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4. Data Report: Silicoflagellates Recovered from Ocean Drilling Program Leg 207 Sites 1257 and 1258[1]

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INTRODUCTION

The Ocean Drilling Program (ODP) drilled at five sites in the western Atlantic Ocean during Leg 207. The objective of the drilling was to recover samples from the shallow buried Cretaceous and Paleocene sediments on the Demerara Rise off Suriname, South America. These sediments are being studied for a number of paleoceanographic studies of the low-latitude Atlantic off the coast of Suriname (this volume). For this report two sites, Sites 1257 and 1258, were selected for silicoflagellate study because shipboard results suggested these two sites as the only ones with siliceous microfossils of Paleocene–Eocene age.

The Demarara Rise is a predominant submarine plateau located off the coast of Suriname and French Guyana. This plateau stretches 380 km along the coast and is 220 km wide. The depth to seafloor along the depth transect drilled during ODP Leg 207 ranges from 1000 to 4500 m, but most of the remainder of the plateau lies in shallow water of 700 m. Much of this area is covered with 2–3 km of sediments. The Demerara Rise is built on rifted Precambrian continental crust. The plateau was one of the last places to be in contact with West Africa during the opening of the Atlantic Ocean (see Shipboard Scientific Party, 2004).

Site 1257 (9°27′N, 54°20′W; water depth = 2951 m) is located on a terrace on the northwestern Demerara Rise ~400 km from Suriname. This is the second deepest water depth location drilled during Leg 207. Sediments from this area range in age from Miocene to Albian. This

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area is part of the transform fault that separated from Central America and western Africa. Three holes were drilled at Site 1257.

Site 1258 (9°26′N, 54°43′W; water depth = 3192 m) is located on the western slope of the Demerara Rise ~380 km north of Suriname. This site is the distal and deepest site of the paleoceanographic depth transect drilled across Demerara Rise during Leg 207. The area is located on a ridge of Paleocene sediments cropping out on the seafloor. Three holes were drilled at Site 1258, but only one is studied.

Sample Preparation

Simple smear slides were first prepared from each sample. Next, to remove carbonate, ~5 cm^3 of raw sample was placed into a 100-mL beaker, to which ~6 mL (sometimes more if needed) of 50% HCl was added while over a slide warmer set to low heat. This was left covered with parafilm overnight to complete the dissolution of any carbonate.

The sample was then centrifuged in a 15-mL test tube using distilled water (pH = 8) three times for 10 min each to remove the HCl. Approximately 6 mL (or until bubbling stopped) of 30% hydrogen peroxide was added, and the sample was allowed to sit covered overnight to remove organic material. The samples were again washed via centrifuge three times then wet-sieved into three size fractions: 63 µm, 38 µm, and the pan. Strewn slides mounted in Norland-61 optical adhesive on a 22 mm × 50 mm coverslip were then made for each fraction.

All the slides for each size fraction were completely examined, with all specimens representing more than one-half of a silicoflagellate included in the counts (see Tables T1, T2). This study was done at the Micropaleontology Undergraduate Research Laboratory at the University of Maine at Presque Isle. The microscope work and some of the analyses were conducted by undergraduate students having limited experience with silicoflagellates. Participating students generally have a year of training in micropaleontology and deep ocean drilling and then conduct micropaleontology research as a directed independent project that is closely supervised by the laboratory's director (K. McCartney).

T1. Abundance of silicoflagellates from Holes 1257A, 1257B, and 1257C, p. 9.

T2. Abundance of silicoflagellates from Hole 1258A, p. 10.

SYSTEMATIC PALEONTOLOGY

The synonymies shown here include the first description and representative references that illustrate the development of the species concept for the taxon.

Genus *BACHMANNOCENA* Locker, 1974, emend. Bukry, 1987

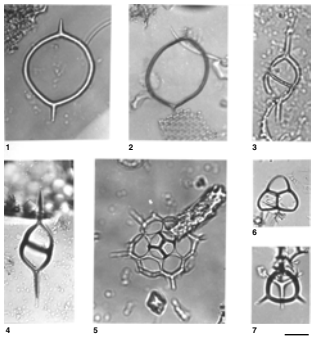
***Bachmannocena diodon* (Ehrenberg) Bukry**
(Pl. P1, figs. 1, 2)

Mesocena diodon Ehrenberg, 1844, pp. 71, 84.

