckel, 1887: 1475, pl. 79, figs 18-19; Cleve 1901: 174; Schröder, 1911: 135–139 (descr.), text-figs 109-110; Petrushevskaya, 1967 [1968, transl.: 141-143, figs 73 (IV–V), 80 (VI), 81 (I–IV)]; Nigrini & Moore, 1979: N102 (may refer to *Botryostrobus lithobotrys* Haeckel — see remarks under *B. auritus/australis*).

Genus **Stichopilium** Haeckel, 1862

Stichopilium annulatum Popofsky, 1913

Popofsky, 1913: 403-404, pl. XXXVII, figs 2-3; Hays, 1965: 126, 127 139, 181, text-fig. 12 (distrib. in N.Z. region), pl. 37, figs 2-3.

Genus **Theocalyptra** Haeckel, 1882

Theocalyptra (?) **bicornis** (Popofsky, 1908)

Popofsky, 1908: 228-229, pl. XXXIV, figs 7-8 (*Pterocorys*); Riedel, 1958: 240 (descr., syn. etc.), pl. 4. fig.4 (*Theocalyptra*); Petrushevskaya, 1967 [1968, transl.: 124-127, figs 71 (II–IX), 97 (II) (distrib.), tables 2–5]; Nigrini & Moore, 1979: N53–N55, (descr., distrib. etc), pl. 24, fig. 1; Boltovskoy, 1981: 291,307 (in key), fig. 160.141.

Theocalyptra davisiana (Ehrenberg, 1861)

Ehrenberg, 1861b: 297 (*Cycladophora ? davisiana*), 300-301 (as *Pterocodon davisianus*); Haeckel, 1862: 328-9 (*Eucyrtidium*), 332 (*Pterocanium*); Ehrenberg, 1873: pl. II, fig. 19 (*Pterocodon davisianus*), pl. II, fig. 11 (*Cycladophora ?Davisiana*); Haeckel, 1887: 1437–1438 (*Stichopilium* and *Lithostrobus*); Cleve, 1899: 33, pl. IV, fig. 6; Riedel, 1958: 239, text-fig. 10, pl. 4, figs 2–3 (*Theocalyptra*); Hays, 1965: 126, 127, 135, 180–181, text-fig. 8 (distrib. in N.Z. region) (*Theocalyptra*); Petrushevskaya, 1967 [1968, transl.: 120–122 (*Cycladophora*), figs 69 (I–VI)I, 97 (I) (distrib.) tables 4–5]; Petrushevskaya, 1971b: 319, table 22.1, fig. 22.3b (N.Z. distrib.); Foreman & Riedel, 1972: entry under *Cycladophora? davisiana* (orig. descr., transl. etc.); Nigrini & Moore, 1979: N57–N60 (descr., distrib., syn.), (*Theocalyptra*), pl. 24, figs 2a-b; Boltovskoy, 1981: 291, 305C (in key), fig. 160.143.

Family COROCYRTIDAE

Genus **Deflandrella** Loeblich & Tappan, 1961

Deflandrella sp. (Taylor, 1975)

Taylor, 1975 *in* Gordon & Ballantine, 1977: 97 (listed from Leigh region), as *Campylocantha;* note *Campylocantha* Jörgensen, 1905 replaced by *Deflandrella* (new name) by Loeblich & Tappan, 1961: 227.

Family PTEROCORYIDAE
Genus **Androcyclas** Jörgensen, 1905

Androcyclas gamphonycha (Jörgensen, 1899)

Jörgensen, 1899: 86 (*Pterocorys gamphonyxos*), 86 (as *P. theoconus*), 86 (as *P. amblycephalis*); Jörgensen, 1905: 139, pl. XVIII, figs 92–97 (*Androcyclas gamphonycha*); Schröder, 1911: 126–127 (descr.), text-figs 95–97: Hays, 1965: 126, 127, 143, 178, text-fig. 16 (distrib. in N.Z. region), pl. III, fig. 2; Petrushevskaya, 1971b: 319, table 22.1, fig. 22.4a (N.Z. distrib.); Petrushevskaya, 1971c: 1139 (generic key), text-fig. 3, 19; Nigrini & Moore, 1979: N71–N72, (descr., distrib), pl. 25, fig.3; Boltovskoy, 1981: 292, 307 (in key), fig. 160.148.

Genus **Lamprocyclas** Haeckel, 1881

Lamprocyclas maritalis Haeckel, 1887

Haeckel, 1887: 1390, pl. 74, figs 13–14; Hays, 1965: 126, 127, 137, 180, text-fig. 10 (distrib. in N.Z. region), pl. III, fig.11; Nigrini, 1967: 74–76, (descr., distrib.), pl. 7, fig. 5; Casey, 1971b: 332 (table 23.1), pl. 23.3, figs 6–7; Petrushevskaya, 1971c: 1138 (generic key); Renz, 1974: 793, pl. 19, fig. 21, tables 2, 4, 6–8; Riedel *et al.*, 1974: 712, pl. 61, figs 2–3; Renz, 1976: 245 (ecol.), pl. 6, fig. 26; Riedel & Sanfilippo, 1978: 119, pl. 6, figs 1–2; Nigrini & Moore, 1979: N75-N80 (descr., distrib., subspp.), pl. 25, fig. 4.; Boltovskoy, 1981: 292, 308 (in key), fig. 160.152

Family TRICYRTOIDAE
Genus **Pterocorys** Haeckel, 1881

(?) **Pterocorys** (?) **hirundo** Haeckel, 1887

Haeckel, 1887: 1318, pl. 71, fig. 4; Riedel, 1958: 238, text-fig. 9 pl. 3, fig. 11, pl. 4, fig. 1; Petrushevskaya, 1967 [1968, transl.: 114–116, fig. 67 (I–V), tables 4–5]; Casey, 1971b: 332 (table 23.1), pl. 23.1, figs 6–7; Petrushevskaya, 1971c: 1138 (generic key); Petrushevskaya, 1975: 583 (*Dictyophimus*) (in part); Nigrini & Moore, 1979: N35–N36, pl. 22, figs 2, 3a-b, 4 (descr., distrib. in *Dictyophimus* Ehrenberg, 1847, emend. Nigrini, 1978, incl. Petrushevskaya, 1967: 115, fig. 67 I–III (in part); see also N33–N34, *D. crisiae* Ehrenberg, 1854, for record of Petrushevskaya, 1967: 115, figs 67, IV–V, in part); Boltovskoy & Riedel, 1980: 124 (descr.), pl. 5, fig. 20 (transferred to *Dictyophimus* Ehrenberg, 1847); Boltovskoy, 1981: 292, 308 (in key), fig. 160.154; Cachon & Cachon, 1985: 294 (generic diag.).

Family ARTOSTROBIIDAE
Genus **Artostrobus** Haeckel, 1887

Artostrobus annulatus (Bailey, 1856)

Bailey, 1856: 3, pl. 1, figs 5a-b (*Cornutella*); Ehrenberg, 1860b: 822; Ehrenberg, 1861b: 297 (off Greenland and Iceland); Haeckel, 1862: 327–328 (*Eucyrtidium*); Ehrenberg, 1874: pl. 2, fig. 16 (*Cornutella*); Haeckel, 1887: 1182 (as *C. annulata* Ehr.), 1481 (as *Antrostrobus annulatus* (Bailey); type species of *Artostrobus* new genus and *"Artostrobulus"*); Cleve, 1899: 27, pl. 1, fig. 6; Schröder, 1911: 140–141 (descr.), text-figs 120–121; Riedel, 1958: 241–242, pl. 4, fig. 6; Petrushevskaya, 1967 [1968, transl.: 98–99, figs 56 (I–V), 99 (distrib.), tables 3, 4]; Petrshevskaya, 1968c: 1769, fig. 1; Petrushevskaya, 1971c: 1138 generic key), text-figs 2, 19; Foreman & Riedel, 1972: entry under *"Cornutella annulata"* (orig. descr., translations of Ehrenberg's Latin etc.); Boltovskoy, 1981: 292, 309 (in key), fig.160.159.

Genus **Lithomitra** Bütschli, 1882

Lithomitra arachnea (?) (Ehrenberg, 1861)

Ehrenberg, 1861b: 299 (*Eucyrtidium lineatum arachneum*); Haeckel, 1887: 1483 (as *Lithomitra lineata* (Ehr.), in part); Popofsky, 1908: 296, pl. XXVI, fig. 9 (as *L. Vanhöffeni*); Riedel, 1958: 242–243, pl. 4, figs 7–8; Petrushevskaya, 1962: 339–340, figs 9–10; Petrushevskaya, 1967 [1968, transl.: 145–147, figs 83 (IV–V), 96 (distrib.,) tables 2–5]; Petrushevskaya, 1971b: 319, table 22.1, fig. 22.4b (N.Z. distrib.); Foreman & Riedel, 1972: entry under *"Eucyrtidium lineatum, y arachneum"* (orig. descr., translation of Ehrenberg, 1861 etc.); Boltovskoy, 1981: 292, 309 (in key), fig. 160.163.

Superfamily BOTRYOIDEA
Family CANNOBOTRYIDAE

Genus **Saccospyris** Haecker, 1907

Saccospyris antarctica Haecker, 1907

Haecker, 1907: 124, figs 10a-b; Haecker, 1908: 447–448, pl. 84, figs 584, 589–590; Campbell, 1954a: D1116, fig. 12 (*Haliformis*); Riedel, 1958: 224–226, text-fig. 13, pl. 4, fig. 12 (in part as *Botryopyle antarctica* (Haecker), *q.v.*); Petrushevskaya, 1964: 1123–1125, fig. 2 (I–II) (in part as *B. antarctica* (Haecker)); Petrushevskaya, 1965: 96–98 (descr. refs & syn), text-fig. 10 (I–V) (*Saccospyris*); Hays, 1965: 126, 127, 136, 182, text-fig 9 (distrib. in N.Z. region, as (*Botryopyle* ?); Petrushevskaya, 1967a [1968, transl.]: 149–150, figs 85 (II), 92 (II), (distrib.), tables 2–5; Petrushevskaya, 1967b: 151–152, pl. 85; Petrushevskaya, 1971b: table 22.1 (= *Botryopyle*?); Boltovskoy, 1981: 293, 310 (in key), fig.160.167.

Saccospyris conithorax Petrushevskaya, 1965

Petrushevskaya, 1965: 98–99, text-fig. 11 (I–VII); Riedel, 1958: 224–246 (in part as *Botryopyle antarctica* (Haecker, 1907)); Petrushevskaya, 1964: 1123–1125, fig. 2 (III–IV) (in part, as *B. antarctica* (Haecker)); Petrushevskaya, 1967a [1968, transl.]: 150, figs 85 (I), 90 (I), (distrib), tables 3, 5]; Petrushevskaya, 1967b: 151–152, pl. 85; Boltovskoy, 1981: 293, 310 (in key), fig. 160.168.

Family SPYRIDAE
Genus **Triceraspyris** Haeckel, 1882

Triceraspyris antarctica (Haecker, 1907)

Haecker, 1907: 124, fig. 9 (*Phormospyris*); Haecker, 1908: 445–446, pl. 84, fig. 586 (*Triceraspyris*); Popofsky, 1908: 269, pl. XXX, fig. 7 (as *Triospyris biloculata*), 269–270, pl. XXX, fig. 6 (as *Triospyris bicornis*); Riedel, 1958: 230–231, text-fig. 3, pl. 2, figs 6–7; Petrushevskaya, 1964: 1121–1123, fig. 1 (I-VI); Hays, 1965: 126, 127, 134, 173, text-fig. 7 (distrib. in N.Z. region); Petrushevskaya, 1967 [1968, transl.: 62–64, figs 37 (I-III), 88 (distrib.), tables 2–5]; Chen, 1975: 456 (syn.), pl. 15, fig. 6; Petrushevskaya, 1975: 593, pl. 8, fig. 1 (*Triceraspyris* (?), 593, pl. 27, figs 4–6 (as *Desmopyris (?) haysi*, in part); Goll, 1977: 379 (taxon.); Nigrini & Moore, 1979: N17– N18 (descr., distrib., as *Phormospyris stabilis* (Goll) *antarctica*, pl. 20, figs 1a-d; Boltovskoy, 1981: 290, 302 (in key), fig. 160.101.

* Class PHAEODARIA
Order PHAEOCYSTIDA
Family AULACANTHIDAE
Subfamily AULACANTHINAE

Genus **Aulodendron** Haeckel, 1887

Aulodendron australe Haeckel, 1887

Haeckel, 1887: 1589, pl. 105, fig. 3 ("Challenger" Stn 169, off East Cape); Hamilton, 1896: 28 (listed); Hutton, 1904: 340 (listed); Campbell, 1954a: D147 (generic diag.)

Order PHAEOSPHAERIDA
Family SAGOSPHAERIDAE

Genus **Sagoscena** Haeckel, 1887

Sagoscena lampadophora Haecker, 1905

Haecker, 1905: 344, text-fig. 6; Haecker, 1908: 140, pl. XVIII, fig. 163, pl. XLV, fig. 345; Tibbs & Tibbs, 1986: 184 (table 3), 190 (from "Eltanin" station west of New Zealand).

Sagoscena ornata Haeckel, 1887

Haeckel, 1887: 1610–1611, pl. 108, fig. 4 ("Challenger" Stn 156, Antarctic Ocean); Tibbs & Tibbs, 1986: 184 (table 3), 196 (from "Eltanin" station west of New Zealand).

Order PHAEOCALPIDA
Family CASTENELLIDAE

Genus **Castanarium** Haeckel, 1879

Castanarium huxleyi Haeckel, 1887

Haeckel, 1887: 1682 ("Challenger" Stn 165, Tasman Sea); Hamilton, 1896: 28 (listed); Schmidt, 1908: 263 (listed); Campbell, 1954a: D154 (generic diag.).

Genus **Castanidium** Haeckel 1879

Castanidium bromleyi Haeckel, 1887

Haeckel, 1887: 1685 ("Challenger" Stns 165 and 169); Hamilton 1896: 28 (listed); Hutton, 1904: 340 (listed); Schmidt, 1908: 263 (listed), 264; Campbell, 1954a: D154 (generic diag.).

* Tibbs & Tibbs (1986) have reported on species of Phaeodaria from "Antarctic Seas" including 85 "Eltanin" stations in the general New Zealand region. Precise localities were not given but widespread distribution of many new records within the "Pacific Antarctic" are to be included. Only three records where New Zealand has been specifically identified are included here.

Also review of the occurrence of phaeodarian radiolarians in Recent sediments and Tertiary deposits by Reshetnyak (1971: 343–349).

