

Occurrence of *Pseudammodochium* from the subbottom sediments of the Ross Ice Shelf

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Occurrence of *Lorica* or *Podamphora* stage is a unique phenomenon among some ebridians (a siliceous protozoans). The true nature, whether it is part of a developmental (ontogenic) state or merely a hypersiliceous encystment of individuals, remained unsolved until now (Deflandre 1932a, 1932b, 1932c; Gemeinhardt 1931; Hovasse 1932a, 1932b, 1932c). Specimens of these forms, both with and without *Lorica* (or *Podamphora* stage), were generally reported from the same samples or at the same time. I also observed and/or documented these specimens from the circum-North Pacific regions (Ling 1971; Ling and Kim in preparation), submarine deposits recovered in the North Pacific

and North Atlantic (Ling in press) during the Deep Sea Drilling Project.

However, during the examination of cored sediments from the subbottom of the Ross Ice Shelf of Antarctica (figure 1), specimens that can be referred to as *Pseudammodochium dictyoides* (Hovasse) are recognized, and they are almost exclusively of those with *Lorica* or *Podamphora* stage.

RISP (Ross Ice Shelf Project) samples. Among the cored sediments from site J-9 ($82^{\circ}22.5'S$ $168^{\circ}37.5'W$) of 1977–1978, 17 samples from the three longest cores (8, 9, and 10) (Webb 1978) were examined for their siliceous microfossil contents (figure 2, table 1). Radiolarians were completely absent from these samples; Miocene age for the sediments of lower lithological unit was already suggested (Ling and White 1979).

MSSTS (McMurdo Sound Sediment and Tectonic Studies) samples. This drilling project was proposed and carried out mainly by scientists from New Zealand after the conclusion of the dry valley drilling project (DVDP) (McGinnis 1981) with the broad objectives of unraveling the Earth history of the east antarctic ice sheet and its possible relationship with the development of the Transantarctic Mountains. The coring operation was carried out from 21 October to 22 November 1979, at $77^{\circ}33'25.83''S$ $164^{\circ}23'12.85''E$ with water depth of 196 meters (see figure 1). After the drilling reached the depth of 229.6 meters (73 cores), the operation was prematurely terminated by sea-ice conditions (Pyne and Waghorn 1980).

Among 32 samples examined for the siliceous microfossils, only four samples contained silicoflagellates and/or ebridians (figure 2, table 2). The microfossils recovered from the samples were too few and generally too long-range to provide any definite geological age for the sediments; however, based on the RISP results, I suggest a minimum age of Miocene for the basal part of the cored sediments where these siliceous microfossils were encountered.

Investigations of these subsurface sediments from the Ross Ice Shelf record the southernmost occurrence of genus *Pseudammodochium* for the first time. Furthermore, it is interesting to note here that the specimens referred to the present genus are all double skeletons of unequal size, and all are with *Lorica* or *Podamphora* stage. This is a sharp contrast to the previous records by Deflandre (1932a, 1932b, 1932c) and Hovasse (1932a, 1932b, 1932c) where the majority of specimens in the illustrations are generally without *Lorica* or double skeleton of equal size.

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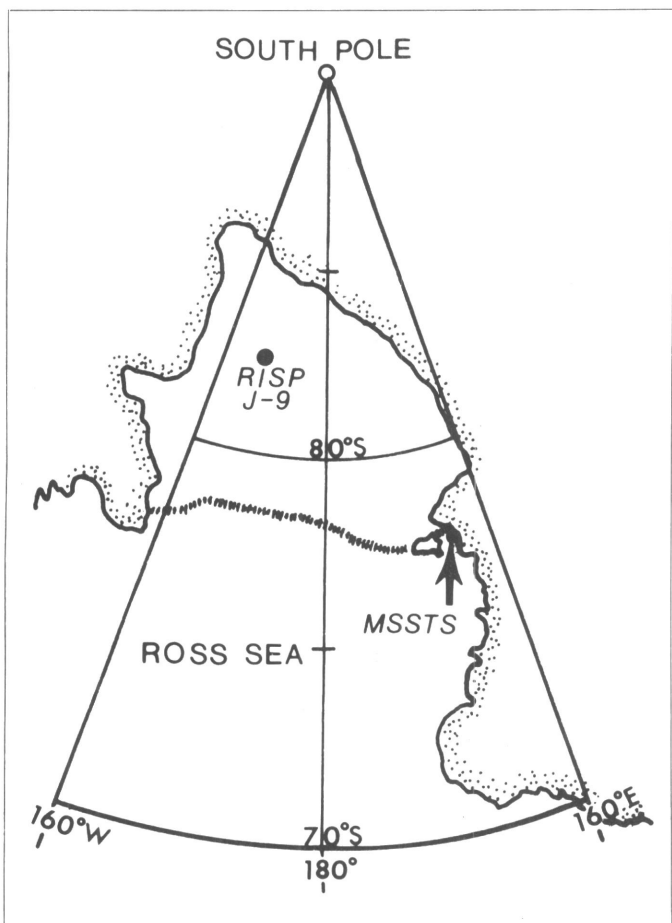