Bachmannocena diodon (Ehrenberg), Bukry, 1987, p. 404.

Remarks: This species was abundant in Samples 207-1258A-15R-CC through 16R-CC. The specimens are fairly large, with an oval to round basal ring and two prominent basal spines on opposite ends of the long axis of the basal ring, and appear to be very similar to other *B. diodon* in the literature (see McCartney and Wise, 1987, pl. 4, fig. 5, for a photograph of a typical specimen). The early Eocene age of these samples may be the oldest known occurrence of this taxon. *B. diodon* is typically found in the middle–upper Miocene (see, for example, Locker and Martini, 1986; McCartney and Wise, 1987). *Bachmannocena occiden-*

P1. Silicoflagellates from Leg 207, Sites 1257 and 1258, p. 11.



talis Hanna ex Bukry, 1977, with four spines, is sometimes recorded from the Eocene but was not found in this study.

Three specimens were found that had a third spine in the 2-o'clock or 10-o'clock position with respect to the major axis. These are counted separately in Table T2. The three specimens were found in different samples.

Genus *CORBISEMA* Hanna

Corbisema apiculata (Lemmermann)

Corbisema triacantha var. *apiculata* Lemmermann, 1901, p. 259, pl. 10, figs. 19, 20.

Corbisema apiculata (Lemmermann), Ling, 1972, p. 153, pl. 24, fig. 1; Shaw and Ciesielski, 1983, p. 706, pl. 1, figs. 1–3.

Remarks: This taxon was found in the upper Paleocene, Sample 207-1257A-7X-CC, and in the lower Eocene, Samples 207-1258A-3R-CC and 4R-CC.

Corbisema bimucronata Deflandre

(Pl. P1, fig. 6)

Corbisema bimucronata Deflandre, 1950, p. 191, figs. 174–177.

Corbisema bimucronata Deflandre, Bukry and Foster, 1974, p. 307, pl. 1, fig. 1.

Corbisema bimucronata Deflandre, Bukry, 1975, p. 853, pl. 1, fig. 3.

Corbisema sp. cf. *C. hastata hastata* (Lemmermann), Bukry, 1978, pl. 4, figs. 22–24.

Remarks: This taxon is unusual among *Corbisema* in having blunt corners on the basal rings, which sometimes have two short spines. There was some variation, with some specimens having short spines and others having blunt corners without spines. Several specimens had both blunt and spined corners. Most specimens had a long axis (see Bukry, 1978, pl. 4, fig. 24). Bukry and Foster (1974) record this as commonly occurring in the middle Eocene *Dictyocha hexacantha* Zone.

Corbisema hastata (Lemmermann)

Corbisema triacantha var. *hastata* Lemmermann, 1901, p. 259, pl. 10, figs. 16, 17.

Corbisema hastata (Lemmermann), Ling, 1972, p. 155, fig. 5.

Remarks: This taxon was relatively abundant in Sample 207-1257B-2R-CC and sparse elsewhere. The specimens are fairly small, with very short spines.

Corbisema inermis inermis (Lemmermann)

Dictyocha triacantha var. *inermis* Lemmermann, 1901, p. 259, pl. 10, figs. 16, 17.

Corbisema inermis inermis (Lemmermann), Bukry, 1976, p. 892, figs. 2, 3.

Remarks: This taxon occurs consistently in the Paleocene in Hole 327A (Bukry, 1976) and in the lower middle Eocene of Site 605 (McCartney and Wise, 1987). It occurs sporadically in the present study.

Corbisema recta (Schulz)

Dictyocha triacantha var. *recta* Schulz, 1928, p. 250, fig. 32a, 32b.

Corbisema recta (Schulz), Ling, 1972, p. 155, pl. 24, figs. 6, 7; McCartney and Wise, 1987, p. 804, pl. 1, figs. 11, 12.

Remarks: A single specimen of this taxon was found in Sample 207-1258A-3R-CC.

Corbisema triacantha (Ehrenberg)

Dictyocha triacantha Ehrenberg, 1844, p. 80.