Family CIRCOPORIDAE
Genus **Circospathis** Haeckel, 1879

Circospathis sexfurca (Haeckel, 1887)
Haeckel, 1887: 1694–1695, pl. 117, fig. 5 (in *Circoporus* Haeckel, 1879); Tibbs & Tibbs, 1986: 186 (table 3), 192 (from "Eltanin" Station west of New Zealand).

Order PHAEODENDRIDA
Family COELODENDRIDAE

Genus **Coelodrymus** Haeckel, 1879

Coelodrymus lappulatus Haeckel, 1887
Haeckel, 1887: 1738 ("Challenger" Stn 169, off East Cape, 700 fm.); Hamilton, 1896: 28 (listed as *Callodrymnus*); Popofsky, 1926: 61 (listed); Campbell, 1954a: D158 (generic diag.).

Family COELOGRAPHIDIDAE
Genus **Coelothauma** Haeckel, 1879

Coelothauma duodenum Haeckel, 1887
Haeckel, 1887: 1750, pl. 122, figs 3–5 ("Challenger" Stn 169 off East Cape, 700 fm.); Hamilton, 1896: 28 (listed as *Callothauma*); Popofsky, 1926: 61 (listed); Campbell, 1954a: D160, fig. 86.1.

Order PHAEOGROMIDA
Family MEDUSETTIDAE

Genus **Gazelletta** Murray *in* Haeckel, 1887

Gazelletta orthonema Haeckel, 1887
Haeckel, 1887: 1671, pl. 120, fig. 10 ("Challenger" Stns 270–274, Central Pacific); Tibbs & Tibbs, 1986: 187 (table 3), 193 (from two "Eltanin" stations west of New Zealand); Cachon & Cachon, 1985: 299 (generic diag.).

Class HELIOZOA
Order CENTROHELIDA

Genus **Wagnerella** Mereschowsky, 1878

Wagnerella borealis Mereschowsky, 1878
Mereschowsky, 1878a: 22, pl. II, figs 1–5; Mereschowsky, 1878b: 70–77, pl. V; Mayer, 1874: 357–358; Mayer, 1881: 592–593; Mereschowsky, 1881: 288–290; Zuelzer, 1909: 135–202, pls VI–X (structure and develop.); Dons, 1918: 101–116; Dons, 1921: 50–56 (review, distrib.), text-fig. 1, 1 table (N.Z. records on *Spirorbis* sp. [Polychaeta]); Heron-Allen & Earland, 1922: 235–236 (Antarctic records on Hydrozoa and Bryozoa); Wailes, 1937: 8 (in key, descr.), fig. 13; Trégouboff, 1953: 440–443, 447, 450, 464–465 (descr.) text-figs 333A–E, 335, 355A–C; Jepps, 1956: 114, fig. 56A; Kudo, 1964: 513, fig. 216f; Rainer, 1968: 64–66 (descr., ecol. etc.), text-figs 24A–B; Febvre-Chevalier, 1980: 909 *et seq.* (comparison with *Actinocoryne*, behaviour, cytology); Febvre-Chevalier, 1982: 176 (in key to genera); Febvre-Chevalier, 1985: 309 (in key), 313 (diag.), fig. 21A.

Phylum LABYRINTHULATA
[Labyrinthomorpha]
Class LABYRINTHULEA
Order LABYRINTHULIDA
Family LABYRINTHULIDAE

Genus **Labyrinthula** Cienkowsky, 1867

Labyrinthula sp. Armiger, 1964
Armiger, 1964: 3–9, 2 figs (as causative organism for die-off of the eel-grass *Zostera*, Auckland).

Genus **Myxoplasma** Kirk, 1907

Myxoplasma rete Kirk, 1907
H.B. Kirk, 1907: 522–523, pl. XXVI. [This genus is not included by Pokorny (1985: 318-321) in her review of the labyrinthulids.]

Phylum APICOMPLEXA
* Class SPOROZOA [Sporozoida]
Subclass GREGARINIA [Gregarinasina]
Order EUGREGARINIDA [Eugregarinorida]
Suborder CEPHALINA [Septatorina]
Superfamily POROSPOROIDEA [Porosphoricae]
Family POROSPORIDAE

* Names for hosts are not necessarily given as in original description. Later usage may be checked against the "recognisable" revision by Hewitt & Hine (1972) and with the current names proposed by Paulin *et al.* (1989: 32–35, 249–266). [Whitley's (1968) "check-list" provides a helpful intermediary stage of correlation between the many name changes in Paulin *et al.*, and earlier taxonomic citations.]

Genus **Nematopsis** Schneider, 1892

Nematopsis n.sp. Jones, 1976
Jones, 1976 ["1975"]: 567–568, 1 fig (see also Jones thesis 1975); Lauckner, 1983: 546; Levine, 1985: 334, 361 (generic diag.).
Host: Green mussel, *Perna canaliculus* (Gmelin, 1791)

Subclass COCCCIDIA
Order EUCOCCIDIIDA [Eucoccidiorida]
Suborder ADELEINA [Adeleorina]

Family HAEMOGREGARINIDAE
Genus **Haemogregarina** Danilewsky, 1885

Haemogregarina acanthoclini Laird, 1953
Laird, 1953: 96, pl. 8, figs 44–50 (in subgenus *Hepatozoon* (? Miller); Hewitt & Hine, 1972: 77, 102 (listed); Levine, 1985: 369 (generic diag.).
Host: Rockfish, *Acanthoclinus fuscus* Jenyns, 1842.

Haemogregarina bigemina Laveran & Mesnil, 1901
Laveran & Mesnil, 1901: 572: Reichenow, 1931: 48 (descr.); Laird, 1953: 88–96, 137–138, tables II–V, pl. 7, figs 1–43 (first Southern Hemisphere records, review, gametocyte formation, hosts, refs., etc.); Grassé *in* Grassé, 1952: 757, text-figs 583A–F; Saunders, 1955: 171–176 (recorded from Florida); Laird, 1958: 162, 164, text-fig. 2a; Laird, 1961: 834; Hewitt & Hine, 1972, 84, 86, 90–98, 102 (listed).
Hosts (in N.Z.): Blenny, *Ericentrus rubrus* (Hutton, 1872), Twister, *Bellapiscis medius* (Günther, 1861), Topknot, *Notoclinus fenestratus* (Bloch & Schneider, 1801), Blenny, *Forsterygion varium* (Bloch & Schneider, 1801), Suckerfish, *Trachelochismus melobesia* Phillipps, 1927

Haemogregarina coelorhynchi Laird, 1952
Laird, 1952b: 589–594, pl. 1128, figs 1–34; Hewitt & Hine, 1972–81, 102 (listed).
Hosts: Javelin Fish, *Lepidorhynchus denticulatus* (Richardson, 1846), Red Cod, *Pseudophysis bachus* (Bloch & Schneider, 1801).

Haemogregarina hoplichthys Laird, 1952
Laird, 1952b: 594–596, pl. 129, figs 1–15; Hewitt & Hine, 1972: 86, 102 (listed)
Host: Deepsea Flathead, *Hoplichthys haswelli,* McCulloch, 1907.

Haemogregarina leptoscopi Laird, 1952
Laird, 1952b: 596–598, pl. 129, figs 16–33; Laird, 1958: 163; Hewitt & Hine, 1972: 88, 102 (listed).
Host: Stargazer, *Leptoscopus macropygus* (Richardson, 1846).

Family LEUCOCYTOZOIDAE
Genus **Leucocytozoon** Danilewsky, 1899

Leucocytozoon tawaki Fallis, Bissett & Allison, 1976
Fallis *et al.*, 1976: 11–16, text-figs 1–7; Allison *et al.*, 1978: 371–374, figs 1–8.
Host: Fiordland Crested Penguin, *Eudyptes pachyrhynchus* Gray, 1845 [from Kaikoura], vector in Sandfly *Austrosimulium dumbletoni* Crosby, 1976 [Diptera]

Suborder HAEMOSPORINA [Haemosporina]
Family PLASMODIIDAE

Genus **Plasmodium** Marchiafava & Celli, 1885

Plasmodium relictum (Grassi & Feletti, 1891) var. **spheniscidae** (Fantham & Porter, 1944)
Fantham & Porter, 1944: 114, 279–292; Laird, 1950: 9–10; Laird, 1952a: 583–586 (significance of negative records from Macquarie Is); Levine, 1985: 371 (generic diag.).
Hosts (in N.Z.): Yellow-eyed Penguin, *Megadyptes antipodes* (Hombron & Jacquinot, 1841), Snares Crested Penguin, *Eudyptes robustus* Oliver, 1953

Phylum MICROSPORA
Class UNKNOWN
Order UNKNOWN
Family UNKNOWN
[Included in "collective group" Microsporidium by Sprague, 1977]

Genus **Microsporidium** Balbiani, 1884

Microsporidium rapua Jones, 1981
Jones, 1981: 67–70, figs 1–2; Lauckner, 1983: 552; Larsson, 1988: 30 (comment on use of the *Microsporidium* "which is actually a synonym to *Nosema* ... as a collective and unclassified genus for existing species of microsporidia which were too incompletely known to be included in an existing genus or to allow the creation of a new genus ... it is probably better to take the risk of creating a future synonym than to increase the amorphous mass of *Microsporidium* species."
Host: Oyster, *Tiostrea lutaria* (Hutton, 1873).

Phylum MYXOZOA [Cnidospora]
Class MYXOSPOREA
Order BIVALVULIDA
Suborder BIPOLARINA
Family MYXIDIIDAE

*Genus **Myxidium** Bütschli, 1882

Myxidium incurvatum Thélohan, 1892

Thélohan, 1892: 165; Thélohan, 1895: 341; Jameson, 1929: 66; Jameson, 1931: 63; Reichenow, 1931: 72–73 (descr.), text-figs 54A–B; Laird, 1953: 106–108, (review, refs, hosts), pl. 9, figs 62–71, 138; Poisson, 1953: 1031, 1033; Iversen *et al.*, 1971: 85 (table 1, comparison with *M. sphaericum* Thélohan 1895); Hewitt & Hine, 1972: 77, 83, 90, 98, 103 (listed); Weiser, 1985: 385-386 (generic diag.).

Hosts in N.Z.: Rockfish, *Acanthoclinus fuscus* Jenyns, 1842; Topknot, *Notoclinus fenestratus* (Bloch & Schneider, 1801); Suckerfish, *Trachelochismus melobesia* Phillipps, 1927.

Genus **Sphaeromyxa** Thélohan, 1892

Sphaeromyxa tripterygii Laird, 1953

Laird, 1953: 108–111, pl. 10, figs 72–74, table VII; Hewitt & Hine, 1972: 85, 86, 103 (listed); Weiser, 1985: 385 (generic diag.).

Hosts: Twister, *Helcogramma medium* (Günther, 1861); Blenny, *Forsterygion varium* (Bloch & Schneider, 1801).

Genus **Zschokkella** Auerbach, 1910

Zschokkella sp. Laird. 1953

Laird, 1953: 111–112, pl. 10, fig. 75; Hewitt & Hine, 1972: 84, 103 (listed); Weiser, 1985: 385 (generic diag.).

Host: Blenny, *Forsterygion varium* (Bloch & Schneider, 1801).

Family SINUOLINEIDAE
Genus **Davisia** Laird, 1953

Davisia diplocrepis Laird, 1953

Laird, 1953: 101–103, pl. 9, figs 59–61; Hewitt & Hine, 1972: 83, 102 (listed); Weiser, 1985: 386 (diag.), fig.7a.

Host: Clingfish, *Diplocrepis puniceus* (Richardson, 1846)

Suborder EURYSPORINA
Family CERATOMYXIDAE

Genus **Ceratomyxa** Thélohan, 1892

Ceratomyxa aggregata Davis, 1917

Davis, 1917: 229, pl. XX, figs 61–64; Meglitsch, 1960: 327, text-fig. 11 (fig. 148); Iversen *et al.*, 1971: 84–85, table 2 (comparison from different hosts and localities); Hewitt & Hine, 1972: 80, 84, 86 102 (listed).

Host (in N.Z.): Tarakihi, *Nemadactylus macropterus* (Bloch & Schneider, 1801).

Ceratomyxa angusta Meglitsch, 1960

Meglitsch, 1960: 325–327, text-fig. 11 (figs 145-147); Hewitt & Hine, 1972: 102 (listed).

Hosts: Sea Perch (Jock Stewart), *Helicolenus percoides* (Richardson, 1842); Banded Sea Perch (Red-banded Perch) *Ellerkeldia huntii* (Hector, 1875).

Ceratomyxa arcuata Thélohan, 1895

Thélohan, 1895: 335, pl. 7, figs 16–19; Labbé, 1889: 89 (in key), 90 (descr. etc., as of Thélohan, 1892), text-fig. 157; Dunkerly, 1921: 331; Reichenow, 1931: 70 (descr.), fig. 39A; Poisson *in* Grassé, 1953: 1028 (listed); Meglitsch, 1960: 313–315, text-fig. 8 (figs 108– 110); Hewitt & Hine, 1972: 78, 102 (listed); Shotter, 1971: 51–54.

Host (in NZ.): Orange Perch, *Lepidoperca* sp., formerly *Anthias pulchellus* Waite, 1899.

Ceratomyxa castigata Meglitsch, 1960

Meglitsch, 1960: 289–291, text-fig. 3 (figs 34–38); Hewitt & Hine, 1972: 82, 102 (listed).

Host: Southern Pigfish, *Congiopodus leucopaecilus* (Richardson, 1846).

Ceratomyxa castigatoides Meglitsch, 1960

Meglitsch, 1960: 291–293, text-figs 3 (figs 39–40), 4 (figs 41–44); Hewitt & Hine, 1972: 94, 102 (listed).

Host: Scarlet Parrotfish (Wrasse), *Pseudolabrus miles* (Bloch & Schneider, 1801).

Ceratomyxa constricta Meglitsch, 1960

Meglitsch, 1960: 315–316, text-figs 8 (figs 111–114), 9 (fig. 115); Hewitt & Hine, 1972: 80, 102

* Note also the following species of *Myxidium* recorded from New Zealand eels (*Anguilla* spp.) by Hine (1975); *M. acinum* Hine 1975 [see also Hine, 1978, 1979], *M. serum* Hine, 1975, *M. zealandicum* Hine, 1975 (the latter two species subsequently synonymised by Hine (1980) with the ubiquitous *M. giardi* Cépède, 1906).

(listed).
Host: Banded Bellows-fish, *Centriscops humerosus* (Richardson, 1846).

Ceratomyxa declivis Meglitsch, 1960
Meglitsch, 1960: 293–294, text-fig. 3 (figs 45–49); Hewitt & Hine, 1972: 83, 102 (listed).
Hosts: Silver Dory, *C. novaezealandiae* (Arthur, 1885); John Dory, *Zeus faber* Linnaeus, 1758 (formerly *Zeus [Cyttus] australis* Richardson, 1842).

