

On the legitimacy of the generic name *Discoaster* Tan, 1927 ex Tan, 1931.

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Introduction.

In all literature (except Prins, 1971) the asteroliths are classified in the genus *Discoaster* Tan, 1927 with type species *Discoaster pentaradiatus* Tan, 1927. A careful study of the relevant publications revealed:

- a) The generic name *Discoaster* was first validly published in Tan Sin Hok, 1931 and was typified by *Discoaster brouweri* Tan, 1927 ex Tan, 1931.
- b) Although valid, the name is illegitimate as nomenclaturally superfluous at the time of publication. As such it must be rejected.

*Eu-Discoaster* Tan, 1927 versus *Discoaster* Tan, 1927 ex Tan, 1931.

Tan Sin Hok firstly published about "asterisks" or "Disco-asters" in 1926. This early reference, however, is of no nomenclatural significance because the names were mentioned incidentally and in anticipation of a future taxonomic treatment.

In 1927, Tan Sin Hok introduced formally the genera *Helio-Discoaster*, *Eu-Discoaster* and *Hemi-Discoaster*. All genera were validly published with sufficient descriptions, clear indication of rank and type species (*Discoaster Barbadiensis* typ. spec. of *Helio-Discoaster*; "*Discoaster Brouweri*" typ. spec. of *Eu-Discoaster*; and "*Discoaster Molengraaffi*" typ. spec. of *Hemi-Discoaster*). At the same time the name *Discoaster* appears both as a morphologic term as well as in combination with specific epithets, but lacks a formal description.

The lack of description invalidates the name *Discoaster* Tan, 1927 (I.C.B.N. article 32) and consequently all species names associated with it are also invalid (I.C.B.N. article 43.1.). The fact that among the invalid species are included also the type species of *Helio-Discoaster*, *Eu-Discoaster* and *Hemi-Discoaster* does not affect the validity of these genera, since descriptions and figures of the holotypes are given (a).

In Tan Sin Hok, 1931 (p.93, remark 1) the valid generic name *Eu-Discoaster* is cited as a synonym of *Discoaster*. Thus, *Discoaster* is validated by an indirect reference to the description of *Eu-Discoaster* (I.C.B.N. article 41.1.b.). Had the opposite been mentioned (i.e. *Discoaster* synonym of *Eu-Discoaster*) the name *Discoaster* would have remained invalid (I.C.B.N. article 34.1.d.). The validation of the name is automatically followed by typification by *D.brouweri* (I.C.B.N. article 7.11.). Moreover, all *Discoaster* species earlier introduced by Tan (1927) are validated at the same time, as references are given to their original descriptions (I.C.B.N. article 43.).

The generic name *Discoaster* Tan, 1927 ex Tan, 1931, although valid, was nomenclaturally superfluous at the time of validation since it was meant to substitute the earlier validly published *Eu-Discoaster* Tan, 1927. As such it is illegitimate and must be rejected (I.C.B.N. article 63.1.).

### Selected references.

Bramlette and Riedel (1954) noticed the insufficiency of the diagnoses of the genera introduced by Tan. Because it was impossible to distinguish *Helio-Discoaster* from *Eu-Discoaster* on the basis of the original diagnoses they lumped all asteroliths into one genus. In naming this genus they chose *Discoaster* Tan, 1927, instead of the correct *Eu-Discoaster* Tan, 1927. They justified this choice by stating that Tan intended *Eu-Discoaster* (and *Helio-Discoaster*) to be subgenera of *Discoaster*.

Unfortunately nowhere in Tan's publications this is clearly mentioned. On the contrary, all other names except *Discoaster* bear the clear indication "nov.gen.". Thus the association of the name *Discoaster* with the specific epithets is either a mistake, or - in the case he meant it to be a genus name - an incorrect introduction of a genus.