Corbisema triacantha (Ehrenberg), Hanna, 1931, p. 198, pl. D, fig. 1; Bukry and Foster, 1974, p. 305, fig. 1e.

Remarks: This taxon was found in middle Eocene Samples 207-1257A-7X-CC and 207-1257B-2R-CC and lower Eocene Sample 207-1258A-3R-CC.

Genus *DICTYOCHA* Ehrenberg

Dictyocha bachmanni Dumitricá

(Pl. **P1,** fig. 5)

Dictyocha bachmanni Dumitricá, 1967, p. 5, pl. 1, figs. 1–17.

Remarks: This very unusual silicoflagellate morphology is a rare exception to a general rule among silicoflagellate skeletons (McCartney and Loper, 1989) that the numbers of struts is equal to the number of basal sides. *D. bachmanni* has four struts and six basal sides. It appears to be part of an evolutionary lineage that includes *Distephanus stauracanthus* and, if correct, is one of many examples that illustrate the close biological relationships of the genera *Dictyocha* and *Distephanus*. A single specimen was found in Sample 207-1258A-16R-CC. The single occurrence suggests that this could be an aberrant specimen of another taxon, though the specimen was well formed and showed no evidence of skeletal deformity.

Dictyocha fibula Ehrenberg

Dictyocha fibula Ehrenberg, Locker, 1974, p. 636, pl. 1, fig. 6 (= lectotype).

Remarks: Specimens of this taxa were only found in Sample 207-1258A-4R-CC. The specimens were consistent in shape, being small, with a short and thick, almost medusoid, bridge. For a discussion on the species concept for *D. fibula* used in this study, see McCartney et al. (1995).

Dictyocha spinosa (Deflandre)

(Pl. **P1,** fig. 7)

Corbisema spinosa Deflandre, 1950, p. 193, figs. 178–182.

Dictyocha spinosa (Deflandre), Glezer, 1970, p. 238, pl. 10, figs. 6–8; McCartney and Wise, 1987, pl. 1, fig. 6; McCartney and Wise, 1990, pl. 2, fig. 2.

Remarks: This taxon was found by Engel and McCartney (2005) to occur in a narrow interval of the *Dictyocha hexacantha* Zone.

Genus *DISTEPHANUS* Stohr, 1880

Distephanus crux Ehrenberg

Distephanus crux Ehrenberg, 1840, p. 207; Ehrenberg, 1854, pl. 18, fig. 56; pl. 33(XV), fig. 9.

Genus *NAVICULOPSIS* Frenguelli, 1940

Naviculopsis biapiculata (Lemmermann)

Dictyocha navicula biapiculata Lemmermann, 1901, p. 258, pl. 10, figs. 14, 15.

Naviculopsis biapiculata (Lemmermann), Bukry, 1978, p. 787, pl. 3, figs. 9, 10; McCartney and Harwood, 1992, p. 825, pl. 1, figs. 3, 7, 8.

Remarks: *Naviculopsis biapiculata* co-occurs with *Naviculopsis constricta*, *Naviculopsis eobiapiculata*, and *Naviculopsis foliacea* in the interval from Sample 207-1258A-15R-CC through 16R-CC. All four taxa are relatively abundant in that interval but sparse elsewhere. All four taxa had basal rings and spines of similar size and are distinguished one from the other by the size and height of the bridge. *N. biapiculata* are similar to *N. eobiapiculata* but have a lower bridge.

Naviculopsis constricta (Schulz)

Dictyocha navicula biapiculata constricta Schulz, 1928, p. 246, fig. 21.

Naviculopsis constricta (Schulz), Bukry, 1975, p. 856, pl. 7, figs. 1, 2; McCartney and Wise, 1987, p. 807, pl. 5, figs. 1, 2; see also fig. 2, p. 807.

Naviculopsis eobiapiculata Bukry

Naviculopsis eobiapiculata Bukry, 1978, p. 878.

Remarks: *Naviculopsis eobiapiculata* is distinguished from *N. biapiculata* in having a higher bridge, with the bridge commonly being higher than the width across the basal ring.

Naviculopsis foliacea Deflandre

Naviculopsis foliacea Deflandre, 1950, p. 204, figs. 235–240; McCartney and Wise, 1987, p. 807, pl. 5, figs. 3, 4; see also fig. 2, p. 807.