Figure 1. Index map showing Ross Ice Shelf Project (RISP) site J-9 1977–1978 and the drilling location of the McMurdo Sound Sediment and Tectonic Studies (MSSTS) of the Ross Ice Shelf.

References

- Deflandre, G. 1932a. Sur le genre *Podamphora* et ses relations avec les Ébriacées. *Compte Rendue des Academie des Sciences*, 194, 2171–2173.
- Deflandre, G. 1932b. Remarques sur quelques Ébriacées. *Bulletin de la Societe Zoologique de France*, 57, 302–315.
- Deflandre, G. 1932c. Enkystement et stade loriqué chez les Ébriacées. *Bulletin de la Societe Zoologique de France*, 57, 514–523.

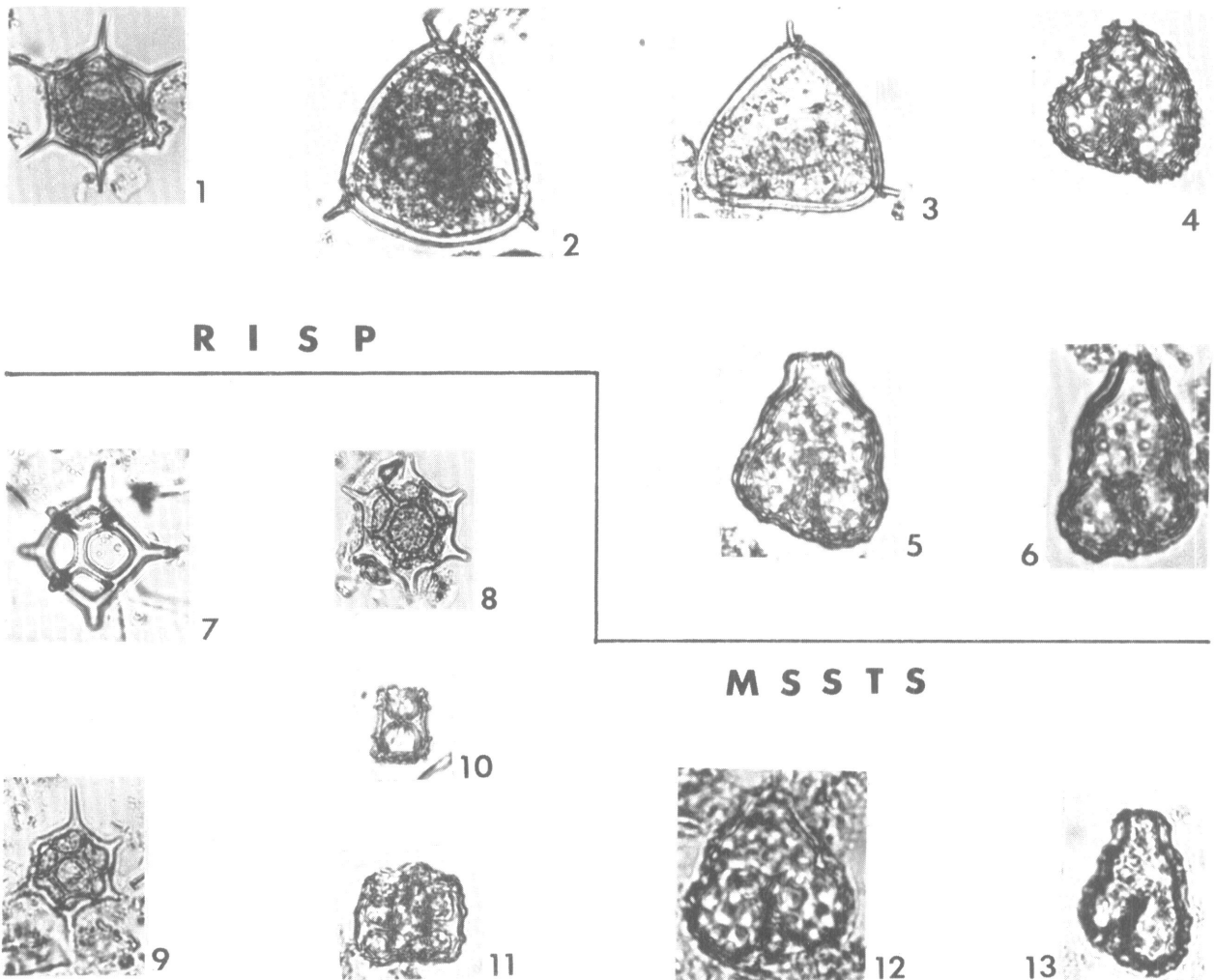


Figure 2. Silicoflagellates and ebridians from the subbottom of the Ross Ice Shelf. Taxonomic names, core numbers, depth intervals, slide numbers, loca locations with England Finder coordinates, and magnifications are: (1) *Distephanus speculum* Ehrenberg (short spine)—core number 77–8, depth intervals 40–43 centimeters, slide number L-2, loca location 045/0, magnification $\times 500$; (2) *Mesocena pappii* Bachmann—core number 77–8, depth intervals 83–86 centimeters, slide number L-2, loca location D14/3, magnification $\times 500$; (3) *Mesocena pappii* Bachmann—core number 77–10, depth intervals 16–19 centimeters, slide number L-2, loca location J21/4, magnification $\times 500$; (4) *Pseudammodochium dictyoides* Hovasse—core number 77–10, depth intervals 80–83 centimeters, slide number L-2, loca location D18/0, magnification $\times 