Loeblich and Tappan (1963) validated *Discoaster* and typified it with *D. pentaradiatus*. Both the validation as well as the typification was superfluous as the name was validated (in 1931) and automatically typified. Furthermore, for the validation of the name, the authors referred to "Tan Sin Hok, 1927, p.412" instead of the correct pp.414-418 which is the taxonomic part of Tan's publication. Had the name been invalid, the validation by Loeblich and Tappan would have been ineffective.

Farinacci (1969, 1/59) implied that the substitution of *Eu-Discoaster* by *Discoaster* was a correction by Tan Sin Hok. Unfortunately such a correction of an earlier validly published name by a latter one is not recognized by the International Code of Botanical Nomenclature (I.C.B.N. article 62.1).

Prins (1971) questioned the validity of *Discoaster* and suggested the rejection of this name in favour of *Eu-Discoaster*. Furthermore he recombined all *Discoaster* species names with the latter, as well as with other generic and subgeneric names introduced by him.

However, all the new combinations of Prins (1971) lack direct references to the original publications and are, therefore, invalid (I.C.B.N. article 33.2.).

### New combinations of species earlier assigned to the illegitimate genus *Discoaster*.

From the three genera introduced by Tan Sin Hok only *Eu-Discoaster* and *Helio-Discoaster* have taxonomic significance, because the type species assigned to them show essentially different construction. The discussion about the distinction of the two genera and the emendation of their diagnoses are reserved for a thorough taxonomic treatment of the discoasters (Theodoridis, 1983, in prep.). *Hemi-Discoaster*, on the other hand, is considered to be a preservational state of either one of them.

The name *Discoaster* is replaced here by *Eu-discoaster* and *Helio-discoaster* (<sup>b</sup>). In the following list of new combinations, names which are considered to be synonyms are omitted. The species of each genus are arranged in alphabetic order.

Family EUDISCOASTERACEAE Prins, 1971.

Genus *Eu-discoaster* Tan Sin Hok, 1927.

*Eu-discoaster altus* (Müller) n. comb.

Basionym: *Discoaster altus* Müller, 1974: In. Repts. D.S.D.P., vol. 25, p. 592, pl. 9, figs. 1-3.

*Eu-discoaster asymmetricus* (Gartner) n. comb.

Basionym: *Discoaster asymmetricus* Gartner, 1969: Trans. Gulf Coast Assoc. Geol. Soc., vol. 19, p. 598, pl. 1, figs. 1-3.

*Eu-discoaster bellus* (Bukry and Percival) n. comb.

Basionym: *Discoaster bellus* Bukry and Percival, 1971: Tul. Stud. Geol. Paleont., vol. 8, n. 3, p. 128, pl. 3, figs. 1, 2.

*Eu-discoaster berggrenii* (Bukry) n. comb.

Basionym: *Discoaster berggrenii* Bukry, 1971: Micropal., vol. 17, n. 1, p. 45, pl. 2, figs. 4-6.

*Eu-discoaster browseri* (Tan, 1927 ex Tan, 1931) n. comb.

Basionym: *Discoaster browseri* Tan, 1927: Kon. Akad. Wet. Proc., vol. 30, n. 3, p. 415, figs. 5-8a, b, 13.

*Eu-discoaster bollii* (Martini and Bramlette) n. comb.

Basionym: *Discoaster bollii* Martini and Bramlette, 1963: J. Paleont., vol. 37, n. 4, p. 851, pl. 105, figs. 1-4, 7.

*Eu-discoaster calcaris* (Gartner) n. comb.

Basionym: *Discoaster calcaris* Gartner, 1967: Paleont. Contr. Univ. Kansas, paper 29, p. 2, pl. 2, figs. 1, 2a, b, 3a, b.

*Eu-discoaster decorus* (Bukry) n. comb.

Basionym: *Discoaster variabilis decorus* Bukry, 1971: Micropal., vol. 17, n. 1, p. 48, pl. 3, figs. 5, 6.