Remarks: *Naviculopsis foliacea* is similar to *N. constricta* but has a much wider bridge.

Naviculopsis lata (Deflandre)

Dictyocha biapiculata lata Deflandre, 1932, p. 500, figs. 30, 31.

Naviculopsis lata (Deflandre), Ling, 1972 (in part), p. 185, pl. 30, figs. 12–14; Bukry, 1975, p. 856, p. 7, fig. 4.

Naviculopsis cf. *lata obliqua* Bukry

(Pl. **P1**, figs. 3, 4)

Naviculopsis cf. *lata* (Deflandre), Sawamura and Otawa, 1979, p. 52, fig. 2 (13); Ling, 1977, pl. 3, fig. 12.

Naviculopsis lata obliqua Bukry, 1982, p. 434.

Remarks: This identification must be considered tentative, as this rare taxon has previously been reported from the lower Miocene of the Pacific (see Bukry, 1982; Ling, 1977). However, it is very similar to the specimen illustrated by Ling (1977) and does not have the more robust skeletal elements and triangular plates where the bridge attaches to the basal ring of *N. robusta*.

BIOSTRATIGRAPHIC RESULTS

Silicoflagellates are very sparse or absent in many of the Leg 207 samples studied (see Table **T1**). Of 27 samples from ODP Sites 1257A, 1257B, 1257C, and 1258A examined for silicoflagellates, 16 were found to be barren, despite the examination of multiple slides of three size fractions. No silicoflagellate specimens were found in the two samples examined from Hole 1257C. For Holes 1257A and 1257B, only two samples were found in each hole to contain silicoflagellates, and the total diversity was only eight species. The frequent barren intervals did not provide sufficient information to determine biostratigraphic zonations.

Silicoflagellates were more consistently abundant and diverse in the Hole 1258A samples that were examined (see Table **T2**). Silicoflagellates were found in all samples except for a barren interval from Samples 207-1258A-5R-CC through 8R-CC. In the two samples from above the barren interval, silicoflagellates were sparse, with only a few specimens per slide. *Dictyocha spinosa*, found in Sample 207-1258A-4R-CC, is usually restricted to a narrow stratigraphic interval (see Engel and McCartney, 2005; McCartney and Wise, 1990). *Dictyocha spinosa* is commonly associated with *D. frenguelli* or *D. deflandei*, but these associated taxa were not found in Sample 207-1258A-4R-CC, and no attempt is made to therefore assign this sample to an existing silicoflagellate zone.

Silicoflagellates were relatively abundant in Samples 207-1258A-15R-CC through 16R-CC. This interval is placed in the *Naviculopsis foliacea* Zone (Bukry, 1981), based on the co-occurrence of *N. foliacea, N. eobiapiculata,* and *N. constricta* and the absence of *Dictyocha hexacantha*. This interval also includes two taxa that have not previously been re-

corded from this early. Most noteworthy is the lower Eocene occurrence of *Bachmannocena diodon* in Samples 207-1258A-15R-CC through 16R-CC. *Naviculopsis lata obliqua* is also an early occurrence, although this is a rarely seen taxon.

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REFERENCES

Bukry, D., 1975. Silicoflagellate and coccolith stratigraphy, Deep Sea Drilling Project, Leg 29. *In* Kennett, J.P., Houtz, R.E., et al., *Init. Repts. DSDP,* 29: Washington (U.S. Govt. Printing Office), 845–872.

Bukry, D., 1976. Cenozoic silicoflagellate and coccolith stratigraphy, South Atlantic Ocean, Deep Sea Drilling Project Leg 36. *In* Hollister, C.D., Craddock, C., et al., *Init. Repts. DSDP,* 35: Washington (U.S. Govt. Printing Office), 885–917.

Bukry, D., 1977. Coccolith and silicoflagellate stratigraphy, South Atlantic Ocean, Deep Sea Drilling Project Leg 39. *In* Perch-Nielsen, K., Supko, P.R., et al., *Init. Repts. DSDP,* 39: Washington (U.S. Govt. Printing Office), 825–840.

Bukry, D., 1978. Cenozoic silicoflagellate and coccolith stratigraphy, northwestern Atlantic Ocean, Deep Sea Drilling Project Leg 43. *In* Bensen, W.E., Sheridan, R.E., et al., *Init. Repts. DSDP,* 44: Washington (U.S. Govt. Printing Office), 775–805.