Ceratomyxa elongata Meglitsch, 1960
Meglitsch, 1960: 329–332, text-fig. 11 (figs 151–154); Hewitt & Hine, 1972: 88, 102 (listed).
Host: Frostfish, *Lepidopus caudatus* (Euphrasen, 1788).

Ceratomyxa faba Meglitsch, 1960
Meglitsch, 1960: 287–289, text-fig. 3 (figs 30—33); Hewitt & Hine, 1972: 79, 102 (listed).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa flexa Meglitsch, 1960
Meglitsch, 1960: 299–300, text-fig. 5 (figs 63–67); Hewitt & Hine, 1972: 93, 102 (listed).
Host: Rubyfish, *Plagiogeneion rubiginosus* Hutton, 1875.

Ceratomyxa gemmaphora Meglitsch, 1960
Meglitsch, 1960: 302–305, text-fig. 6 (figs 75–82); Hewitt & Hine, 1972: 79, 102 (listed).
Host: Butterfly Perch, *Caesioperca lepidoptera* (Bloch & Schneider, 1801).

Ceratomyxa gibba Meglitsch, 1960
Meglitsch, 1960: 301–302, text-fig. 6 (figs 70–74); Hewitt & Hine, 1972: 82, 102 (listed).
Host: Pigfish, *Congiopodus leucopaecilus* (Richardson, 1846).

Ceratomyxa hama Meglitsch, 1960
Meglitsch, 1960: 308–311, text-fig. 7 (figs 93–97); Hewitt & Hine, 1974: 79, 102 (listed).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa hokarari Meglitsch, 1960
Meglitsch, 1960: 323–325, text-fig. 10 (figs 139-145).
Host: Ling, *Genypterus blacodes* (Bloch & Schneider, 1801).

Ceratomyxa inconstans Jameson, 1929
Jameson, 1929: 63–64, pl. VI, figs 10–12; Meglitsch, 1960: 285–287, text-figs 2 (figs 9–20), 3 (figs 21–29); Hewitt & Hine, 1972: 80, 86, 96, 99, 102 (listed).
Hosts (in N.Z.): Sea Perch (Jock Stewart), *Helicolenus percoides* (Richardson, 1842); Large Horse Mackerel, *Trachurus novaezelandiae* (Richardson, 1843); Trevally, *Pseudocaranx dentex* (Bloch & Schneider, 1801); Common Mackerel, *Scomber australasicus* (Cuvier & Valenciennes, 1831).

Ceratomyxa insolita Meglitsch, 1960
Meglitsch, 1960: 300–301, text-figs 5 (fig. 68), 6 (fig. 69); Hewitt & Hine, 1972: 80, 102 (listed); Kovalyova, 1988: 1619 (type species of new genus *Meglitschia*, new family Meglitschidae).
Host: Tarakihi, *Nemadactylus macropterus* (Bloch & Schneider, 1801).

Ceratomyxa intexua Meglitsch, 1960
Meglitsch, 1960: 294–297, text-figs 4 (figs 50–54), 5 (figs 55–57); Hewitt & Hine, 1972: 93, 95, 102 (listed).
Hosts: Southern Kingfish, *Rexea solandri* (Cuvier & Valenciennes, 1832); probably also *Plagiogeneion rubiginosus* (Hutton, 1875).

Ceratomyxa inversa Meglitsch, 1960
Meglitsch, 1960: 328–329, text-fig. 11 (fig. 150); Hewitt & Hine, 1972: 85, 102 (listed).
Host: Ling, *Genypterus blacodes* (Bloch & Schneider, 1801).

Ceratomyxa laxa Meglitsch, 1960
Meglitsch, 1960: 311–313, text-figs 7 (fig. 98), 8 (figs 103–107); Hewitt & Hine, 1972: 79, 102 (listed).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa minuta Meglitsch 1960
Meglitsch, 1960: 282–285, text-fig. 2 (figs 1–8); Hewitt & Hine, 1972: 95, 98, 102 (listed).
Hosts: Barracouta, *Thyrsites atun* (Euphrasen, 1791); Southern Kingfish, *Rexea solandri* (Cuvier & Valenciennes, 1832).

Ceratomyxa moenei Meglitsch, 1960
Meglitsch, 1960: 318, text-fig. 9 (figs 121–125); Hewitt & Hine, 1972: 93, 102 (listed).
Host: Bass, *Polyprion americanus* Bloch & Schneider, 1801.

Ceratomyxa nitida Meglitsch, 1960
Meglitsch, 1960: 328, text-fig. 11 (fig. 149); Hewitt & Hine, 1972: 92, 102 (listed).

Host: Common Sole, *Peltorhamphus novaezeelandiae* Günther, 1862.

Ceratomyxa polymorpha Meglitsch, 1960
Meglitsch, 1960: 321–323, text-fig. 10 (figs 128–137); Hewitt & Hine, 1972: 92, 102 (listed).
Host: Red Cod, *Pseudophysis bachus* (Bloch & Schneider, 1801).

Ceratomyxa recta Meglitsch, 1960
Meglitsch, 1960: 297–299, text-fig. 5 (figs 58–62); Hewitt & Hine, 1972: 85, 102 (listed).
Host: Ling, *Genypterus blacodes* (Bloch & Schneider, 1801).

Ceratomyxa renalis Meglitsch, 1960
Meglitsch, 1960: 317–318, text-fig. 8 (figs 118–120); Hewitt & Hine, 1972: 79, 102 (listed).
Host: Megrim *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa subtilis Meglitsch, 1960
Meglitsch, 1960: 307–308, text-fig. 6 (figs 83–87); Hewitt & Hine, 1972: 81, 102 (listed).
Host: Javelin Fish, *Lepidorhynchus denticulatus* (Richardson, 1846).

Ceratomyxa torquata Meglitsch, 1960
Meglitsch, 1960: 316–317, text-fig. 9 (figs 116–117); Hewitt & Hine, 1972: 79, 102 (listed).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa uncinata Meglitsch, 1960
Meglitsch, 1960: 320–321, text-fig. 9 (figs 126–127); Hewitt & Hine, 1972: 79, 92, 102 (listed).
Hosts: Lemon Sole, *Pelotretis flavilatus* Waite, 1910; Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa vepallida Meglitsch, 1960
Meglitsch, 1960: 305–307, text-figs 6 (fig. 88), 7 (figs 89–92); Hewitt & Hine, 1972: 79, 102 (listed).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa sp. 1 Meglitsch, 1960
Meglitsch, 1960: 291; Hewitt & Hine, 1972: 94, 192 (listed, sp. h)
Host: with *Ceratomyxa castigatoides* in Scarlet Parrotfish, *Pseudolabrus miles* (Bloch & Schneider, 1801).

Ceratomyxa sp. 2 Meglitsch, 1960
Meglitsch, 1960; 333; Hewitt & Hine, 1972: 98, 102 (listed, sp. a).
Host: Barracouta, *Thyrsites atun* (Euphrasen, 1791).

Ceratomyxa sp. 3 Meglitsch, 1960
Meglitsch, 1960: 333; Hewitt & Hine, 1972: 79, 102 (listed, sp. b)
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa sp. 4 Meglitsch, 1960
Meglitsch, 1960: 333; Hewitt & Hine, 1972: 96, 102 (listed, sp. c).
Host: Common Mackerel, *Scomber australasicus* (Cuvier & Valenciennes, 1831).

Ceratomyxa sp. 5 Meglitsch, 1960
Meglitsch, 1960: 333; Hewitt & Hine, 1972: 79, 102 (listed, sp. d).
Host: Butterfly Perch, *Caesioperca lepidoptera* (Bloch & Schneider, 1801).

Ceratomyxa sp. 6 Meglitsch, 1960
Meglitsch 1960: 334; Hewitt & Hine, 1972: 73, 102 (listed, sp. e).
Host: Spotted Smooth-hound (Rig), *Mustelus lenticulatus* Phillipps, 1932.

Ceratomyxa sp. 7 Meglitsch, 1960
Meglitsch, 1960: 335; Hewitt & HIne, 1972: 78, 102 (listed, sp. f).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Ceratomyxa sp. 8 Meglitsch, 1960
Meglitsch, 1960: 335; Hewitt & Hine, 1972: 73, 102 (listed, sp. g).
Host: Spotted Smooth-hound (Rig), *Mustelus lenticulatus* Phillipps, 1932.

Genus **Leptotheca** Thélohan, 1895

Leptotheca annulata Meglitsch, 1960
Meglitsch, 1960: 351–352, text-fig. 13 (figs 169–174); Hewitt & Hine, 1972: 74, 95, 98, 103 (listed); Weiser, 1985: 387 (generic diag.).
Hosts: Kahawai, *Arripis trutta* (Bloch & Schneider, 1801); Southern Kingfish, *Rexea solandri* (Cuvier & Valenciennes, 1832); Barracouta, *Thyrsites atun* (Euphrasen, 1791).

Leptotheca minima Meglitsch, 1960
Meglitsch, 1960: 349–351, text-fig. 13 (figs 163–

168); Hewitt & Hine, 1972: 79, 103 (listed).
Host: Kahawai, *Arripis trutta* (Bloch & Schneider, 1801).

Leptotheca pinguis Meglitsch, 1960
Meglitsch, 1960: 352–354, text-fig. 13 (figs 175–178); Hewitt & Hine, 1972: 78, 92, 103 (listed).
Hosts: Common Sole, *Peltorhamphus novaezeelandiae* (Günther, 1862); Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Leptotheca subelegans Laird, 1953
Laird, 1953: 103–105, pl. 8 figs 51-58; Hewitt & Hine, 1972: 79, 83, 103 (listed).
Hosts: Black Goby, *Gobiopsis atrata* (Griffin, 1933); Clingfish, *Diplocrepis puniceus* (Richardson, 1846).

Leptotheca sp. 1. Meglitsch, 1960
Meglitsch, 1960: 354; Hewitt & Hine, 1972: 82, 103 (listed, sp. a).
Host: Pigfish, *Congiopodus leucopaecilus* (Richardson, 1846).

Leptotheca sp. 2 Meglitsch, 1960
Meglitsch, 1960: 354; Hewitt & Hine, 1972: 78, 103 (listed, sp. b).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Leptotheca sp. 3. Meglitsch, 1960
Meglitsch, 1960: 354–355; Hewitt & Hine, 1972: 78, 103 (listed, sp. c).
Host: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801).

Family SPHAEROSPORIDAE
Genus **Bonamia** Pichot, Comps, Tige, Grizel & Rabouin, 1979

Bonamia cf. **ostreae** Pichot, Comps, Tige, Grizel & Rabouin, 1979
cf. Pichot *et al.*, 1979 [1980]: 131–140, figs 1–12; Poder et al., 1982: 254–257 (pathology, etc.); Bannister 1982: 6; Bannister & Key, 1982: 1–9; Banning, 1982: 261–265; Bachère *et al.*, 1982: 28; Balouet, 1983: 19–20; Balouet & Poder, 1983: 74–83; Balouet *et al.*, 1983: 1–14 (morphol./pattern of oyster lesions); Balouet & Poder, 1985: 372–374; Bucke & Feist, 1985: 387–392; Banning, 1985: 393–396; Bachère & Grizel, 1985: 237–240 (receptivity of oyster to parasites); Poder *et al.*, 1985: 125–138 (biology/epizootiology); Bachère *et al.*, 1986: 127–132 (experimental infection); *Evening Post*, 1986: 30 (first N.Z. reports); *Dominion*, 1986: 8; *Catch*, 1986a: 2 (first N.Z. record, July 1986, Foveaux Strait oyster fishery closed); Hickman & Dinamani, 1986: 1; Hickman & Jones, 1986: 1-3, figs 1-6 (Foveaux Strait oyster disease survey); Hine, 1986: 2–4 (summary of overseas information); Dinamani *et al.*, 1986: 4–6, figs 1–5 (analysis of N.Z. material); Elston *et al.*, 1986: 49–54, 4 figs (North American occurrence and significance); Catch, 1986b: 3–5, 4 figs (Foveaux Strait further effects); Dinamani *et al.*, 1987: 1–30, figs 1–2 (report on Foveaux Strait disease outbreak); Hine *et al.*, 1987: ("A parasite similar to *Bonamia ostreae* ... in oysters from Foveaux Strait."), figs A–C; Dinamani *et al.*, 1987: 37–44, figs 1–10 (occurrence and characteristics in N.Z.); Bucke & Hepper, 1987: 79–80 (pathology/prevalence); Cheng, 1987: 1–14 (host immunosuppression/pathogenicity); Parasitology Today, 1987: 36; Montes & Melendez, 1987: 195–198 (prevalence/host condition/morphol.); Perkins, 1987: 240–243 (life cycle/morphol./transmission); Hine, 1988: 11–12, tables 1–2 (progress report, N.Z.); Fisher, 1988: 43–53 (haemocyte recognition/binding of parasite); Bucke, 1988: 174–176 (life cycle, taxon., etc.); Hyman, 1988: 18–23 (impact on oysters); Mialhe *et al.*, 1988a: 293–299 (isolation/purification); Mialhe *et al.*, 1988b: 67–69 (serology etc.); Friedman *et al.*, 1989: 133–137 (pathol./host mortalities); Boulo *et al.*, 1989: 257–262 (immunodiag.); Equinoxe, 1990: 32–39 (biol./host reaction, resistivity); Banning, 1990: 189–192, figs (life cycle); McKoy, 1991: 8 (comment on disease-resistant oysters as hope for survival of Foveaux Strait fishery); Fishing Industry Board, 1991: [3] (failure of N.Z. MAF to contain spread in Foveaux Strait beds); *Evening Post*, 1991: 3 (*Bonamia* record from MAF hatchery, Wellington, ex. Tasman Bay oysters, pro-posed restriction of transport of live oysters).

Genus **Chloromyxum** Mingazzini, 1890

Chloromyxum obliquum Meglitsch, 1960
Meglitsch, 1960: 334, 335 (*nomen nudum*); Hewitt & Hine, 1972: 73, 102 (listed); Weiser, 1985: 387 (generic diag.).
Host: Spotted Smooth-hound (Rig), *Mustelus lenticulatus* Phillipps, 1932.

Genus **Sphaerospora** Thélohan, 1892

Sphaerospora undulans Meglitsch, 1970
Meglitsch, 1970: 112–113, text-figs 1–9; Meglitsch, 1960: 317 (*nomen nudum*) (as *S. undulus* [sic]); Hewitt

& Hine, 1972: 79, 92, 103 (listed).
Hosts: Megrim, *Arnoglossus scapha* (Bloch & Schneider, 1801); Common Sole, *Peltorhamphus novaezeelandiae* (Günther, 1862).

Sphaerospora sp. Meglitsch, 1970
Meglitsch, 1970: 115 ("... so few spores that no attempt to measure or describe them was made"); Hewitt & Hine, 1972: 85, 103 (listed).
Host: Ling, *Genypterus blacodes* (Bloch & Schneider, 1801).