*Eu-discoaster deflandrei* (Bramlette and Riedel) n. comb.

Basionym: *Discoaster deflandrei* Bramlette and Riedel, 1954: J. Paleont., vol. 28, n. 4, p. 399, pl. 39, fig. 6, text-figs. 1a, b, c.

*Eu-discoaster distinctus* (Martini) n. comb.

Basionym: *Discoaster distinctus* Martini, 1958: Senck. Leth., vol. 39, n. 5/6, p. 363, pl. 4, figs. 17a, b.

*Eu-discoaster druggii* (Bramlette and Wilcoxon) n. comb.

Basionym: *Discoaster druggii* Bramlette and Wilcoxon 1967: Tul. Stud. Geol. Paleont., vol. 5, p. 220; nomen subst. pro *Discoaster extensus* Bramlette and Wilcoxon 1967: Tul. Stud. Geol. Paleont., vol. 5, n. 3, p. 110, pl. 8, figs. 2-8.

*Eu-discoaster exilis* (Martini and Bramlette) n. comb.

Basionym: *Discoaster exilis* Martini and Bramlette, 1963: J. Paleont., vol. 37, n. 4, p. 852, pl. 104, figs. 1-3.

*Eu-discoaster hamatus* (Martini and Bramlette) n. comb.

Basionym: *Discoaster hamatus* Martini and Bramlette, 1963: J. Paleont., vol. 37, n. 4, p. 852, pl. 105, figs. 8, 10, 11.

*Eu-discoaster kugleri* (Martini and Bramlette) n. comb.

Basionym: *Discoaster kugleri* Martini and Bramlette, 1963: J. Paleont., vol. 37, n. 4, p. 853, pl. 102, figs. 11-13.

*Eu-discoaster loeblichii* (Bukry) n. comb.