Bukry, D., 1981. Synthesis of silicoflagellate stratigraphy for Maestrichtian to Quaternary marine sediments. *In* Warme, T.E., Douglas, R.C., and Winterer, E.L. (Eds.), *The Deep Sea Drilling Project: A Decade of Progress.* Spec. Publ.—Soc. Econ. Paleontol. Mineral., 32:433–444.

Bukry, D., 1982. Cenozoic silicoflagellates from offshore Guatemala, Deep Sea Drilling Project Site 495. *In* Aubouin, J., von Huene, R., et al., *Init. Repts. DSDP,* 67: Washington (U.S. Govt. Printing Office), 425–445.

Bukry, D., 1987. Eocene siliceous and calcareous phytoplankton, Deep Sea Drilling Project Leg 95. *In* Poag, C.W., Watts, A.B., et al., *Init. Repts. DSDP,* 95: Washington (U.S. Govt. Printing Office), 395–415.

Bukry, D., and Foster, J.H., 1974. Silicoflagellate zonation of Upper Cretaceous to lower Miocene deep sea sediments. *J. Res. U.S. Geol. Surv.,* 2:303–310.

Deflandre, G., 1932. Sur la systématique des Silicoflagellés. *Bull. Soc. Bot. Fr.,* 79:494–506.

Deflandre, G., 1950. Contribution a l'étude des silicoflagellidés actuels et fossiles. *Microscopie,* 2:72–108, 117–142, 191–210.

Dumitricá, P., 1967. *Dictyocha bachmanni* n. sp. et considérations sur la lignée phylogénetique *Dictyocha crux-D. saturacantha-D. bachmanni.* Arch. Orig. Centre Document, *C.N.R.S., Cah. Micropaleontol., Ser. 1,* 4:1–6.

Ehrenberg, C.G., 1840. 274 Blatter von ihm selbst augefuhrter Zeichnungen von ebenso vielen Arten. *K. Preuss. Akad. Wiss. Berlin Ber.,* 1840:197–219.

Ehrenberg, C.G., 1844. Mittheilung uber zwei neue Lager von Gebirgsmassen aus Infusonien als Meeres-Absatz in Nord-Amerika und eine Vergleichung derselben mit den organischen Kreide-Gebilden in Europa und Afrika. *K. Preuss Akad. Wiss. Berlin, Ber.,* 1844:57–97.

Ehrenberg, C.G., 1854. *Mikrogeologie: Das Erden und Felsen Schaffende Wirken des Unsichtbar Kleinen Selbständigen Lebens auf der Erde:* Leipzig (Leopold Voss).

Engel, R., and McCartney, K., 2005. Silicoflagellates recovered from the deep sea, ODP Leg 199 Site 1219, east equatorial Pacific. *In* Wilson, P.A., Lyle, M., and Firth, J.V. (Eds.), *Proc. ODP, Sci. Results,* 199: College Station, TX (Ocean Drilling Program) 1–29. **doi:10.2973/odp.proc.sr.199.202.2005**

Glezer, Z.I., 1970. Silicoflagellatophyceae. *In* Gollerbakh, M.M. (Ed.), *Cryptogamic Plants of the USSR:* Jerusalem (Israel Prog. Sci. Transl.).

Hanna, G.D., 1931. Diatoms and silicoflagellates of the Kreyenhagen Shale. *Spec. Rep.—Calif., Div. Mines Geol.,* 27:187–201.

Lemmermann, E., 1901. Silicoflagellatae. *Ber. Dtsch. Bot. Ges.,* 19:247–271.

Ling, H.Y., 1972. Upper Cretaceous and Cenozoic silicoflagellates and ebridians. *Bull. Am. Paleontol.,* 62:135–229.

Ling, H.Y., 1977. Late Cenozoic silicoflagellates and ebridians from the eastern North Pacific region. *In* Saito, T., and Ujiie, H. (Eds.), *Proc. First Int. Congr. Pacific Neogene Stratigraphy,* 1:205–233.

Locker, S., 1974. Revision der Silicoflagellaten aus der Mikrogeologischen Sammlung von C.G. Ehrenberg. *Ecologae Geol. Helv.,* 67:631–646.

