

***Candeodiscoaster*, a new nannofossil genus (*Coccolithophyceae*, *Discoasteraceae*)**

Richard W. Howe, *Ellington Geological Services, Houston, TX, USA*. (correspondence: [richard.howe@yahoo.com](mailto:richard.howe@yahoo.com))

The coccolith order *Discoasterales* W.W.Hay (1977) *emend.* Bown (2010) includes the families *Fasciculithaceae* and *Discoasteraceae*. Transitional forms between the two families are derived from forms in the genus *Tectulithus* (in the family *Fasciculithaceae*) through reduction and then loss of the column and cone cycles, leaving only the lateral element cycle in *Discoaster* (in the *Discoasteraceae*). A new genus is needed for forms that still have column and/or cone cycles, where they are flush with the main body of the coccolith, rather than raised as they are in *Tectulithus*.

The type species of the genus *Discoaster* S.H.Tan (1931) *nom. cons.*, is *D. brouweri* S.H.Tan (Tan 1927; Doweld 2014), which has a single cycle of radial elements and is only weakly birefringent in plan view in cross-polarised light. Two other genera described by Tan (1927), *Heliodiscoaster* (type species *H. barbadiensis* S.H.Tan, 1927) and *Hemidiscoaster* (type species *H. molengraafii* S.H.Tan, 1927) are heterotypic synonyms of *Discoaster* (i.e. taxonomic synonyms based on different types, to be rejected in favour of *Discoaster*, see Doweld, 2014). Both their types have similar ultrastructure to *D. brouweri*, with only a single cycle of weakly birefringent elements.

The genus *Discoasteroides* Bramlette & F.R.Sullivan (1961) was erected for forms similar to discoasters, but with a birefringent cycle or cycles in the central area, and would include *Discoaster protomultiradiatus*, except that the type species is *Discoaster kuepperi* Stradner (1959), a species with a single cycle of radially arranged elements, with a very high knob on one side. This knob is a raised extension of the elements in the single cycle and is in optical continuity with the main body of the coccolith. The birefringence of the knob in plan view comes from its substantial height, not from it being a different structural unit, as in the genus being described here. *D. kuepperi* hence belongs in *Discoaster*, and *Discoasteroides* is superfluous.

A new genus is needed for *Discoaster protomultiradiatus*, as with structurally distinct birefringent cycles in the central area, it clearly cannot belong to either *Discoaster* or *Discoasteroides*.

***Candeodiscoaster*** R.W.Howe, *gen. nov.*

Description: Circular coccoliths with a broad, low main cycle of elongate radial elements joined through most of their length, and in which the calcite c-axes are arranged such that in plan view, the cycle is not birefringent in cross-polarised light. In the central area, one or two cycles are present, which in lateral view are flush with, or lower than, the top of the main cycle. In plan view, these cycles are birefringent in cross-polarised light.

Type species: *Candeodiscoaster protomultiradiatus* (W.Weil) R.W.Howe, *comb. nov.* as follows.

***Candeodiscoaster protomultiradiatus*** (W.Weil) R.W.Howe, *comb. nov.*

Basionym: *Discoaster protomultiradiatus* W.Weil *Journal of Nannoplankton Research* 20(2): 110, pl. 1: figs 1-7, 13-14, 1998

Bown, P.R. (2010). Calcareous nannofossils from the Paleocene/Eocene Thermal Maximum interval of southern Tanzania (TDP Site 14). *Journal of Nannoplankton Research* 31(1): 11-38.

Bramlette, M.N. & Sullivan, F.R. (1961). Coccolithophorids and related nannoplankton of the Early Tertiary in California. *Micropaleontology* 7(2): 129-188.



- Doweld, A.B. (2014). (2265–2267) Proposals to conserve the name *Discoaster* against *Eudiscoaster*, *Helio-discoaster* and *Hemi-discoaster*, and the names *Heliodiscoaster* and *Hemidiscoaster* with those spellings (fossil *Prymnesiophyta* (*Algae*) vel *Haptomonada* (*Protista*)). *Taxon* 63(1): 195-197.
- Hay, W.W. (1977). Calcareous nannofossils. In, Ramsay, A. T. S. (ed.) *Oceanic Micropalaentology*. Academic Press, London 1055-1200.
- Stradner, H. (1959). Die fossilen Discoasteriden Österreichs. II. *Erdoel-Zeitschrift* 75(12): 472-488.
- Tan Sin Hok (1927). Discoasteridae incertae sedis. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen*. Sect Sci, 30: 411-419.
- Tan Sin Hok, (1931). Discoasteridae, Coccolithinae, and Radiolaria. *Leidse Geologische Mededelingen*, 5: 92-95
- Wei, W. (1998). New calcareous nannofossil species and stratigraphic markers from the Upper Paleocene. *Journal of Nannoplankton Research* 20(2): 107-115.