- Basionym: *Discoaster loeblichii* Bukry, 1971: Trans. San Diego Soc. Nat. Hist., vol. 16, n. 14, p. 315, pl. 4, figs. 3-5.
- Eu-discoaster mendomombensis* (Wise) n. comb.  
Basionym: *Discoaster mendomombensis* Wise, 1973: In. Repts. D.S.D.P., vol. 18, n. 15, p. 594, pl. 7, figs. 1-8.
- Eu-discoaster musicus* (Stradner) n. comb.  
Basionym: *Discoaster musicus* Stradner, 1959: Proc. Fifth World Petr. Congr., sect. 1, p. 1088, text-fig. 28.
- Eu-discoaster moorei* (Bukry) n. comb.  
Basionym: *Discoaster moorei* Bukry, 1971: Micropal., vol. 17, n. 1, p. 46, pl. 2, figs. 11, 12, pl. 3, figs. 1, 2.
- Eu-discoaster neohamatus* (Bukry and Bramlette) n. comb.  
Basionym: *Discoaster neohamatus* Bukry and Bramlette, 1969: Tul. Stud. Geol. Paleont., vol. 7, n. 3, p. 133, pl. 1, figs. 4-5.
- Eu-discoaster neorectus* (Bukry) n. comb.  
Basionym: *Discoaster neorectus* Bukry, 1971: Trans. San Diego Soc. Nat. Hist., vol. 16, n. 14, p. 316, pl. 4, figs. 6, 7.
- Eu-discoaster nonaradiatus* (Klumpp) n. comb.  
Basionym: *Discoaster nonaradiatus* Klumpp, 1953: Paleontographica, Abt. A, vol. 103, n. 5-6, p. 383, text-fig. 3, n. 5.
- Eu-discoaster pansus* (Bukry and Percival) n. comb.  
Basionym: *Discoaster variabilis pansus* Bukry and Percival, 1971: Tul. Stud. Geol. Paleont., vol. 8, n. 3, p. 129, pl. 3, figs. 8, 9.
- Eu-discoaster pentaradiatus* (Tan, 1927 ex Tan, 1931) n. comb.  
Basionym: *Discoaster pentaradiatus* Tan, 1927: Kon. Akad. Wet. Proc., vol. 30, n. 3, p. 416, fig. 14.
- Eu-discoaster prepentaradiatus* (Bukry and Percival) n. comb.  
Basionym: *Discoaster prepentaradiatus* Bukry and Percival, 1971: Tul. Stud. Geol. Paleont., vol. 8, n. 3, p. 129, pl. 3, figs. 6, 7.
- Eu-discoaster pseudovariabilis* (Martini and Worsley) n. comb.  
Basionym: *Discoaster pseudovariabilis* Martini and Worsley, 1971: In. Repts. D.S.D.P., vol. 7, part. 2, p. 1500, pl. 3, figs. 2-8.
- Eu-discoaster quinquerramus* (Gartner) n. comb.  
Basionym: *Discoaster quinquerramus* Gartner, 1969: Trans. Gulf Coast Assoc. Geol. Soc., vol. 19, p. 598, pl. 1, figs. 1-3.
- Eu-discoaster signus* (Bukry) n. comb.  
Basionym: *Discoaster signus* Bukry, 1971: Micropal., vol. 17, n. 1, p. 48, pl. 3, figs. 3, 4.
- Eu-discoaster subsurculus* (Gartner) n. comb.  
Basionym: *Discoaster subsurculus* Gartner, 1967: Paleont. Contr. Univ. Kansas, paper 29, p. 3, pl. 5, figs. 1a, b, 2a, b.
- Eu-discoaster surculus* (Martini and Bramlette) n. comb.  
Basionym: *Discoaster surculus* Martini and Bramlette, 1963: J. Paleont., vol. 37, n. 4, p. 854, pl. 104, figs. 10-12.
- Eu-discoaster tamalis* (Kamptner) n. comb.  
Basionym: *Discoaster tamalis* Kamptner, 1967: Ann. Naturhist. Mus. Wien, vol. 71, p. 166, text-fig. 29.
- Eu-discoaster tristellifer* (Bukry) n. comb.  
Basionym: *Discoaster tristellifer* Bukry, 1976: In. Repts. D.S.D.P., vol. 33,

p.499,pl.1,figs.1-17.

*Eu-discoaster variabilis* (Martini and Bramlette) n.comb.

Basionym: *Discoaster variabilis* Martini and Bramlette,1963: J.Paleont., vol.37,n.4,p.854,pl.104,figs.4-8.

Genus *Helio-discoaster* Tan,1927.

*Helio-discoaster barbadiensis* (Tan,1927 ex Tan,1931) n.comb.

Basionym: *Discoaster barbadiensis* Tan,1927: Kon.Akad.Wet.Proc.,vol.30, n.3,p.415,fig.4.

*Helio-discoaster bifax* (Bukry) n.comb.

Basionym: *Discoaster bifax* Bukry,1971: Trans.San Diego Soc.Nat.Hist., vol.16,n.14,p.313,pl.3,figs.6-11.

*Helio-discoaster binodosus* (Martini) n.comb.

Basionym: *Discoaster binodosus* Martini,1958: Senck.Leth.,vol.39,n.5/6, p.361,pl.4,figs.18a,b,19a,b.

*Helio-discoaster colletii* (Parejas) n.comb.

Basionym: *Discoaster colletii* (Parejas) Bersier,1939:p.237,figs.18,21.

*Helio-discoaster diastypus* (Bramlette and Sullivan) n.comb.

Basionym: *Discoaster diastypus* Bramlette and Sullivan,1961: Micropal., vol.7,n.2,p.159,pl.11,figs.6-8.

*Helio-discoaster elegans* (Bramlette and Sullivan) n.comb.

Basionym: *Discoaster elegans* Bramlette and Sullivan,1961: Micropal., vol.7,n.2,p.159,pl.11,figs.16a,b.