Family INCERTAE SEDIS

* Genus **Auerbachia** Meglitsch, 1968

Auerbachia anomala Meglitsch, 1968
Melgitsch, 1968: 397–399, figs 1–4; Hewitt & Hine, 1972: 102 (listed).
Host: Ling, *Genypterus blacodes* (Bloch & Schneider, 1801).

Auerbachia monstrosa Meglitsch, 1968
Meglitsch, 1968: 399–401, figs 5–7; Hewitt & Hine, 1972: 81, 85, 102 (listed).
Host: Javelin Fish, *Lepidorhynchus denticulatus* (Richardson, 1846).

Order PLATYSPORINA
Family MYXOSOMATIDAE

** Genus **Myxosoma** Thélohan, 1892

Myxosoma tripterygii Laird, 1953
Laird, 1953: 112–113, pl. 10, figs 76–77; Hewitt & Hine, 1972: 84, 103 (listed); Weiser, 1985: 388 (generic diag.).
Host: Blenny, *Forsterygion varium* (Bloch & Schneider, 1801).

* " ... analysis of the three species of the genus *Auerbachia* has shown that they belong to a single, very variable, and widely spread species." (Kovaliova & Schulman, 1985: 56; cf. Evidokimova, 1973).

** See Gupta & Khera (1988: 45-48) for review of *Myxobolus* Bütschli, 1882, as senior synonym of *Myxosoma* Thélohan, 1892.

Phylum ASCETOSPORA [= Haplospora]
Class STELLATOSPOREA
Order BALANOSPORIDA
Family HAPLOSPORIDIIDAE

Genus **Urosporidium** Caullery & Mesnil, 1905

Urosporidium constantae Howell, 1967
Howell, 1967: 233–235, text-figs 5A–N, 6A–E (pls 1-3); Lauckner, 1983: 654.
Hosts: Trematode, *Bucephalus longicornutus* (Manter, 1954), sporocysts in mud oyster, *Tiostrea lutaria* (Hutton, 1873).

Phylum CILIOPHORA
Class KINETOPHRAGMINOPHORA
Subclass GYMNOSTOMATA
Order HAPTORIDA

Family DIDINIIDAE
Genus **Cyclotrichium** Meunier, 1910

Cyclotrichium meunieri Powers, 1932
Powers, 1932: 74–80; Kahl, 1933: 56 (cf. *Mesodinium pulex* forma *rubrum*); Bary & Stuckey, 1950: 87–92, (N.Z. occurrence, morphol., refs), pl. 13; Bary, 1951: 44, 1 fig.; Bary, 1953a: 72; Bary, 1953b: 393, 395, 398, fig. 1 (N.Z. distrib.), figs 2–4 (patterns of blooms); Kudo, 1954: 107, 683, 706 (descr.), figs 300o, 301a-b; see also Ryther, 1955: 387–414, text-figs 1–5 for detailed discuss. of red-water conditions, refs. etc.); Brongersma-Saunders, 1957: 980, 982, text-figs 3-6 (maps); Ryther, 1967: 1318–1319; Fonds & Eisma, 1967: 458–463, figs 4a-h; Fenchel, 1968: 245–253 (comparison with *Mesodinium rubrum* and consideration that they are identical, cf. also Kahl, 1933); Barber *et al.*, 1969: 86–88 (cryptomonad symbiont); cf. Borror, 1973: 44, Corliss, 1979: 217, pl. XXII, figs 56–57.

Family MESODINIIDAE
Genus **Mesodinium** Stein, 1863

Mesodinium rubrum (Lohmann, 1908)
Lohmann, 1908: 303, pl. 17, figs 37–41 (*Halteria*); (?) Perty, 1852: 150, pl. 7, fig. 2 (as *Megatricha partita*); Hamburger & von Buddenbrock, 1911: 26 (descr., distrib. etc., transferred to *Mesodinium*), text-figs 20a-b; Kahl, 1930: 127 (descr., status etc., as *M. (Halteria) pulex* Claparède & Lachmann), text-fig. 18, 7–8; Kahl, 1933: 56 (in key etc., as *M. pulex* forma *rubrum*),

fig. 4.7; Hart, 1934: 459–460, fig. 1 (red-water bloom); Clemens, 1935: 473 (red water); Wailes, 1943: 4, fig. 6; Hart, 1943: 661–662 (Darwin's obs. on blooms, causes etc.); Bary & Stuckey, 1950: 91 ("... recently a single specimen of a species remarkably similar to, and provisionally identified as, *M. rubrum* was obtained ... from Wellington Harbour"); Kudo, 1954: 706; Fonds & Eisma, 1967: 458–463 (identif., status etc.), figs 4a-h (note: Gaarder *in* Fonds & Eisma, 1967: 462 — "This ciliate lives in symbiosis with a red/brown alga, called by Lohmann *Erythromonas haltericola*, perhaps belonging to the Prasinophyceae. ... The *M. "rubrum"* of Fonds & Eisma seems to be the symbiotic form of *Mesodinium pulex* & Lachman (cf. Bakker, 1966)"; Fenchel, 1968: 245–253, text-figs 1 a-c (incl. *Cyclotrichium meuneri* Powers, and refs to world records (table 1) etc., incl. Bary's records); Taylor *et al.*, 1969: 819–821; Taylor *et al.*, 1971: 391–407 (review of symbiosis, ultrastructure, ecology, taxon., distrib. (table 1 and fig. 1, incl. note on N.Z. identification of *C. meuneri*, p. 401), figs 1–26; (cf. Borror, 1973: 44; Zimmerman *et al.*, 1975: 146–147; Campodónico *et al.*, 1975: 225–239 (discolouration); Jankowski, 1976: 167–168 (type species of new genus *Myrionecta*); Taylor (1973) *in* Gordon & Ballantine, 1977: 97 (listed from Leigh region); Hibberd, 1977: 45–61, pls 1–4; Oakley & Taylor, 1978: 361–369; Packard *et al.*, 1978: 73–89 (in upwelling system, refs); Lindholm, 1978a: 1–5 (mass develop.); Corliss, 1979: 80 (refs), 217, pl. XXII, figs 63–64; Margalef *et al.*, 1979: 89–94; Smith & Barker, 1979: 27-33 (carbon budget); Lindholm, 1981: 117–123 (ecol.); Taylor, 1982: 77, 79-82, 84, 86, figs 5–6, 18–19, 22 (symbiosis); Cabeçadas *et al.*, 1983: 81–97 (develop. of bloom, refs); Kat, 1984: 375–377 (cause of "red" oysters; Koray, 1984: 75–83 (red tide, salinity/temp.); Jara *et al.*, 1985: 53-63 (biol., history of bloom); Orlova *et al.*, 1985: 54–61 (red tide develop., refs etc.), figs 1–5 (English transl., 1986: 342–348); Lindholm, 1985: 1–48 (review of biol.); Small & Lynn, 1985: 393, 419, 472 (generic status); Dikarev, 1985: 58–63, figs; Taylor, 1985: 778; Konovalova & Selina, 1986: 62–63; MacKenzie & Gillespie, 1986: 365 (Tasman Bay bloom); Lockwood, 1986: 421–430 (blooms/oxygen levels); Leppänen & Bruun, 1986: 147–157 (role in blooms); Froga, 1987: 19; Jenkinson, 1987: 47; Rat'kova, 1987: 113–118; de Puytorac *et al.*, 1987: 482 (as type genus of new family Mesodiniidae); Hallegraeff, 1987: 4, fig. 4 (SEM photos etc.); Steiff, 1987: 32–33 (seasonal abundance); Jimenez & Intriago, 1987: 145–154; Leppänen & Bruun, 1988: 37–54 *passim* (biomass/productivities); Lindholm, *et al.*, 1988: 141–149 (cell ultrastructure); Jonsson, 1989: 39–53 *passim* (vertical distrib., swimming behaviour); Montagnes & Lynn, 1989: 193–201 (annual cycle/population dynamics); Lindholm, 1989: 297–298 (taxonomic comment); Crawford, 1989: 161–174; Jonsson & Tilesius, 1990: 35–44 (behaviour/predators/copepods etc.); Lindholm & Mörk, 1990: 53-64 (depth maxima/stratification, refs).

Family ENCHELYIDAE
Genus **Haematophagus** Woodcock & Lodge, 1921

Haematophagus megapterae Woodcock & Lodge, 1921

Woodcock & Lodge, 1921: 7–22, text-figs 1A–B, pl. I, figs 13–20, pl. II, figs 21–36, pl. III, figs 37-65; Kahl, 1930: 147, 148, text-fig. 21, 17; Corliss, 1979: 215.

Host: Humpback Whale, (*Megaptera novaeangliae* Borowski) from "Terra Nova" Stn 149, Bay of Islands (parasitic on baleen plates).

Subclass HYPOSTOMATA
Order CHONOTRICHIDA
Suborder CRYPTOGEMMINA
Family STYLOCHONIDAE

Genus and species unnamed, Mohr, Matsudo & Leung, 1970

Mohr *et al.*, 1970: 436 (table 1) (listed as ectocommensal on *Nebaliella antarctica* Thiele, 1904 (Crustacea: Leptostraca) from Macquarie Is); Small & Lynn, 1985: 492 (family diag.).

Subclass SUCTORIA
Order SUCTORIDA
Suborder EXOGENINA
Family EPHELOTIDAE

Genus **Ephelota** Wright, 1857

Ephelota gemmipara (Hertwig, 1876)

Hertwig, 1876: 20, pls I–II (*Podophyra*); Maupas, 1881: 325, figs 167–17; Kent, 1881/82: 823, pl. XLVI, figs 48–51, pl. XLVII, figs 9–14 (*Hemiophyra*); Sand, 1899/1901: 195, pl. III, figs 4 & 7, pl. V, fig. 8, pl. VI, fig. 2; Collin, 1912: 412–413 (descr., refs & syn.), pl. III, figs 40–48, 50–55, pl. VI, figs 97–111; Hamburger & von Buddenbrock, 1913: 160-161 (descr., distrib., refs & syn., incl. *P. benedeni* Fraipont, 1878 and *P. lyngbyei* Robin, 1879), text-figs 4a-c; Dons, 1921: 81 (Port Ross, Auckland Is); Noble, 1929: 13, text-fig. A(2); Kahl, 1934; 203 (in key, etc.), figs 4.1–4.2;

Wailes, 1943: 37 (in key), 38 (descr., refs), figs 111A–C; Kudo, 1954: 877 (fig. 374d; Batisse, 1965: 5629–5632; Batisse, 1966: 771–774; Corliss, 1979: 237, pl. XXV, figs 7–8; Yagiu, 1980: 3–5 (descr., etc.), text-fig. 1, pl. I; Small & Lynn, 1985: 498 (family and genus diag.).

Family OPHRYODENDRIDAE
Genus **Ophryodendron** Claparède & Lachmann, 1858

Ophryodendron macquarie Johnston, 1938
Johnston, 1938: 5–7, figs 1–14; Small & Lynn, 1985: 497 (family and genus diag.).
Host: *Munna novazelandica* Chilton (Isopoda: Asellota), Macquarie Is.

Family URNULIDAE
Genus **Paracineta** Collin, 1911

Paracineta crenata (Fraipont, 1878) forma **pachytecha** Collin, 1912
Collin, 1912: 123, 406, text-figs CVIa-c; Hamburger & von Buddenbrock, 1912: 174–175 (incl. var. *pachytheca* Collin, 1912 (see text-fig. 23b), text-fig. 23 a-c); Dons, 1921: 80–81, text-figs 32–33 (Perseverance Harbour, Campbell Is); Kahl, 1934: 201 (in key, distrib. etc.), figs 7.20, 7.31, 7.40; Wailes, 1943: 41 (in key), 43 (descr., refs), fig. 126; Small & Lynn, 1985: 500 (family and genus diag.).

Paracineta limbata (Maupas, 1881) forma **convexa** Dons, 1921
Dons, 1921: 77–79, text figs 28–30 (Port Ross, Auckland Is); Hamburger & von Buddenbrock, 1913: 179–180 (descr., distrib., refs & syn., as *P. limbata*), text-figs 31a-b; Kahl, 1934: 200–201(in key, descr.), fig. 4.31; Wailes, 1943: 41 (in key), 42 (descr., refs), fig. 120; Kudo, 1954: 868, figs 369c-d.

Genus **Endosphaera** Engelmann, 1876

Endosphaera engelmanni Entz, 1896
Entz, 1896: 1; Collin, 1912: 363–364 (descr., refs); Lynch & Noble, 1931: 97–114 (diag., descr.); Laird, 1953: 135–136, 138 (morphol., refs), pl. 11, fig. 84; Kudo, 1954: 873, fig. 373b; Matthes, 1971: 286–288, fig. 19; Hewitt & Hine, 1972: 86, 103 (listed); Small & Lynn, 1985: 502, fig.22.
Host: Hyperparasitic in ciliate *Trichodina multidentis* Laird, 1953 from gills of Twister, *Bellapiscis mediums* (Günther, 1861).

Class OLIGOHYMENOPHORA
Subclass HYMENOSTOMATA
Order HYMENOSTOMATIDA
Suborder OPHRYOGLENINA

Family ICHTHYOPHTHIRIIDAE
Genus **Ichthyophthirius** Fouquet, 1876

Ichthyophthirius sp. Anderson, 1973
Anderson, 1973 thesis: 52 (infecting tripterygiid fishes); Gordon & Ballantine, 1977: 97 (listed, Leigh region, following Anderson); cf. Kent, 1881/82: 530–531 (generic descr.); Kudo, 1954: 708–709 (generic descr.); Corliss, 1982: 623 (a "single species ... known for over a hundred years as the causative agent of "itch" in freshwater fishes ...").

Order SCUTICOSILIATIDA
Suborder PHILASTERINA
Family PARANOPHRYIDAE

Genus **Paranophrys** Thompson & Berger, 1965

Paranophrys elongata (Bigger & Wenrich, 1932)
Bigger & Wenrich, 1932: 252–257 (*Anophrys*); Powers, 1935: 306–307 (diag., descr.), text-fig. 6, pl. 2, fig. 1; McRae, 1959: 261 (endocommensal in gut of the echinoid *Evechinus chloroticus* (Valenciennes); Kudo, 1954: 750, fig. 319f; Jones & Rogers, 1968: 514–519 (occurrence, hosts, refs), tables I-VI; cf. Borror, 1973: 47; Corliss, 1979: 128 (to *Paranophrys* since *Anophrys*, Cohn, 1866, restricted to type species *A. sarcophaga*), 262, 264, pl. XXVII, figs 11–12; Small & Lynn, 1985: 535 (family and genus diag.).