Locker, S., and Martini, E., 1986. Silicoflagellates and some sponge spicules from the southwest Pacific, DSDP Leg 90. *In* Kennett, J.P., von der Borch, C.C., et al., *Init. Repts. DSDP,* 90: Washington (U.S. Govt. Printing Office), 887–924.

McCartney, K., Churchill, S., and Woestendiek, L., 1995. Silicoflagellates and ebridians from Leg 138, eastern equatorial Pacific. *In* Pisias, N.G., Mayer, L.A., Janecek, T.R., Palmer-Julson, A., and van Andel, T.H. (Eds.), *Proc. ODP, Sci. Results,* 138: College Station, TX (Ocean Drilling Program), 129–162. **doi:10.2973/odp.proc.sr.138.108.1995**

McCartney, K., and Harwood, D.M., 1992. Silicoflagellates from Leg 120 on the Kerguelen Plateau, southeast Indian Ocean. *In* Wise, S.W., Jr., Schlich, R., et al., *Proc. ODP, Sci. Results,* 120: College Station, TX (Ocean Drilling Program), 811–831. **doi:10.2973/odp.proc.sr.120.154.1992**

McCartney, K., and Loper, D.E., 1989. Optimized skeletal morphologies of silicoflagellate genera *Dictyocha* and *Distephanus*. *Paleobiology,* 15:283–298.

McCartney, K., and Wise, S.W., Jr., 1987. Silicoflagellates and ebridians from the New Jersey Transect, Deep Sea Drilling Project Leg 93, Sites 604 and 605. *In* van Hinte, J.E., Wise, S.W., Jr., et al., *Init. Repts. DSDP,* 93 (Pt. 2): Washington (U.S. Govt. Printing Office), 801–814.

McCartney, K., and Wise, S.W., Jr., 1990. Cenozoic silicoflagellates and ebridians from ODP Leg 113: biostratigraphy and notes on morphologic variability. *In* Barker, P.F., Kennett, J.P., et al., *Proc. ODP, Sci. Results,* 113: College Station, TX (Ocean Drilling Program), 729–760. **doi:10.2973/odp.proc.sr.113.142.1990**

Sawamura, K., and Otawa, K., 1979. Silicoflagellate flora in calcareous concretions found in Cretaceous and Tertiary of Japan. *Bull. Geol. Surv. Jpn.,* 30:51–56.

Schulz, P., 1928. Beiträge zur Kenntnis fossiler und rezenter Silicoflagellaten. *Bot. Arch.,* 21:225–292.

Shaw, C.A., and Ciesielski, P.F., 1983. Silicoflagellate biostratigraphy of middle Eocene to Holocene subantarctic sediments recovered by Deep Sea Drilling Project Leg 71. *In* Ludwig, W.J., Krasheninnikov, V.A., et al., *Init. Repts. DSDP,* 71 (Pt. 2): Washington (U.S. Govt. Printing Office), 687–737.

Shipboard Scientific Party, 2004. Leg 207 summary. *In* Erbacher, J., Mosher, D.C., Malone, M.J., et al., *Proc. ODP, Init. Repts.,* 207: College Station, TX (Ocean Drilling Program), 1–89. **doi:10.2973/odp.proc.ir.207.101.2004**

Table T1. Abundance of silicoflagellates in selected samples, Holes 1257A, 1257B, and 1257C.