*Helio-discoaster gemmeus* (Stradner) n.comb.

Basionym: *Discoaster gemmeus* Stradner,1959: Proc.Fifth World Petr.Congr., sect.1,p.1086,text-fig.21.

*Helio-discoaster kuepperi* (Stradner) n.comb.

Basionym: *Discoaster kuepperi* Stradner,1959: Erdoel Z.,vol.75,n.12, p.478,figs.17,21.

*Helio-discoaster lenticularis* (Bramlette and Sullivan)n.comb.

Basionym: *Discoaster lenticularis* Bramlette and Sullivan,1961: Micropal., vol.7,n.2,p.160,pl.12,figs.1a,b,2.

*Helio-discoaster lodoensis* (Bramlette and Riedel) n.comb.

Basionym: *Discoaster lodoensis* Bramlette and Riedel,1954: J.Paleont., vol.28,n.4,p.398,pl.39,figs.3a,b.

*Helio-discoaster mediosus* (Bramlette and Sullivan) n.comb.

Basionym: *Discoaster mediosus* Bramlette and Sullivan,1961: Micropal., vol.7,n.2,p.161,pl.12,figs.7a,b,8.

*Helio-discoaster mirus* (Deflandre,1952 ex Deflandre,1954) n.comb.

Basionym: *Discoaster mirus* Deflandre,1952 ex Deflandre in Deflandre and Fert,1954: Ann.Paléont.,vol.40,p.168,text-fig.118.

*Helio-discoaster mohleri* (Bukry and Percival) n.comb.

Basionym: *Discoaster mohleri* Bukry and Percival,1971: Tul.Stud.Geol. Paleont.,vol.8,n.3,p.128,pl.3,figs.3-5.

*Helio-discoaster multiradiatus* (Bramlette and Riedel) n.comb.

Basionym: *Discoaster multiradiatus* Bramlette and Riedel,1954: J.Paleont.,vol.28,n.4,p.396,pl.38,fig.10.

*Helio-discoaster nobilis* (Martini) n.comb.

Basionym: *Discoaster nobilis* Martini, 1961: Senck.Leth., vol.42, n.1/2, p.11, pl.2, fig.23, pl.5, fig.51.

*Helio-discoaster nodifer* (Bramlette and Riedel) n.comb.

Basionym: *Discoaster tani nodifer* Bramlette and Riedel, 1954: J.Paleont., vol.28, n.4, p.394, pl.39, fig.2.

*Helio-discoaster ornatus* (Stradner) n.comb.

Basionym: *Discoaster ornatus* Stradner, 1958: Erdoel Z., vol.74, p.188, fig.38.

*Helio-discoaster pacificus* (Haq) n.comb.

Basionym: *Discoaster pacificus* Haq, 1969: Stock.Contr.Geol., vol.21, n.1, p.11, pl.4, figs.4-7, text-fig.3.

*Helio-discoaster perpolitus* (Martini) n.comb.

Basionym: *Discoaster perpolitus* Martini, 1961: Senck.Leth., vol.42., n.1/2, p.9, pl.2, fig.20, pl.5, fig.50.

*Helio-discoaster saipanensis* (Bramlette and Riedel) n.comb.

Basionym: *Discoaster saipanensis* Bramlette and Riedel, 1954: J.Paleont., vol.28, n.4, p.398, pl.39, fig.4.

*Helio-discoaster splendidus* (Martini) n.comb.

Basionym: *Discoaster splendidus* Martini, 1960: Notizbl.hess.L.-Amt. Bodenforsch., vol.88, p.80, pl.10, figs.25, 26, 29.

*Helio-discoaster sublodoensis* (Bramlette and Sullivan) n.comb.

Basionym: *Discoaster sublodoensis* Bramlette and Sullivan, 1961: Micro-pal., vol.7, n.2, p.162, pl.12, figs.6a, b.

*Helio-discoaster tani* (Bramlette and Riedel) n.comb.