Subclass PERITRICHIA
Order PERITRICHIDA
Suborder SESSILINA
Family VORTICELLIDAE

* Genus **Vorticella** Linnaeus, 1767

Vorticella marina Greef, 1870
Greef, 1870: 352, pl. 4, figs 1–6, pl. 5, figs 1–7; Kent, 1882: 685, pl. XXXV, figs 1–8, pl. XLIX, fig. 30; T.W. Kirk, 1886: 215 ("... small rock ponds ... on the

* Curds *et al.*, 1983: 260, fig. 159 (generic descr. etc.); cf. also Borror, 1973: 49; Corliss, 1979: 273; Small & Lynn, 1985: 549; also Jolán, 1972: 130–152 (key to species).

shore of Port Nicholson and Cook Strait."); Möbius, 1888: 94; Hutton, 1904: 328 (listed); Hamburger & von Buddenbrock, 1911: 123–124 (descr., distrib., refs & syn., incl. *V. nebulifera* Bütschli, 1867); H.B. Kirk, 1922: 14; Noland & Finley, 1931: 97 ("... possibly identical with *V. nebulifera* O.F.M. ... only described from saltwater ..."); Kahl, 1933: 129 (in key etc.), figs 22–39; Stiller, 1939: 428-429 text-fig. 4; Wailes, 1943: 30 (in key, descr., refs), fig. 87; Roberts *et al.*, 1983: fig. 2/30.

Vorticella microstoma Ehrenberg, 1838

Ehrenberg, 1838: 272, pl. XXV fig. 3; Dujardin, 1841: 558, pl. 16, figs 5–9; Kent, 1882: 684, pl. XXXIV, figs 15–19, pl. XLIX, fig. 29 (as *V. striata* Dujardin, 1841), 685, pl. XXV, figs 9–24 (*V. microstoma* Ehrenberg, 1838); T.W. Kirk, 1886: 217 ("On Algae in Wellington Harbour ..."); Hutton, 1904: 328 (listed); Hamburger & von Buddenbrock, 1911: 125 (descr., distrib., refs & syn.), text-fig. 159 (as *V. microstoma* Ehrb., 1838, incl *V. hians* O.F. Müller, 1786, *V. striata* Dujardin, 1841, *V. infusionum* Dujardin, 1841, *V. plicata* Fromental, 1874, *V. pyrum* Mereschkowsky, 1878, and *V. nebulifera* Gourret & Roesen, 1880); Noland & Finley, 1931: 98 ("... a common, well-known species ..."), 108 (descr. etc.), pl. X, figs 33–34; Kahl, 1933: 129 (in key etc.), fig. 22.44; Wailes, 1943: 30 (in key), 31 (descr., refs), fig. 89; Roberts *et al.*, 1983: fig. 1/27; Barausova, 1983: 33–37 (zinc effects/behaviour); Small & Lynn, 1985: 549, fig. 14, I. Smith, 1973: 33.

Vorticella mortenseni Dons, 1921

Dons, 1921: 56–57, text-figs 2–3 (Port Ross, Auckland Is); Noland & Finley, 1931: 98 ("... a doubtful marine species ... description from preserved specimens ..."); Kahl, 1933: 127 (in key etc.), fig. 22.47.

Vorticella oblonga Kirk, 1886

T.W. Kirk, 1886: 216, 1 fig. ("... attached to seaweed", Wellington); Hutton, 1904: 328 (listed); Noland & Finley, 1931: 98 ("... a poorly characterized marine species, which must be further studied before it can be definitely decided whether it is distinct."); Kahl, 1933: 128 (in key etc.), fig. 22.11a.

Family SCYPHIDIIDAE
Genus **Caliperia** Laird, 1953

Caliperia longipes Laird, 1953

Laird, 1953: 117–120, pl. 11, figs 81–83; Hewitt & Hine, 1972: 84, 98, 103 (listed); Corliss, 1979: 275, pl. XXIX, fig. 66.

Hosts: Blenny, *Ericentrus rubrus* (Hutton, 1872); Suckerfish, *Trachelochismus melobesia* Phillipps, 1927.

* Genus **Scyphidia** Dujardin, 1841
Subgenus **Gerda** Claparède & Lachman, 1858

Scyphidia (Gerda) acanthoclini Laird, 1953

Laird, 1953: 114–117, pl. 10, figs 78–79, pl. 11, fig. 80; Hewitt & Hine, 1972: 77, 103 (listed); note Corliss, 1979: 275 (*Gerda* as a resurrected genus (family Ophrydiidae, cf. *Scyphidia* in family Scyphidiidae, sp. 274–275).

Host: Rockfish, *Acanthoclinus fuscus* Jenyns, 1842.

Family VAGINICOLIDAE
* Genus **Cothurnia** Ehrenberg, 1831

Cothurnia compressa Claparède & Lachmann forma **ovata** Dons, 1921

Dons, 1921: 66–67, text-fig. 16 (Figure of Eight Is, Auckland Is) — not *Cothurnia ovata* Fromentel, 1874, see Kahl, 1935: 771; cf. Hamburger & von Buddenbrock, 1911: 143 (as *C. compressa* Cl. & Lachm., 1858: 124, pl. 2, figs 2–3), text-fig. 183; Kahl, 1933: 138 (in key etc.), figs 4.38–4.39; Kahl, 1935: 780, text-fig. 143, 49–50; Stiller, 1939: 441–443, text-figs 16a-b; Wailes, 1943: 34 (in key), 35, fig. 101; Warren & Paynter, 1991: 24 (in key), 33 (descr., habitat, syn. etc.), figs 64–68 (as *C. compressa*), 57 (*C. c.* f. *ovata* listed as *Vaginicola ovata* (Dons, 1921)).

Cothurnia curvula Entz, 1884

Entz, 1884: 432 (*C. inerbis* var. *curvula*), pl. 25, figs 17–28; Hamburger & von Buddenbrock, 1911; 139–140 (descr., distrib., refs & syn.), text-figs 180a-b; Dons, 1921: 70–71, text-fig. 20 (Figure of Eight Is, Auckland Is); Kahl, 1933: 139, figs 24.24; Kahl, 1935: 776, text-fig. 143, 16; Warren & Paynter, 1991: 21 (in key), 33 (descr., habitat), 57, figs 69–70.

Cothurnia grandis (Perty, 1852)

Perty, 1852: 137, pl. 3, fig.1 (*Vaginicola*); Hamburger & von Buddenbrock, 1911: 141–142 (descr., distrib., refs & syn., as *C. ingenita* O.F. Müller, 1786,

* Curds *et al.*, 1983 (generic descr. etc.); cf. also Borror, 1973; Corliss, 1979; and Small & Lynn, 1985 (family and genus diag.); see also Jolán, 1972, (key to species); Jamadar & Chondhury, 198 (key to species of *Scyphidia*); Jankowski, 1985 (key to species of *Cothurnia*).

incl. *V. grandis* Perty, 1852); Dons, 1921: 63–64 (refs & syn.), text-fig. 11 (Figure of Eight Is, Carnley Harbour, Auckland Is).

Cothurnia maritima Ehrenberg, 1838 forma **nodosa** (Claparède & Lachmann, 1858)

Claparede & Lachmann, 1858: 123, pl. 3, figs 4–5; Kent, 1882: 721–722 (descr.); Entz, 1884: 420–422 (descr., refs & syn), pl. 25, figs 19–24; Hamburger & von Buddenbrock, 1911: 138–139 (descr., distrib., refs & syn.), text-figs 179a-c (as *C. innata* O.F. Müller, 1786, incl. *C. nodosa* Cl. & Lachm., 1858); Dons, 1921: 69–70, text-fig. 19 (Port Ross, Auckland Is); Kahl, 1933: 138, figs 24.18, 24.19, 25.4, 25.27; Kahl, 1935: 782, text-fig. 143, 22; Stiller, 1939: 446, text-fig. 20; Felinska, 1965: 229–239; Warren & Paynter, 1991: 24 (in key), 44, 57 (as *C. nodosa* Cl. & Lachm., descr., habitat), figs 128–129.

Cothurnia patellae Hutton, 1878

Hutton, 1878: 49–50; Hutton, 1879: 330; Hutton, 1904: 329 (listed); Jankowski, 1985: 74 *et seq.* (transf. to *Mantoscyphidia*); Warren & Paynter, 1991: 58 (listed).

Host: *"Patella argentea"* [= *Cellana radians radians* (Gmelin, 1791)], Mollusca: Gastropoda.

* Genus **Platycola** Kent, 1882

Platycola donsi (Kahl, 1933)

Kahl, 1933: 140, fig. 25.18 (*P. donsi*, new name for *P. dilatata* of Dons, 1921, not of Fromental, 1876); Kahl, 1935: 793, text-fig. 146, 16; Dons, 1921: 71–73 (as *P. dilatata* Fromentel, 1876); cf. also Kent, 1882: 731 (descr.), pl. XL, fig. 43; Kahl, 1933: 793, text-fig. 146, 12, text-figs 21–22 (Figure of Eight Is, Auckland Is); Jolán, 1972: 220 (in key to species).

Family ZOOTHAMNIIDAE
Genus **Zoothamnium** Ehrenberg, 1838

Zoothamnium sp. Gordon, 1972

Gordon, 1972: fig. 3, I (as component of epifaunal population on the bryozoan *Crassimarginatella papulifera* (MacGillivray), as *Zoothamnion* [*sic*]; Gordon & Ballantine, 1977: 97 (listed from Leigh region, after Gordon); cf. Kent, 1881/82: 693–694 (generic descr, species, etc); Kudo, 1954: 857 (generic descr.); Curtis, 1968: 164–167; Corliss, 1979: 273; Corliss, 1982: 629, fig. 160 (generic descr. etc.); Small & Lynn 1985: 550 (family and genus diag.); cf. Jolán, 1972: 177–193 (key to species).

Suborder MOBILINA
Family TRICHODINIDAE

* Genus **Trichodina** Ehrenberg, 1830
Subgenus **Trichodina** s.str.

Trichodina (Trichodina) multidentis Laird, 1953

Laird, 1953: 130–135, text-figs 1–2, table IX, pl. 12, figs 88–89, 92, pl. 13, fig. 10; Laird, 1961: 836 (status), 842 (footnote); Lom & Laird, 1969: 1379 (listed with hosts — "redescription by means of silver impregnation urgently needed."); Hewitt & Hine, 1972: 77, 83, 84, 86, 90, 98, 103 (listed).

Hosts: Blenny, *Ericentrus rubrus* (Hutton, 1872); Twister, *Bellapiscis medius* (Günther, 1861); Blenny, *Forsterygion varium* (Bloch & Schneider, 1801); Topknot, *Notoclinus fenestratus* (Bloch & Schneider, 1801).

Trichodina (Trichodina) parabranchiola Laird, 1953

Laird, 1953: 121–130, text-figs 1–2, pl. 11, fig. 85, pl. 12, figs 86-87, 90–91, 93-97, pl. 13, figs 98–100, table VIII; Laird, 1961: 840, 842; Lom & Laird, 1969: 1380 (listed with hosts — "redescription by means of silver impregnation urgently needed."); Hewitt & Hine, 1972: 77, 83, 84, 86, 90, 98, 103 (listed).

Hosts: Rockfish, *Acanthoclinus fuscus* Jenyns, 1842 [and *A. trilineatus* Griffin, 1933, syn.]; Blenny, *Ericentrus rubrus* (Hutton, 1872); Twister, *Bellapiscis medius* (Günther, 1861); Blenny, *Forsterygion varium* (Bloch & Schneider, 1872); Topknot, *Notoclinus fenestratus* (Bloch & Schneider, 1801); Suckerfish, *Trachelochismus melobesia* Phillipps, 1927; Clingfish, *Diplocrepis puniceus* (Richardson, 1846).

Family URCEOLARIIDAE
** Genus **Urceolaria** Lamarck, 1801

* Curds *et al.*, 1983: 242, fig. 146 (generic descr. etc.); Corliss, 1979: 275, and Small & Lynn, 1985: 548 (generic diag.).

* Curds *et al.*, 1983: 264, fig. 162 (generic descr. etc.); Corliss, 1979: 277, and Small & Lynn, 1985: 553; see also Jamadar & Choudhury, 1988: 1 (key to species); Guhl & Haider, 1988: 258 (key to species.).

** See Jolán, 1972: 234–236, and Guhl & Haider, 1988: 247, for key to species *Urceolaria*.

Urceolaria gaimardia Johnston, 1938

Johnston, 1938: 7–10, figs 15–16; Corliss, 1979: 146, 147, 276–277 (nomenclatural preoccupied status of *Urceolaria* of Lamarck and of Stein, 1854, 1867, cf. *Leiotrocha* Fabré-Domergue, 1888 etc.); Small & Lynn, 1985: 554 (family and genus diag.).

Host: *Gaimardia trapesina coccinea* Hedley (Mollusca: Bivalvia), Macquarie Is.

Class POLYHYMENOPHORA
Subclass SPIROTRICHA
Order HETEROTRICHIDA
Suborder COLIPHORINA
Family FOLLICULINIDAE

Genus **Ascobius** Henneguy, 1884

(?) **Ascobius** sp. Gordon, 1972

Gordon, 1972: 510–511 (component of epifaunal population on the bryozoan *Crassimarginatella papulïfera* (MacGillivray); Gordon & Ballantine, 1977: 97 (listed from Leigh region, after Gordon); Corliss, 1982: 634 (as *Ascobious* [sic]), fig. on p. 619.

Genus **Echinofolliculina** Dons, 1935

Echinofolliculina mortenseni Dons, 1935

Dons, 1935: 28–30, figs 1–2 (Colville Channel); Silén, 1947: 19–20, 32, 35.

Genus **Lagotia** Wright, 1858

(?) **Lagotia expansa** (Levinsen, 1893)

Levinsen, 1893: 172–173, pl. VII, figs 6–7 ((?) *Filellum*); Dons, 1912: 81 (incl. in *Folliculina ampulla* (O.F. Müller) following Kramp, 1912); Hadzi, 1951: 55–73, fig. 6a; Matthews, 1968: 236–237, fig. 6; Gordon, 1972: 510–511, fig. 3, M (as component of epifaunal population on the bryozoan *Crassimarginatella papulïfera* (MacGillivray); Gordon & Ballantine, 1977: 97 (listed from Leigh region, after Gordon).

Subclass CHOREOTRICHIA
Order CHOREOTRICHIDA
Suborder OLIGOTRICHINA
Family STROMBIDIIDAE

Genus **Strombidium** Claparède & Lachmann, 1860

Strombidium sp. cf. **strobilis** Lohmann, 1908 . Mamaeva, 1986

Mamaeva, 1986: 20–24 *passim* (south of N.Z.); cf. Lohmann, 1908: 299, pl. 17, fig. 14 (*Laboea strobila* n.sp.); see Kudo (1954: 652) for generic diagnosis.