Age	Core, section, interval	Depth (mbsf)	Size fraction (µm)	Number of slides examined	*Corbisema apiculata*	*Corbisema bimucronata*	*Corbisema hastata*	*Corbisema inermis inermis*	*Corbisema triacantha*	*Dictyocha spinosa*	*Naviculopsis foliacea*	*Naviculopsis lata*	Total silicoflagellates
	207-1257A-												
	7X-CC	54.1	Pan	2		5		4	1				10
			38	2	3	11	2	2	1	2	1		19
			63	2		2							2
	8X-CC	63.7	Pan	2		2		2					4
			38	2									0
early to middle			63	2									0
Eocene	9X-CC	73.3	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	10X-CC	83.0	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	11X-CC	92.6	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	12X-CC	102.2	Pan	2	—	—	—	—	—	—	—	—	0
late Paleocene			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	13X-CC	111.8	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	207-1257B-												
middle Eocene	2R-CC	49.8	Pan	2		9	34	1	5				49
			38	2		1	5						6
			63	2		2							2
	3R-CC	59.4	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	4R-CC	69.0	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
early Eocene	5R-CC	78.7	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	6R-CC	88.3	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	7R-CC	97.9	Pan	2		2					3	3	8
			38	2							1	1	2
			63	2	—	—	—	—	—	—	—	—	0
	8R-CC	107.6	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
late Paleocene	207-1257C-												
	2R-CC	101.2	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0
	3R-CC	110.8	Pan	2	—	—	—	—	—	—	—	—	0
			38	2	—	—	—	—	—	—	—	—	0
			63	2	—	—	—	—	—	—	—	—	0

Note: — = barren.

Table T2. Abundances of silicoflagellates in selected samples, Hole 1258A.

Age	Core, section, interval	Depth (mbsf)	Size fraction (µm)	Number of slides examined	*Bachmannocena diodon*	*Bachmannocena diodon* (three spines)	*Corbisema apiculata*	*Corbisema bimucronata*	*Corbisema hastata*	*Corbisema inermis inermis*	*Corbisema recta*	*Corbisema triacantha*	*Dictyocha bachmanni*	*Dictyocha fibula*	*Dictyocha spinosa*	*Dictyocha* sp.	*Distephanus crux crux*	*Naviculopsis biapiculata*	*Naviculopsis constricta*	*Naviculopsis eobiapiculata*	*Naviculopsis foliacea*	*Naviculopsis lata*	*Naviculopsis lata obliqua*	*Aberrants*	Total silicoflagellates
	207-1258A-																								
	3R-CC	22.8	Pan	2			2	6			1	7							1		1				18
			38	2			3	4		1		5									1			1	14
			63	2			1	2		1		1													5
	4R-CC	30.2	Pan	2				3							3	1					1				8
			38	2				1						3	1										5
			63	2																					0
			Unsieved	2			1	6						4	1		2								14
	5R-CC	38.4	Pan	2																					0
			38	2																					0
			63	2																					0
			Unsieved	2																					0
	6R-CC	52.5	Pan	2																					0
			38	2																					0
			63	2																					0
			Unsieved	2																					0
	7R-CC	60.2	Pan	2																					0
			38	2																					0
			63	2																					0
			Unsieved	2																					0
	8R-CC	69.3	Pan	2																					0
			38	2																					0
early Eocene			63	2																					0
			Unsieved	2																					0
	9R-CC	81.5	Pan	2																	4				4
			38	2																					0
			63	2																	1				1
			Unsieved	2																					0
	14R-CC	125.3	Pan	2																11	8				19
			38	2																					0
			63	2																					0
			Unsieved	2		1											3		6	17	4				30
	15R-CC	134.7	Pan	2	38				4									40	16	9	33			1	102
			38	2	53				5									70	45	18	36			1	174
			63	2	12														9	13	8		1	1	31
			Unsieved	2	21	1			2									25	19	18	17		1		82
	16R-top	139.4	Pan	2	11				2								6	8	12	1	9				38
			38	2													6	1	6	10			6		29
			63	2	11				1	1									14	10	10				36
			Unsieved	2	21													11	15	27	16				69
	16R-CC	149.0	Pan	2	9													4		8	10	1			23
			38	2	8	1	1			1			1				5	18	19	17	30		1		93
			63	2																					0
			Unsieved	2	11				1									50	16	7	41		2		117

Plate P1. Silicoflagellates, Sites 1257 and 1258 (scale bar = 10 µm). **1.** *Bachmannocena diodon* (Sample 207-1258A-16R-CC). **2.** *Bachmannocena diodon* (Sample 207-1219A-15R-CC). **3, 4.** *Naviculopsis lata oblique* (Sample 207-1258A-14-CC). **5.** *Dictyocha bachmanni* (focused on the apical structure) (Sample 207-1258A-16R-CC). **6.** *Corbisema bimucronata* (variety with blunt corners and no spines) (Sample 207-1257B-7X-CC). **7.** *Dictyocha spinosa* (Sample 207-1258A-4R-CC).