Basionym: *Discoaster tani* Bramlette and Riedel, 1954: J.Paleont., vol.28, n.4, p.397, pl.39, fig.1.

*Helio-discoaster wemmelensis* (Achuthan and Stradner) n.comb.

Basionym: *Discoaster wemmelensis* Achuthan and Stradner, 1969: Proc. First Int. Conf. Plankt. Micr. Geneva, p.5, pl.4, figs.3, 4, text-fig.2.

#### Remarks.

The letters accompanying the remarks refer to indications in the text.

(<sup>c</sup>) In the new International Code of Botanical Nomenclature a provision has been added according to which a genus is typified by a specimen and not a valid species name.

(b) The generic names have been simplified here by substituting the capital letters by small ones. Such an alteration is recognized by the I.C.B.N. (article 73.2). A further alteration of the original spelling, however, to delete the hyphen is not admissible (I.C.B.N. article 20.3.).

## Literature.

- Achuthan, M.V. and Stradner, E. (1969). Calcareous nannoplankton from the Wemmelian stratotype. In Brönnimann, P. and Renz, H.H. (ed.). Proc. First Int. Conf. Plankt. Micr., Geneva, E.J. Brill, Leiden, vol. 1, pp. 1-13.
- Bersier, A. (1939). Discoastéridées et Coccolithophoridées des marns oligocènes vaudoises. Bull. Soc. Vaud. Sc. Nat., vol. 60, pp. 229-248.
- Bramlette, M.N. and Riedel, W.R. (1954). Stratigraphic value of discoasters and some other microfossils related to recent coccolithophores. J. Paleont., vol. 28, n. 4, pp. 385-403.
- and Sullivan, F.R. (1961). Coccolithophorids and related Nannoplankton of the early Tertiary in California. Micropal., vol. 7, n. 2, pp. 129-188.
- and Wilcoxon, J.A. (1967). Middle Tertiary calcareous nannoplankton of the Cipero section, Trinidad. Tulane Stud. Geol., vol. 5, n. 3, pp. 93-131.
- (1967). *Discoaster druggii* nom. nov. pro *Discoaster extensus* Bramlette and Wilcoxon 1967, non Hay, 1967. Tulane Stud. Geol., vol. 5, p. 220.
- Bukry, D. (1971). Cenozoic Calcareous Nannofossils from the Pacific Ocean. San Diego Soc. Nat. Hist. Trans., vol. 16, pp. 303-327.
- and Bramlette, M.N. (1967). Some new and biostratigraphically useful calcareous nannofossils of Cenozoic. Tulane Stud. Geol. Paleont., vol. 7, n. 3, pp. 131-142.
- and Percival, S.F. (1971). New Tertiary calcareous nannofossils. Tulane Stud. Geol. Paleont., vol. 8, n. 3, pp. 123-146.
- Deflandre, G. In Grassé (1952). Traité de Zoologie, Masson, Paris, vol. 1, n. 1, Classe des Coccolithophoridées, pp. 439-470.
- In Deflandre, G. et Fert, Ch. (1954). Observations sur les Coccolithophoridées actuel et fossiles en microscopie ordinaire et électronique. Ann. Paleont., vol. 40, pp. 115-176.
- Farinacci, A. (1969). Catalogue of calcareous nannofossils. Ed. Tecnoscienza, Roma, vol. 1, p. 59.
- Gartner, S. (1967). Calcareous nannofossils from the Neogene of Trinidad, Jamaica, and Gulf of Mexico. Paleont. Contr. Univ. Kansas, paper 29, pp. 1-7.
- (1969). Correlation of Neogene planktonic foraminifer and calcareous nannofossil Zones. Trans. Gulf Coast Assoc. Geol. Soc., vol. 19, pp. 585-599.