* Suborder TINTINNINA
** Family ASCAMPBELLIELLIDAE

Genus **Acanthostomella** Jörgensen, 1924

Acanthostomella gracilis (Brandt, 1896)

Brandt, 1896: 54, pl. 3, fig. 7 (*Tintinnus*); Brandt, 1906: 29, 30, pl. 62, figs 2, 7 (as *T. norvegicus* var. a. *gracilis*); Brandt, 1907: 404 (*Cytarocylis gracilis*) 407, 433 (as *T. norvegicus* var. a *gracilis*); Kofoid & Campbell, 1929: 192 (refs & syn.), fig. 360 (*Acanthostomella*); Campbell, 1942: 50 (descr. etc.); Cassie, 1961: 21, 50, pl. VIII, fig. 13 (N.Z. record); Marshall, 1969f: 3 (identif. features, distrib., refs), pl. VII, fig. 6; Small & Lynn, 1985: 442 (generic characters), fig. 8A.

Acanthostomella minutissima Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 192, fig. 358; Kofoid & Campbell, 1939: 143, 145 (descr.), pl. 11, figs 1, 4–6, 13; Gaarder, 1946: 5 (distrib.); Burns, 1983: 389 (morphol., N.Z. distrib., first N.Z. record), 390, figs 2–5, 6 (N.Z. distrib.).

Family CODONELLIDAE
\+ Genus **Codonella** Haeckel, 1873

Codonella elongata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 59–60 (descr., refs & syn.), fig. 102; Brandt, 1906: 3, pl. 12, fig. 4 (as *C. galea* Haeckel, 1873); Kofoid, 1930: 10 (as species with patterned lorica), fig. 11.102 (lorica); Kofoid & Camp-

* Families listed in alphabetical order but see Small & Lynn (1985: 441-449) for listing by features of lorica; cf. also "Annotated index to genera, subgenera and suprageneric taxa" of Tintinnina by Loeblich & Tappan, 1968; also note Laval-Peuto & Brownlee (1986) re. evaluation and suggestions for improvement of identification and systematics of the Tintinnina. See also special tintinnid issue of *Plankton Newsletter* 4 (May 1986).

** Corliss, 1979: 305 (family characters and status versus Craterellidae); Small & Lynn, 1985: 442 (in key, characters).

\+ Corliss, 1979: 303 (family characters); Curds *et al.*, 1983: 362, fig. 213 (generic descr. etc.), and Small & Lynn, 1985: 441.

bell, 1939: 50–51 (descr.), pl. 1, fig. 16; Campbell, 1942: 9–10 (descr. etc.), fig. 18; Gaarder, 1946: 7; Cassie, 1961: 21, 50, pl. VIII, fig. 11 (N.Z. record); Marshall, 1969b: 3 (identif. features, distrib., refs), pl. III, fig. 5; Balech, 1972: 521 etc. (as indicator of upwelling); Burns, 1983: 389 (morphol., N.Z. distrib.), 342, figs 6 (distrib.), 7–12; Small & Lynn, 1985: 441, fig. 3.

Codonella robusta Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 66 (descr., syn.), fig. 111; Kofoid, 1930: 10 (as species with patterned lorica), fig. 11.111 (lorica); Kofoid & Campbell, 1939: 44 (listed); Cassie, 1961: 21, 34 (N.Z. records).

* Genus **Tintinnopsis** Stein, 1867

Tintinnopsis cylindrica Daday, 1887

Daday, 1887: 553, pl. 19, fig 26 (*T. davidoffi* var. *cylindrica*); Brandt, 1906: 19, pl. 25, figs 1, 3, 5 & 8; Brandt, 1907: 177 (descr. etc.); Kofoid & Campbell, 1929: 33 (not *T. cylindrica* Daday, 1892); Kofoid, 1930: fig. 12 (lorica); Bakker & Phaff, 1976: 106 (characteristics), 109, 110, figs 10 & 15; Burns, 1983: 399, 402–403 (morphol., distrib., 182 (N.Z. record)), figs 34–38, 39 (N.Z. distrib.).

Tintinnopsis laevigata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 37, fig. 91 (new name for *T. davidoffi* var. *laevis* Wailes, 1925, not *T. urniger* Entz, 1884 var. *laevis* Daday, 1887); Kofoid, 1930: 10 (as species with ragged lorica), fig. 12.91; Wailes, 1943: 13 (in key), 14 (descr. refs), fig. 34; Cassie, 1961: 21 (N.Z. record); Marshall, 1969a: 7 (identif. features, distrib., refs), pl. II, fig. 40; Duran, 1965: 12, figs 11–14; Cosper, 1972: 394 (in key), 398 (descr., discuss.), fig. 2; Burns, 1983: 401, 403–404 (morphol., N.Z. distrib.), figs 39 (distrib.), 40–41 & 48.

Tintinnopsis minutus Wailes, 1925

Wailes, 1925: 536, figs 7–8 (as *T. karajacensis* var. *minutus*); Kofoid & Campbell, 1929: 40 (*T. minuta*); Burns, 1983: 401, 404-405 (morphol., distrib., first N.Z. record), figs 42–43, 49 (N.Z distrib.).

Tintinnopsis parvula Jörgensen, 1912

Jörgensen, 1912: 2–3; Jörgensen, 1927: 6 (in key), 7 (incl. *T. beroidea* Stein of Brandt, 1906/7: pl. 17, fig. 4, not of Entz); Wailes, 1925: 535, pl. 1, figs 17–21 (as *T. beroidea* Stein 1867); Kofoid & Campbell, 1929: 43 (refs & syn. etc.), fig. 28; Kofoid, 1930: fig. 12 (lorica); Sournia, 1972: 451–462; Burns, 1983: 401, 405 (morphol, N.Z. distrib., first N.Z. record), figs 44-45, 50 (N.Z. distrib.).

Tintinnopsis radix (Imhof, 1886)

Imhof, 1886: 103 (*Codonella*); Daday, 1887: 552, pl. 19, figs 23, 25–26 (as *Tintinnus Davidoffi*), 554, pl. 19, fig. 33 (as *T. curvicauda*); Imhof, 1891: 4; Brandt, 1906: 4, 18, 21, pl. 23, figs 1, 3–5, 9–13, pl. 31, fig. 8 (as *T. fracta*); Brandt, 1907: 20, 174–176 descr., syn. etc.); Laackmann, 1913: 17, pl. II, figs 17–31; Jörgensen, 1924: 7, 69–70 (descr. etc.), 76, fig. 77; Kofoid & Campbell, 1929: 45 (detailed refs & syn.), fig. 93; Marshall, 1934: 636, 637 (remarks, etc., incl. *T. fracta* of Brandt, 1906: 4, pl. XXIII, figs 1, 3–5, 9–13, pl. XXXI, fig. 8 and of Brandt, 1907: 174–176), text-fig. 10; Massuti & Margalef, 1950: 108, fig. 297; Kofoid & Campbell, 1939: 41 (descr.); Trégouboff, 1958: 24 (key features), pl. 56, fig. 12; Cassie, 1961: 21, 51, pl. VIII, fig. 9 (N.Z. records); Marshall, 1969a: 9 (identif. features, distrib., refs), pl. II, fig. 35; Hada, 1970: 30; Souto, 1970a: 191, fig. 4; Cosper, 1972: 394 (in key), 401 (descr., discuss.), figs 6-7; Ueta, 1976: 22, fig. 62; Taylor (1976) *in* Gordon & Ballantine, 1977: 97 (listed from Leigh region); Taylor, 1978: 217 (Leigh area).

Tintinnopsis rapa Meunier, 1910

Meunier, 1910: 141, pl. 12, figs 29–35, pl. 13, figs 14–16; Brandt, 1906: 16, pl. 16, fig. 6 (as *T. beroidea* var. a); Kofoid & Campbell, 1929: 45; Gaarder, 1946: 22 (distrib.), text-fig. 20; Cassie, 1961: 21, 51 (possible N.Z. record); Marshall, 1969a: 9 (identif. features, distrib., refs), pl. II, fig. 42; Reid & John, 1978: 554 (table 1, encystment).

Tintinnopsis rotundata Jörgensen, 1899

Jörgensen, 1899: 5, 24 (*T. beroidea* var. *rotundata*); Daday, 1887: 547, pl. XIX, figs 2, 14 (as *T. beroidea*); Jörgensen, 1924: 68; Kofoid & Campbell, 1929: 46 (descr., refs & syn.), fig. 73; Marshall, 1934: 635; Trégouboff, 1957: 242 (key features); Komarovsky, 1959: 8 (forms), figs 1–2; Cassie, 1961: 21, 51, pl. VIII, fig. 15 (N.Z. record); Marshall, 1969a: 9 (identif. features, distrib., refs), pl. I, fig. 16.

Tintinnopsis sacculus Brandt, 1896

Brandt, 1896: 57, pl. 3, fig. 6; Brandt, 1906: pl. 19, figs 6, 8 & 13; Brandt, 1907: 164 (descr. etc.); Wailes, 1925: 537, pl. 2, fig. 9; Kofoid & Campbell, 1929: 41 (descr.); Burns, 1983: 401, 405 (morphol, N.Z. dis-

* Corliss, 1979: 303 (family characters); Curds *et al.*, 1983: 366, fig. 215 (generic descr. etc.); Corliss, 1989: 304, and Small & Lynn, 1985: 441.

trib.), 182 (N.Z. record), fig. 39 (N.Z. distrib.), 46-47.

* Family CODONELLOPSIDAE
Subfamily CODONELLOPSINAE

Genus **Codonellopsis** Jörgensen, 1924
Subgenus **Codonelloides** Kofoid & Campbell, 1939

Codonellopsis (Codonelloides) morchella Cleve, 1899

Cleve, 1899a: 969–970, fig. [2], (*Codonella*); Brandt, 1906: 15, pl. 13, figs 1–3, pl. 14, fig. 3, pl. 15, fig. 1 (*C. morchella*), pl. 14, fig. 4 (as var. *erythraensis*), pl. 13, fig. 5 (as *C. ecaudata*); Brandt, 1907: 124–125 (*C. morchella*, descr., refs), 126 (as var. *erythraensis*); Dons, 1921: 76, text-fig, 25 (Figure of Eight Is, Auckland Is); Jörgensen, 1924: 99, 100, fig. 111 (*Codonellopsis*); Kofoid & Campbell, 1929: 79, fig. 154 (as *Codonellopsis ecaudata, fide* Balech, 1971), 83–84, fig. 165 (refs & syn as *C. morchella*), 90, fig. 155 (as *C. turgescens, fide* Balech, 1971); Hofker, 1931: 365–367 (descr. etc.), text-figs 43–46; Hada, 1932: 563, fig. 15 (as *C. orientalis*); Kofoid & Campbell, 1939: 44, 60 (listed in new subgenus *Codonelloides*); Massuti & Margalef, 1950: 121, fig. 362; Trégouboff, 1957: 243 (key features), pl. 57, fig. 12; Komarovsky, 1959: 11 (note on syn), fig. 10; Balech, 1971: 169–170 (descr., ecol., etc.), pl. XXXVII, fig. 71b.

** Genus **Luminella** Kofoid & Campbell, 1939

Luminella pacifica (Kofoid & Campbell, 1929)

Kofoid & Campbell, 1929: 70 (in *Stenosemella*, name for *Tintinnopsis punctata* f. *minor* Wailes, 1925, not *Codonella ventricosa* var. *minor* Fauré-Fremiet); Kofoid & Campbell, 1939: 284 (to new genus *Luminella*); Burns, 1983: 394, 398 (morphol., N.Z. distrib., first N.Z. record), figs 23–24, 31 (N.Z. distrib.).

Genus **Stenosemella** Jörgensen, 1924

Stenosemella nivalis (Meunier, 1910)

Meunier, 1910: 143, figs 26–27; Campbell, 1926: pl. 12, fig. 8 (as *Tintinnopsis nucula*); Kofoid & Campbell, 1929: 69; Kofoid & Campbell, 1939: 64– 65 (descr., refs & syn. etc.) (*Stenosemella*); Gaarder, 1946: 21 (distrib.); Burns, 1983: 399, 400 (morphol., N.Z. distrib., first N.Z. record), 402, figs 31 (N.Z. distrib.), 32–33; Small & Lynn, 1985: 442, fig. 7A; Middlebrook *et al.*, 1987: 594–601 *passim* (abundance/ seasonal cycle).

* Family CYTTAROCYLIDIDAE
Genus **Cyttarocylis** Fol, 1881

Cyttarocylis eucecryphalus (Haeckel, 1887)

Haeckel, 1887: 1298, pl. 56, fig. 13 (*Sethocephalus*); Daday, 1887: 581, pl. 21, fig. 13 (as *Cytterocylis cassis* var. *plagiostoma*); Brandt, 1906: 22, pl. 35, fig. 7, pl. 36, fig. 12 (as *C. plagiostoma* Daday), 22, pl. 36, figs 1, 1a, 4, 4a & 8 (as var. a), 22, pl. 36, fig. 7 (as var. b); Brandt, 1907: 198–199 (as *C. plagiostoma*), 199 (as var. a), 199 (as var. b); Jörgensen, 1924: 80 (descr., ecol.,), text-fig. 91; Kofoid & Campbell, 1929: 113 (refs & syn), fig. 211; Kofoid, 1930: fig. 29.211 (lorica, orthogenesis); Campbell, 1942: 19–20 (descr., ecol. etc.), fig. 42; Massuti & Margalef, 1950: 112 (descr), fig. 321; Trégouboff, 1957: 245 (key features), pl. 57, fig. 28; Komarovsky, 1959: 13 (descr. etc.), fig. 22; Balech, 1962: 70, pl. VI, figs 66, 69; Marshall, 1969b: 5 (identif. features, distrib., refs), pl. III, fig. 21; Balech, 1972: 522 etc. (as indicator of upwelling); Small & Lynn, 1985: 443 (generic diag.).

Cyttarocylis magna (Brandt, 1906)

Brandt, 1906: 21, 23, pl. 34, fig. 3, pl. 35, fig. 3 (N.Z. record as *C. cassis* Haeckel, 1873 var. *C. magna*); Brandt, 1907: 33, 42, 189–191, 196–198, 458, 470; Jörgensen, 1924: 78, 79 (descr., distrib. etc., as *C. cassis* var. *magna*, incl. Brandt's 1907 record of *C. cassis* from off N.Z.), fig. 50; Kofoid & Campbell, 1929: 114 (descr.), fig. 222; Kofoid, 1930: fig. 29.222 (lorica, orothogenesis); Hada, 1932: 564, fig. 16; Kofoid & Campbell, 1939: 115 (descr., refs & syn.), pl. 7, fig. 6; Campbell, 1942: 20–21 (descr., var., etc.), figs 44, 46-47; Gaarder, 1946: 10 (distrib.); Trégouboff, 1957: 245, (key features), pl. 57, fig. 26; Cassie, 1961: 21 (N.Z. occurrence); Marshall, 1969b: 5 (identif. features, distrib., refs), pl. III, fig. 19; Balech, 1972: 522 etc. (as indicator of upwelling).