640$; (5) *Pseudammodochium* sp. cf. *P. dictyoides* (?) Hovasse—core number 77–10, depth interval 80–83 centimeters, slide number L-2, loca location H17/0, magnification $\times 640$; (6) *Pseudammodochium* sp. cf. *P. dictyoides* (?) Hovasse—core number 77–10, depth intervals 16–19 centimeters, slide number L-2, loca location P11/1, magnification $\times 640$; (7) *Dictyocha fibula* Ehrenberg—core number 59–5, depth intervals 17–19 centimeters, slide number L-2, loca location K8/3, magnification $\times 500$; (8) *Distephanus speculum* Ehrenberg (short spine)—core number 71–4, depth intervals 41–45 centimeters, slide number L-2, loca location Y32/2, magnification $\times 500$; (9) *Distephanus speculum* Ehrenberg (normal form)—core number 71–4, depth intervals 41–45 centimeters, slide number L-4, loca location R18/4, magnification $\times 500$; (10) *Ammodochium rectangulare* Schulz—core number 59–5, depth intervals 17–19 centimeters, slide number L-4, loca location M39/2, magnification $\times 640$; (11) *Ammodochium rectangulare* Schulz (double skeleton)—core number 71–4, depth intervals 41–45 centimeters, slide number L-4, loca location Q20/0, magnification $\times 640$; (12) *Pseudammodochium dictyoides* Hovasse—core number 71–4, depth intervals 41–45 centimeters, slide number L-3, loca location J8/4, magnification $\times 800$; (13) *Pseudammodochium* sp. cf. *P. dictyoides* (?) Hovasse—core number 59–5, depth intervals 17–19 centimeters, slide number L-2, loca location M30/4, magnification $\times 640$.