- Haq, B.U. (1969). The structure of coccoliths and discoasters from the Tertiary deep-sea core in the Central Pacific. Stockholm Contr. Geol., vol. 21, n. 1, pp. 1-19.
- International Code of Botanical Nomenclature (1978). Bohn, Scheltema and Hokema, Utrecht, pp. 1-457.
- Kamptner, E. (1967). Kalkflagellaten-Skelettreste aus Tiefseeschlamm des Südatlantischen Ozeans. Ann. Naturhist. Mus. Wien, vol. 71, pp. 117-198.
- Klump, B. (1953). Beitrag zur Kenntnis der Mikrofossilien des mittleren und oberen Eozän. Paleontographica Abt. A, vol. 103, n. 5-6, pp. 377-406.
- Loeblich, A.R. and Tappan, H. (1963). Type fixation and validation of certain calcareous nannoplankton genera. Proc. Biol. Soc. Washington, vol. 76, pp. 191-196.
- Martini, E. (1958). Discoasteriden und verwandte Formen im NW-deutschen Eozän (Coccolithophorida). Senck. Leth., vol. 39, n. 5/6, pp. 353-388.
- (1960). Braarudosphaeriden, Discoasteriden und verwandte Formen aus dem Rupelton des Mainzer Beckens. Notizbl. hess. L.-Amt. Bodenforsch., vol. 88, pp. 65-87.
- (1961). Nannoplankton aus dem Tertiär und der obersten Kreide von SW Frankreich. Senck. Leth., vol. 42, n. 1/2, pp. 1-41.
- and Bramlette, M.N. (1963). Calcareous nannoplankton from the experimental Mohole Drilling. J. Paleont., vol. 37, n. 4, pp. 845-856.
- and Worsley, T. (1971). Tertiary calcareous nannoplankton from the Western Equatorial Pacific. In Repts. D.S.D.P. vol. 7, part. 2, pp. 1471-1507.
- Müller, C. (1974). Calcareous nannoplankton, Leg. 25 (western Indian Ocean). In Repts. D.S.D.P., vol. 25, pp. 579-633.
- Parejas, E. (1934). Sur quelques *Actiniscus* du Crétacé supérieur des Brasses (Préalpes médianes) et de l'île d'Elbe. C.R. Soc. Phys. et Hist. Nat. Genève, vol. 51, pp. 100-107.
- Prins, B. (1971). Speculations on relations, evolution and stratigraphic distribution of Discoasters. Proc. Second Plankt. Conf., Rome, 1970, vol. 2, pp. 1017-1039.
- Stradner, E. (1958). Die fossilen Discoasteriden Österreichs. I Teil, Die in den Bohrkernen der Tiefbohrung Korneuburg enthaltenen Discoasteriden. Erdoel Z., vol. 74, pp. 178-188.
- (1959). First report on the discoasters on the Tertiary of Austria and their stratigraphic use. Proc. Fifth Petrol. Congr., sect. 1, pp. 1081-1095.
- (1959). Die fossilen Discoasteriden Österreichs, II Teil. Erdoel Z., vol. 75, n. 12, pp. 472-488.
- Tan Sin Hok (1926). On a Young-Tertiary Limestone of the Isle of Roti with Coccoliths, Calci- and Manganese-peroxide Spherulites. Proc. Kon. Akad. Wet., Afd. Natuurk., vol. 29, n. 8, pp. 1095-1105 (or pp. 1-11).
- (1927). Discoasteridae Incertae Sedis. Proc. Kon. Akad. Wet., Afd. Natuurk., vol. 30, n. 3, pp. 411-419 (or pp. 1-9).
- (1931). Discoasteridae, Coccolithinae and Radiolaria. Leidsche Geol. Mededeel., Leiden, vol. 5, pp. 92-114.
- Wise, S.W. (1973). Calcareous nannofossils from cores recovered during Leg. 18, D.S.D.P.: Biostratigraphy and observations of diagenesis. In Repts. D.S.D.P., vol. 18, n. 15, pp. 561-619.