* Corliss, 1979: 304 (family characters), also Small & Lynn, 1985: 442.

** Corliss, 1979: 304 (as "Incertae Sedis").

* Corliss, 1979: 305 (family characters); Small & Lynn, 1985: 442.

Genus **Petalotricha** Kent, 1882

Petalotricha ampulla (Fol, 1881)

Fol, 1881: 20–21, pl. 1, figs 1–3 (*Tintinnus*); Kent, 1882: 627, 629, figs 1–2 (*Petalotricha*); Fol, 1884: 53, pl. 4, figs 1–3, pl. 5, fig. 7 (*Tintinnus*); Daday, 1887: 572, pl. 21, figs 7, 11–12, 14, 17–19 (*Petalotricha*); Brandt, 1906: 30, pl. 62, figs 8, 8a, 13–15, 17–19; Brandt, 1907: 341–342 (descr., refs & syn. incl N.Z. record); Entz, 1909: 102, pl. XI, figs 1–3, pl. XVIII, figs 11–19; Jörgensen, 1924: 88–89 (descr., ecol. etc.), text-figs 99-100; Kofoid & Campbell, 1929: 203 (refs & syn.), fig. 289; Kofoid, 1930: fig. 23.389 (lorica); Hofker, 1931: 377, text-fig. 66; Entz, 1935: 15–26 (cytology), figs 1–15; Campbell, 1942: 52 (descr., ecol. etc.); Gaarder, 1946: 16 (distrib.); Massuti & Margalef, 1950: 111 (in key), figs 307–309; Trégouboff, 1957: 248, (key features), pl. 58, fig. 12; Kommarovsky, 1959: 16 (descr., etc.), fig. 30; Balech, 1962: 79–80 pl. IX, figs 97–98; Loeblich & Tappan, 1968: 188 (cited as type species); Balech, 1968a: 175 (descr., refs etc.), pl. II, figs 14–15; Marshall, 1969f: 4 (identif. features, distrib., refs), pl. VII, fig. 10; Souto, 1970a: 201, fig. 45; Balech, 1972: 523 etc. (as indicator of upwelling); Small & Lynn, 1985: 443, fig. 10A.

Petalotricha serrata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 205 (descr., refs & syn., incl. varieties c, d, e of *P. ampulla* of Brandt, 1906), fig 386; Kofoid, 1930: fig. 23.386 (lorica); Kofoid & Campbell, 1939: 147; Campbell, 1942: 54 (descr. etc.); Cassie, 1961: 21, 51, pl. VIII, fig. 10 (N.Z. records); Marshall, 1969f : 4 (identif. features, distrib., refs), pl. VII, fig. 12.

* Family DICTYOCYSTIDAE

Genus **Dictyocysta** Ehrenberg, 1854

Dictyocysta dilatata (Brandt, 1906)

Brandt, 1906: 11, pl. I, fig. 4 (as *D. mitra* Haeckel, 1873 var. a *dilatata*); Brandt, 1907: 64, 462, 472; Jörgensen, 1924: 87 (descr., as *D. mitra* forma *dilatata*); Kofoid & Campbell, 1929: 288, (descr. etc.), fig. 549; Kofoid, 1930: fig. 15.549 (lorica); Kofoid & Campbell, 1939: 289–290 (descr.); Campbell, 1942: 32 (descr. etc.); Gaarder, 1946: 11 (distrib.); Massuti & Margalef, 1950: 111 (descr.), fig. 310; Trégouboff, 1957: 252 (key features); Cassie, 1961: 21, 50 (N.Z. occurrence), pl. VIII, fig. 17; Marshall, 1969c: 5 (identif. features, distrib., refs), pl. IV, fig. 21.

Dictyocysta fenestrata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 291; Kofoid & Campbell, 1939: 287, 292–293 (descr.), pl. 26, fig. 10; Burns, 1983: 389, 391 (morphol., N.Z. distrib., first N.Z. record), 393, figs 6 (N.Z. distrib.), 13–14.

Dictyocysta lata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 293, fig. 562 (descr., syn., incl. *D. templum* var. a Brandt, 1906: 12, pl. IV, figs 1–2, 5, Brandt, 1907: 70, 481, and *D. lepida* of Jörgensen, 1924: 83, in part); Kofoid & Campbell, 1939: 293–294 (descr.); Campbell, 1942: 33 (descr. etc.); Cassie, 1961: 21, 50 (N.Z. occurrence); Marshall, 1969c: 6 (identif. features, distrib., refs), pl. IV. fig. 26.

Dictyocysta reticulata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 300, fig. 560; Brandt, 1906: pl. 3, fig. 8 (as *D. templum* var. b); Kofoid & Campbell, 1939: 287, 294–295, 306–307 (descr., syn. etc.), pl. 26, figs 3 & 5; Gaarder, 1946: 12 (distrib.); Burns, 1983: 393, 394, 396 (morphol., etc. incl. *D. mexicana* Kofoid & Campbell, 1929: 295, fig. 563, new synon., N.Z. distrib., first N.Z. record), figs 6 (N.Z. distrib.), 12–20.

Dictyocysta tiara Haeckel, 1873

Haeckel, 1873: 564, pl. 27, fig. 7; Kent, 1882: 626, pl. 32, fig. 28; Daday, 1887: 585 (in key), 587–588 (descr.); Brandt, 1906: 12, pl. 2, fig. 14 (as *D. templum* var. *tiara*); Brandt, 1907: 11, 49, 51, 52, 73, 481; Kofoid & Campbell, 1929: 302 (refs & syn.), fig. 567; Kofoid & Campbell, 1939: 308–310 (descr.), pl. 26, fig. 9; Campbell, 1942: 38 (descr. etc.); Cassie, 1961: 21, pl. VIII, fig. 12 (N.Z. record).

* Family EPIPLOCYLIDIDAE

Genus **Epiplocylis** Jörgensen, 1924

Epiplocylis acuminata (Daday, 1887)

Daday, 1887: 578–579, pl. 20, fig. 33 (*Cyttarocylis*); Brandt, 1906: 28, pl. 58, fig. 5 (*Ptychocylis acuminata*), 29, pl. 58, fig. 9 (as *P. acuminata* var. a *semireticulata*), 29, pl. 58, fig. 11 (as var. c), 29, pl. 59, fig. 6 (as var. b, in part); Brandt, 1907: 270–280, 291 (as *P. acuminata* var. b, in part), 289–290, 452 (*P. acuminata*), 290–291

* Corliss, 1979: 306 (family characters)

* Corliss, 1979: 305 (family characters); Small & Lynn, 1985: 442 (in key), 444 (characters).

(as var. a *semireticulata*), 291 (as var. c); Jörgensen, 1924: 54, 56–57 (descr., ecol., refs.), 106, text-figs 63a-b (*Epiplocylis*); Kofoid & Campbell, 1929: 175 (refs & syn.), fig. 332; Kofoid, 1930: figs 22.332 (lorica), 30.332 (lorica, orthogenesis); Kofoid & Campbell, 1939: 126; Gaarder, 1946: 12 (characters, distrib.), text-figs 13a-d; Massuti & Margalef, 1950: 115, fig. 336; Campbell, 1954b: D176 (generic diag.), fig. 90.9; Trégouboff, 1957: 246 (key features); Cassie, 1960b: 328 (NZOI Stns C201, C203, Cook Strait); Cassie, 1961: 21, 50, pl. VIII, fig. 7 (N.Z. record); Balech, 1962: 77, pl. VII, figs 77–79; Loeblich & Tappan, 1968: 187 (cited as type species); Marshall, 1969f: 7 (identif. features, distrib., refs), pl. VII, 28; Souto, 1970a: 197, fig. 33.

Epiplocylis blanda Jörgensen, 1924

Jörgensen, 1924: 55, text-fig. 62 (as *E. undella* var. *blanda* (in part); Brandt, 1906: 29, pl. LXI, fig. 3 (*Ptychocylis undella* var. b, in part) (N.Z. record), pl. LX, figs 5, 6 (?) (as var. *sargassensis*), pl. LX, fig. 3 (?) (as var. o); Brandt, 1907: 294–295 (*P. undella* var. b), 298 (as var. *sargassensis*), 482; Kofoid & Campbell, 1929: 176 (descr., refs & syn.), fig. 341; Marshall, 1934: 644, text-fig. 19; Campbell, 1942: 65–66 (descr., ecol., etc.), fig. 73; Gaarder, 1946: 13 (distrib.); Trégouboff, 1957: 246, (key features), pl. 58, fig. 9; Komarovsky, 1959: 13 (descr., etc.), fig. 23; Marshall, 1969f: 7 (identif. features, distrib., refs), pl. VII, 29; Zeitzschel, 1969: 54 (cf. inclusion in *E. undella* (Ostenfeld & Schmidt, 1901, *fide* Balech, 1962: 74).

Epiplocylis inflata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 181, fig. 329; Brandt, 1906: pl. 58, figs 6 & 10 (as *Ptychocylis acuminata* var. b); Kofoid & Campbell, 1929; Kofoid & Campbell, 1939: 126; Burns, 1983: 294, 398 (morphol., N.Z. distrib., first N.Z. record, figs 6 (N.Z. distrib.), 21.

Epiplocylis lata Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 182, fig. 336; Kofoid & Campbell, 1939: 126, 131 (descr.), pl. 9, figs 6 & 9; Burns, 1983: 394, 395, 398 (morphol., N.Z. distrib., first N.Z. record), figs 6 (N.Z. distrib.), 22, 25–27.

Family METACYLIDIDAE
[= COXLIELLIDAE, *nomen inquirendum*, *fide* Corliss *in* Parker, 1982: 635, see also Corliss, 1979: 304–305]

Genus Climacocylis Jörgensen, 1924

Climacocylis scalaria (Brandt, 1906)

Brandt, 1906: 7, 18, 19, pl. 21, fig. 15, pl. 25, figs 4–6, pl. 27, figs 1–3 (*Cyttarocylis (Coxliella)*); Brandt, 1907: 33, 187, 236, 238, 264–267, 478 (N.Z. occurrence in Cook Strait as *Cyttarocylis (Coxliella)*); Laackmann, 1909: 392, 423, 425, 426, 430, 455; Laackmann, 1911: 455; Jörgensen, 1924: 77 (descr., ecol., etc.) (*Climacocylis*), text-fig. 88; Kofoid & Campbell, 1929: 93–94 (descr., refs & syn), fig. 155; Marshall, 1924: 640 (remarks); Kofoid, 1930: fig. 17.185 (spiral structure of lorica); Campbell 1942: 41–42 (descr., ecol. etc.); Massuti & Margalef, 1950: 124–125 (descr.), fig. 370; Campbell, 1954b: D174 (generic diag.), fig. 89.20; Trégouboff, 1957: 244 (key features), pl. 57, fig. 18; Komarovsky, 1959: 21, fig. 57; Balech, 1962: 69; Loeblich & Tappan, 1969: 186 (cited as type species); Marshall, 1969d: 4 (identif, features, distrib., refs), pl. V, fig. 15; Zeitzschel, 1969: 53–54 (descr., distrib., refs), fig. 6, pl. 6, fig. 4.

* Genus Coxliella Brandt, 1906

Coxliella fasciata (Kofoid, 1905)

Kofoid, 1905: 297–299, pl. XXVI, figs 6–7 (*Cyttarocylis*); Brandt, 1906: 20, pl. 28, figs 7, 9 (as *Cyttarocylis (Coxliella) fasciata* var. *procera*, off Farewell Spit); Brandt, 1907: 27, 38, 40, 260, 261, 268–269 (descr., etc.), 454, 465; Entz, 1909: 102, 114, 116, 125, 142, 215, 216, pl. X, fig. 3 (as *Cyttarocylis (Coxliella) helix*, not of Claparède & Lachmann, 1858); Laackmann, 1911: 455; Jörgensen, 1924: 75 (descr. etc., in new subgenus *Cochliella*), text-fig. 86; Kofoid & Campbell, 1929: 97–98 (detailed refs & syn.), fig. 205; Campbell, 1942: 38–39 (descr., etc.), figs 30, 34; Massuti & Margalef, 1950: 124, fig. 366; Trégouboff, 1957: 244 (key features), pl. 57, fig. 17; Komarovsky, 1959: 12 (descr., etc.), fig. 17; Balech, 1962: 66, pl. III, fig. 42; Marshall, 1969d: 3 (identif. features, distrib., refs), pl. V, fig. 5; Souto, 1970a: 195 (descr.), figs 27–30.

Genus Helicostomella Jörgensen, 1924

Helicostomella kiliensis (Laackmann, 1906)

Laackmann, 1906: 2, 17, 18, 36, pl. I, figs 1–2, pl. II, fig. 29 (?*Tintinnus*); Brandt, 1907: 43, 393–399 (as *T. subulatus* Ehrenberg, 1838), 469, 480; Jörgensen, 1924: 25 (*H. subulata* var. *kiliensis*); Jörgensen, 1927:

* Corliss (1979: 305, questionable generic status — "may actually have no reality ...").

10; Kofoid & Campbell, 1929: 105–106 (descr., refs & syn.), fig. 210; Kofoid, 1930: fig. 29.210 (lorica); Massuti & Margalef, 1950: 120 (descr.), fig. 356; Campbell, 1954d: D174 (generic diag.), fig. 89.18; Cassie, 1961: 21, 51 (N.Z. record); Marshall, 1969d: 6 (identif. features, distrib., refs); cf. Balech & Souto, 1980: 6–7.