Table 1. Distribution of silicoflagellates and ebridians from the Ross Ice Shelf Project RISP J-9 cores^a

Core number (interval in centimeters)	Taxa				
	<i>Distephanus speculum</i>	<i>Distephanus speculum</i> (short spine)	<i>Mesocena pappii</i>	<i>Pseudammodochium dictyoides</i>	<i>Pseudammodochium</i> sp. cf. <i>P. dictyoides</i>
8 (14-17)	—	—	—	—	—
8 (27-30)	+	+	—	—	—
8 (40-43)	C	R	C	A	R
8 (57-60)	—	+	+	+	+
8 (67-70)	—	—	—	+	+
8 (75-78)	C	C	C	A	A
8 (83-86)	C	C	R	A	A
8 (90-93)	A	A	—	C	—
9 (8-11)	+	+	—	+	+
9 (35-38)	F	R	F	A	A
9 (63-66)	C	A	F	A	A
10 (5-8)	—	—	—	—	—
10 (16-19)	R	R	F	A	A
10 (30-33)	—	—	—	A	A
10 (52-55)	+	+	—	+	+
10 (72-75)	F	C	—	A	A
10 (80-83)	R	F	—	A	C

^a Based on a 200 specimen count. "A" denotes abundant, "C" denotes common, "F" denotes few, "R" denotes rare, "+" denotes single specimen.

Table 2. Occurrence (number of specimens) of silicoflagellates and ebridians from the McMurdo Sound Sediment and Tectonic Studies (MSSTS)

Core number	Interval (in centi- meters)	Subbottom depths (in meters)	Taxa				
			<i>Dictyochoa fibula</i>	<i>Distephanus speculum</i> s.l.	<i>Ammodochium rectangulare</i>	<i>Pseudammodochium dictyoides</i>	<i>Pseudammodochium</i> sp. cf. <i>P. dictyoides</i>
53-1	29-31	159.79-159.81	—	2	—	—	—
59-5	17-19	185.45-185.47	3	2	4	1	2
69-2	55-58	215.54-215.57	—	—	1	—	—
71-4	41-45	222.25-222.29	—	8	4	2	2

Gemeinhardt, K. 1931. Organismenformen auf der grenze zwischen Radiolarien und Flagellaten. *Berichte der Deutschen Botanischen Gesellschaft*, 49, 103-110.

Hovasse, R. 1932a. Note préliminaire sur les Ébriacées. *Bulletin de la Societe Zoologique de France*, 57, 118-131.

Hovasse, R. 1932b. Seconde note sur les Ébriacées. *Bulletin de la Societe Zoologique de France*, 57, 278-283.

Hovasse, R. 1932c. Le Stade *Podamphora* et les Ébriacées. *Compte Rendue des Academie des Sciences*, 195, 676-677.

Ling, H. Y. 1971. Silicoflagellates and ebridians from the Shinzan diatomaceous mudstone member of the Onnagawa Formation (Miocene), Northeast Japan. In A. Farinacci (Ed.), *Proceedings of the II Planktonic Conference, Rome 1970*, II, 689-704.

Ling, H. Y. In press. Paleogene silicoflagellates and ebridians from the Goban Spur, N.E. Atlantic. In P. C. de Graciansky, C. W. Poag, et al., *Initial Reports of the Deep Sea Drilling Project*, Vol. 80. Washington,

D.C.: U.S. Government Printing Office.

Ling, H. Y., and B. K. Kim. In preparation. Taxonomy and biostratigraphy of radiolarians, silicoflagellates and ebridians from the Pohang area, Korea. *The Journal of the Geological Society of Korea*.

Ling, H. Y., and R. J. White. 1979. Silicoflagellate *Mesocena pappii* identified in RISP site J-9 core sediments. *Antarctic Journal of the U.S.* 14(5), 126-127.

McGinnis, L. D. (Ed.) 1981. *Dry Valley Drilling Project*. (Antarctic Research Series, Vol. 23.) Washington, D.C.: American Geophysical Union.

Pyne, A., and D. B. Waghorn. 1980. *Victoria University of Wellington Antarctic Expedition 24 and McMurdo Sound Sediment and Tectonic Studies (MSSTS)*. Victoria: University of Wellington.

Webb, P. N. 1978. *Initial report on geological materials collected at RISP site J-9, 1977-78*. (RISP Technical Report 78-1) Lincoln: University of Nebraska Press.