Family PTYCHOCYLIDIDAE
* Genus **Favella** Jörgensen, 1924

Favella ehrenbergii (Claparède & Lachmann, 1858)

Claparède & Lachmann, 1858: 203, pl. VIII, figs 6–7 (*Tintinnus*); Kent, 1882: 607, pl. 31, figs 1–2; Daday, 1887: 583–584 (descr., etc.) (*Cyttarocylis*); Brandt, 1906: 24, pl. 41, figs 2–4; Brandt, 1907: 208–209 (descr., refs & syn. as *Cyttarocylis*); Entz, 1909: 91–225, pl. XII, fig. 5, pl. XIII, figs 5–6, 12, pl. XIV, figs 1–46, pl. XV, figs 1–2, 5, 7, pl. XVI, fig. 2, pl. XVII, figs 4–6, 9, 13, pl. XVIII, fig 1–10, pl. XIX, figs 1–9, pl. XX, figs 1–11, 28, 30–35, pl. XXI, figs 1, 3, 5, 10–12, 17; Jörgensen, 1924: 28–30 (descr., varieties etc.), figs 32a-b; Jörgensen, 1927: 11 (descr., etc.), fig. 17; Kofoid & Campbell, 1929: 152–153 (detailed refs & syn.), fig. 280; Kofoid, 1930: fig. 19.280 (lorica); Hofker, 1931: 372–375 (descr., review of morphol., etc.), text-figs 54–62; Kofoid & Campbell, 1939: 122; Massuti & Margalef, 1950: 118, 119, fig. 347; Campbell, 1954: D175, fig. 90.2; Trégouboff, 1957: 246 (key features), pl. 58, fig. 1; Cassie, 1961: 21, 51, pl. XIII, fig. 8 (N.Z. record); Loeblich & Tappan, 1968: 187 (cited as type species); Marshall, 1969e: 4 (identif. features, distrib., refs), pl. VI, fig. 9; Hedin, 1975: 11–18 (ultrastructure); Reid & John, 1978: 552, 554 (table 1, encystment); Kawakami *et al.*, 1985: 171–172 (respiration rate); Taniguchi & Kawakami, 1985: 778 (feeding/growth); Hansen, 1989: 105–116 (red tide effects/growth, behaviour); Sassi & Melo, 1989: 63–66 (descr., distrib., refs & syn.), pl. II, figs 10–15, pl. III, figs 16–21, pl. IV, figs 22–24.

** Family RHABDONELLIDAE
Genus **Protorhabdonella** Jörgensen, 1924

Protorhabdonella curta (Cleve, 1901)

Cleve, 1901a: 922, fig. [36] (as *Cyttarocylis striata* forma B *curta*); Brandt, 1907: 315, 316, 328 (as *Rhabdonella amor* var. *curta*), 331 (as *R. amor* var. *simplex*, in part), 460 (as *R. amor* var.); Jörgensen, 1924: 57–58 (descr., etc.), fig. 65; Kofoid & Campbell, 1929: 207 (refs & syn.) fig. 393 (*Protorhabdonella*); Marshall, 1934: 646; Kofoid & Campbell, 1939: 155 (descr.), pl. 12, fig. 27; Campbell, 1942: 54 (descr., etc.); Balech, 1951: 300–301 (descr., etc); Trégouboff, 1957: 248 (key features), pl. 58, fig. 15; Cassie, 1961: 21, 51, pl. VIII, fig. 18 (N.Z. record); Marshall, 1969f: 5 (identif. features, distrib., refs), pl. VII, fig. 13; Small & Lynn, 1985: 444 (generic characters), fig. 22A.

Genus **Rhabdonella** Brandt, 1906

Rhabdonella amor (Cleve, 1899)

Cleve, 1899: 970–971, fig. [4] (*Cittarocylis*); Brandt, 1906: 27, pl. 54, figs 4–5, 12–13, 15 (*Ptychocylis (Rhabdonella)*); Brandt, 1907: 21, 327, 330, 331, 453 (as *Rhabdonella amor* var. *simplex*, in part); Entz, 1909: 133, 215, pl. XII, fig. 2 (*R. amor*), 224, pl. XX, fig. 36 (as *R. spiralis*, in part); Laackmann, 1911: 463–464, pl. XLIX, figs 12–14; Jörgensen, 1924: 58–59 (descr., etc.), fig. 66; Kofoid & Campbell, 1929: 212 (refs & syn), fig. 398 (*Rhabdonella*); Kofoid, 1930: fig. 30.398 (lorica, ontogenesis); Marshall, 1934: 649–650 (remarks), text-figs 26a-b; Kofoid & Campbell, 1939: 161–162 (descr.), pl. 12, fig. 5; Campbell, 1942: 55–56 (descr., ecol., etc.), fig. 85; Gaarder, 1946: 18 (distrib.); Massuti & Margalef, 1950: 114, fig. 333; Trégouboff, 1957: 249 (key features), pl. 58, fig. 18; Komarovsky, 1959: 17 (comparison with *R. indica* Laackmann); Cassie, 1961: 21, 51 (N.Z. occurrence); Balech, 1962: 82, pl. IX, figs 103–104; Marshall, 1969f: 5 (identif. features, distrib., refs), pl. VII, fig. 15; Balech & Souto, 1980: 7–8 (descr.), fig. 9; Small & Lynn, 1985: 444 (generic characters).

Rhabdonella torta Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 220, fig. 404; Kofoid & Campbell, 1939: 180–181 (descr.), pl. 13, figs 4–6; Campbell, 1942: 62 (descr., etc); Cassie, 1961: 21, 51, pl. VIII, fig. 16 (possible N.Z. occurrence).

* Family TINTINNIDIDAE
Genus **Amphorides** Strand, 1926

Amphorides brandtii (Jörgensen, 1924)

Jörgensen, 1924: 18 (as *Amphorella quadrilineata*

* Corliss, 1989: 306 ("Genus not well assigned here?", i.e., in Ptychocylididae); Small & Lynn, 1985: 443 (in key, family and generic characters).

** Small & Lynn, 1985: 443 (in key), 444 (family characters).

* Small & Lynn, 1985: 446 (family characters, key to genera).

(Claparède & Lachmann, 1858) var. *brandti*); Brandt, 1906: pl. LXIX, fig. 6 (as *Tintinnus amphora* Claparède & Lachmann, 1858); Brandt, 1907: 433–434, 454 (as *T. amphora* Brandt, in part); Kofoid & Campbell, 1929: 309 (refs & syn.), fig. 586 (as *Amphorella amphora* (Claparède & Lachmann)), 309 (descr., history of species etc.), fig. 588 (as *A. brandti* Jörgensen); Marshall, 1934: 655, text-fig. 36; Kofoid & Campbell, 1939: 330–301 (descr., refs & syn., as *A. amphora*), pl. 28, fig. 30; Campbell, 1942: 112 (descr., status etc. as *A. amphora*), 113 (as *A. amphora* of Hada, 1932 = *A. quadrilineata* (Claparède & Lachmann); Campbell, 1954b: D178 (generic diag.); Cassie, 1961: 21, 50, pl. VIII, fig. 20 (N.Z. record as *A. brandti*); Zeitzschel, 1969: 60 (cf. placing in *A. amphora*); Cosper, 1972: 395 (in key), 411–412 (descr., distrib., in *Amphorides* Strand, 1926), fig. 22; Taylor (1976) *in* Gordon & Ballantine, 1977: 97 (listed from Leigh region); Taylor, 1978: 217 (Leigh area record, Aug. 1966); Corliss, 1979: 307 (*Amphorides* Strand, 1926 substituted for *Amphorella* Daday, 1887, cf. Strand 1928); Small & Lynn, 1985: 447 (generic characters), fig. 33 (*A. amphora*).

Genus **Eutintinnus** Kofoid & Campbell, 1939

Eutintinnus macilentus Jörgensen, 1924

Jörgensen, 1924: 10, 11 (type locality, Stn "Kramer 17–III–94", off N.Z.), text-fig. 4 (as *Tintinnus lusus undae* Entz, 1885 var. *macilentus*); Brandt, 1906: pl. LXV, figs 12, 16, 19–20 (as *T. lusus undae* Entz, 1885, var. c and *T. fraknoi* var. c), pl. LXV, fig. 15 (as *T. emarginatus* var. b from N.Z.); Brandt, 1907: 424, 466 (as *T. fraknoi* var c, in part); Kofoid & Campbell, 1929: 335, fig. 637 (descr., refs & syn as *T. macilentus*; cf. also *T. brandti* Kofoid & Campbell, 1929: 332–333 off N.Z.); Campbell, 1942: 122 (descr., etc.); Trégouboff, 1957: 255 (key features), pl. 60, fig. 15; Komarovsky, 1959: 23 (descr.), fig. 61 (as *E. brandti*, N.Z.), 24 (descr.), fig. 67 (*E. macilentus*, N.Z.); Balech, 1962: 111–112, pl. XV, fig. 196; Marshall, 1969j: 3 (identif. features, distrib., refs), pl. XII, fig. 8; Calderón & López, 1973: 74 (descr.), fig. 7; Small & Lynn, 1985: 446 (generic characters), fig. 29A (*E. brandti*); Gilron & Lynn, 1989: 1–10 (growth rates etc.).

Eutintinnus rugosus Kofoid & Campbell, 1929

Kofoid & Campbell, 1929: 332, fig. 644 (*Tintinnus*); Kofoid & Campbell, 1939: 363 (descr.), 372, pl. 32, fig. 5 (in new subgenus *Odontotintinnus*); Campbell, 1954b: D179 (subgeneric diag.); Cassie, 1961: 21, 51, pl. VIII, fig. 5 (N.Z. occurrence); Souto, 1972: 461, fig. 11; Gordon & Ballantine, 1976: 97 (listed from Leigh region after Cassie, 1966).

Genus **Dadayiella** Kofoid & Campbell, 1929

Dadayiella ganymedes (Entz, 1884)

Entz, 1884, 409, pl. XXIV, figs 17–18 (*Tintinnus*); Daday, 1887: 534, 539–540, pl. 18, fig. 18 (*Amphorella*); Brandt, 1906: 33, pl. 70, fig. 2 (*Tintinnus*); Brandt, 1907: 409, 412, 466; Jörgensen, 1924: 22–23 (descr., varieties etc.), figs 22a-d; Kofoid & Campbell, 1929: 321 (refs & syn.), fig. 610; Marshall, 1934: 657 (remarks); Hada, 1938: 169, figs 86a-b; Kofoid & Campbell, 1939: 344–346 (descr., syn), pl. 29 figs 1, 7, 9, 13; Campbell 1942: 116–117 (descr., variation, etc.), fig. 128; Gaarder, 1946: 10 (distrib.), text-fig. 11a; Massuti & Margalef, 1950: 110 (in key, as *Dadayella*), fig. 304; Campbell, 1954b: D178 (generic diag.), fig. 91; Trégouboff, 1957: 254 (key features), pl. 60, fig. 8; Balech, 1959: 50, pl. 19, figs 273–278; Komarovsky, 1959: 26 (descr.), fig. 79; Cassie, 1961: 21, 50, pl. VIII, fig. 6 (N.Z. occurrence); Loeblich & Tappan, 1968: 187 (cited as type species); Marshall, 1969c: 5 (identif. features, distrib., refs), pl. XI, fig. 16; Zeitzschel, 1969: 59 (descr., distrib., refs), fig. 20, pl. 7, figs 5–5a, pl. 11, fig. 2; Hada, 1970: 40, text-fig. 64; Souto, 1970a: 199 (descr.), fig. 39; Souto, 1970b: 222; Calderón & López, 1973: 72 (descr.), fig. 1; Sassi & Melo, 1989: 66–67 (descr., etc.), pl. IV, fig. 26.

* Family UNDELLIDAE

Genus **Proplectella** Kofoid & Campbell, 1929

Proplectella fastigiata (Jörgensen, 1924)

Jörgensen, 1924: 38–40, fig. 42b (as *Undella claparedei* Entz, 1885 forma *fastigiata*); Brandt, 1906: 31, pl. LXIV, figs 11–11a (as *Undella claparedi* var. f); Brandt, 1907: 348, 349, 365, 459; Kofoid & Campbell, 1929: 278 (descr., refs & syn.), fig. 528 (*Proplectella*); Hofker, 1931: 381; Kofoid & Campbell, 1939: 248–249 (descr.), pl. 23, fig. 8; Campbell 1942: 104 (descr., etc.), figs 80, 96; Gaarder, 1946: 17 (distrib.); Massuti & Margalef, 1950: 113 (generic key); Trégouboff, 1957: 251 (key features); Campbell, 1954b: D178 (generic diag.); Komarovsky, 1959: 21 (descr.), figs 54–55; Cassie, 1961: 21, 51, pl. VIII, fig. 14 (N.Z. occurrence); Marshall, 1969h: 4 (identif. features, refs), pl. X, fig. 8; Balech, 1975: 378 [*Proplectella*

* Balech, 1975: 378; Small & Lynn, 1985: 443 (family characters).

included in syn. of *Undella* Daday, 1887, emend. Kofoid & Campbell, 1929, emend. Balech, 1975; *P. fastigiata* in syn. of *Undella claparedei* (Entz, 1885: 202, pl. 14, figs 10–11, as *Tintinnus*)], pl. I, figs 29–35 (descr., refs & syn.); Small & Lynn, 1985: 444 (generic characters).

* Family XYSTONELLIDAE
Genus **Xystonella** Brandt, 1906

Xystonella clavata Jörgensen, 1924

Jörgensen, 1924: 33, 36, 37, text-fig. 40 (as *X. longicauda* Brandt, 1906 var. *clavata*); Brandt, 1906: 7, 24, pl. XLII, fig. 8 (as *Cyttarocylis (?) (Xystonella) lanceolata*, in part); Brandt, 1907: 258 (N.Z. record), 469; Kofoid & Campbell, 1929: 235–236 (descr.), fig. 450 (*X. clavata*); Campbell, 1942: 91–92 (descr., etc.); Trégouboff, 1957: 250 (key features); Komarovsky, 1959: 19 (descr.), fig. 40; Balech, 1962: 93, pl. XI, fig. 133 (as *X. longicauda* (Brandt) var. *clavata*).

Xystonella treforti (Daday, 1887)

Daday, 1887: 515, 579, pl. XXI, fig. 1 (*Cyttarocylis*); Kofoid, 1905: 290, 293, pl. XXVII, figs 8–11, pl. XXVIII, fig. 18 (as *C. quadridens*), 291 (*C. treforti*); Brandt, 1906: 25 (off N.Z.), pl. XLVII, figs 2–3, 6–7, 9, pl. XLVIII, fig. 1 (*C. xystonella*); Entz, 1909: 215, pl. IX, fig. 3; Laackmann, [1909] 1911: 449; Jörgensen, 1924: 32–34 (descr., refs & syn), fig. 37; Kofoid & Campbell, 1929: 238 (refs & syn), fig. 452; Hofker, 1931: 381 (as *Xystonella*); Marshall, 1934: 651; Campbell, 1942: 94 (descr., ecol. etc.); Gaarder, 1946: 25 (distrib.); Massuti & Margalef, 1950: 120, fig. 355; Campbell, 1954b: D176 (generic diag. in subgenus *Xystonella*); Trégouboff, 1957: 250 (key features), pl. 59, fig. 4; Komarovsky, 1959: 19 (descr.), figs 41–42; Balech, 1962: 91; Loeblich & Tappan, 1968: 190 (cited as type species); Marshall, 1969g: 5 (identif, features, distrib., refs), pl. IX, fig. 18; Souto, 1970a: 200 (descr.), fig. 42; Souto, 1970b: 221; Calderón & López, 1973: 79–80 (descr.), figs 25–27.

* Small & Lynn, 1985: 444 (family characters).

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