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15. Data Report: *Botryococcus* Colonies in Miocene Sediments in the Western Woodlark Basin, Southwest Pacific (ODP Leg 180)[1]

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ABSTRACT

Miocene sediments interpreted during Leg 180 as continental and transitional facies have been analyzed for palynologic contents and found to contain algal colonies of *Botryococcus* cf. *braunii* Kützing.

INTRODUCTION

Eleven sites were studied during Leg 180 in the western Woodlark Basin (June–August 1998). Miocene sedimentary successions recovered at Sites 1109 and 1115 have been interpreted as continental deposits (Taylor, B., Huchon, P., Klaus, A., et al., 1999).

Nineteen samples were processed from these two sites to study the fossil microflora in the interpreted continental facies. Two samples belonging to sandy and sandy-silty horizons (Samples 180-1115C-30R-5, 31–34 cm, and 180-1115C-31R-1, 4–6 cm) contain algal colonies of *Botryococcus* cf. *braunii* Kützing.

MATERIALS AND METHODS

Representative samples of continental and transition facies from Holes 1109D and 1115C (Table T1) were processed following standard palynological preparation techniques. The residue was rinsed on 16-µm filter cloth and then mounted in glycerine jelly on microscope slides.

T1. Samples included in this study, p. 6.

[1]Testa, M., Gerbaudo, S., and Andri, E., 2001. Data report: *Botryococcus* colonies in Miocene sediments in the western Woodlark Basin, southwest Pacific (ODP Leg 180). *In* Huchon, P., Taylor, B., and Klaus, A. (Eds.), *Proc. ODP, Sci. Results,* 180, 1–6 [Online]. Available from World Wide Web: <http://www-odp.tamu.edu/publications/180_SR/VOLUME/CHAPTERS/172.PDF>. [Cited YYYY-MM-DD]
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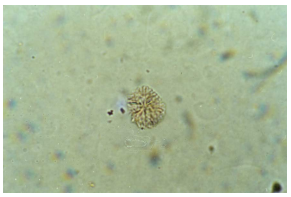
The analysis was carried out using both an optical microscope and scanning electron microscope.

MORPHOLOGY OF THE *BOTRYOCOCCUS* COLONIES

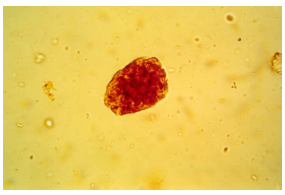
Under the light microscope, the microfossil colonies *B.* cf. *braunii* are yellow–yellow orange in color. Their shape is generally rounded to elliptical. The colonies appear rather small (~20–60 µm) and are usually not very well preserved. The typical structure of this algae consists of various cylindrical and ramified tubes that branch off of the colony center. In addition, the tubes show a gentle but distinctive increase in diameter near the distal endings, as already observed by Burns (1982) in samples of *B. braunii* Kützing (Fig. F1). We also observed some colonies with a fairly rectangular perimeter, which under strong magnification (800×) showed few but typical cells (autospores) with a diameter of 3–5 µm (Fig. F2).

Even though the preservation of the algal colonies is not perfect, they still have close morphological analogies with *B. braunii,* allowing us to refer to them as *B.* cf. *braunii* (Burns, 1982, fig. 6, p. 170, and figs. 14–16, p. 181; Batten and Grenfell, 1996, pl. 1, figs. 3, 10, 12, pl. 2, figs. 1, 2; H. Grenfell, pers. comm., 2000).

F1. Elliptical morphology in a colony of *B.* cf. *braunii* Kützing, p. 4.



F2. Various cells in a colony of *B.* cf. *braunii* Kützing, p. 5.



PALEOENVIRONMENTAL INFORMATION AND CONCLUSION

Present *Botryococcus* generally live in freshwater (swamps, ponds, and lakes) (Gray, 1960; Emberger, 1968; Tappan, 1980, Guy-Ohlson, 1992) even though forms tolerating brackish settings are known (Wake and Hillen, 1980; DeDeckker, 1988). Based on the analogy to present living forms, it is commonly accepted that fossil colonies of *Botryococcus* also indicate depositional settings affected by freshwater (Batten and Grenfell, 1996). Colonies of *Botryococcus* referable to *B.* cf. *braunii* Kützing are present in some sandy and sandy-silty sediments in Hole 1115C, which had previously been interpreted by Taylor, B., Huchon, P., Klaus, A., et al. (1999) as continental deposits.

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Wake, L.V., and Hillen, L.W., 1980. Study of a "bloom" of the oil-rich alga *Botryococcus braunii* in the Darwin River Reservoir. *Biotechnol. Bioeng.,* 22:1637–1656.

Figure F1. Colony of *Botryococcus* cf. *braunii* Kützing with elliptical morphology (26 µm × 31 µm) (800×). Various cylindrical and ramified tubes that branch off the colony center are shown (Sample 180-1115C-31R-1, 4–6 cm).

Figure F2. Colony of *Botryococcus* cf. *braunii* Kützing, 45 µm × 35 µm (800×). Various cells (autospores) are shown (Sample 180-1115C-30R-5, 31–34 cm).

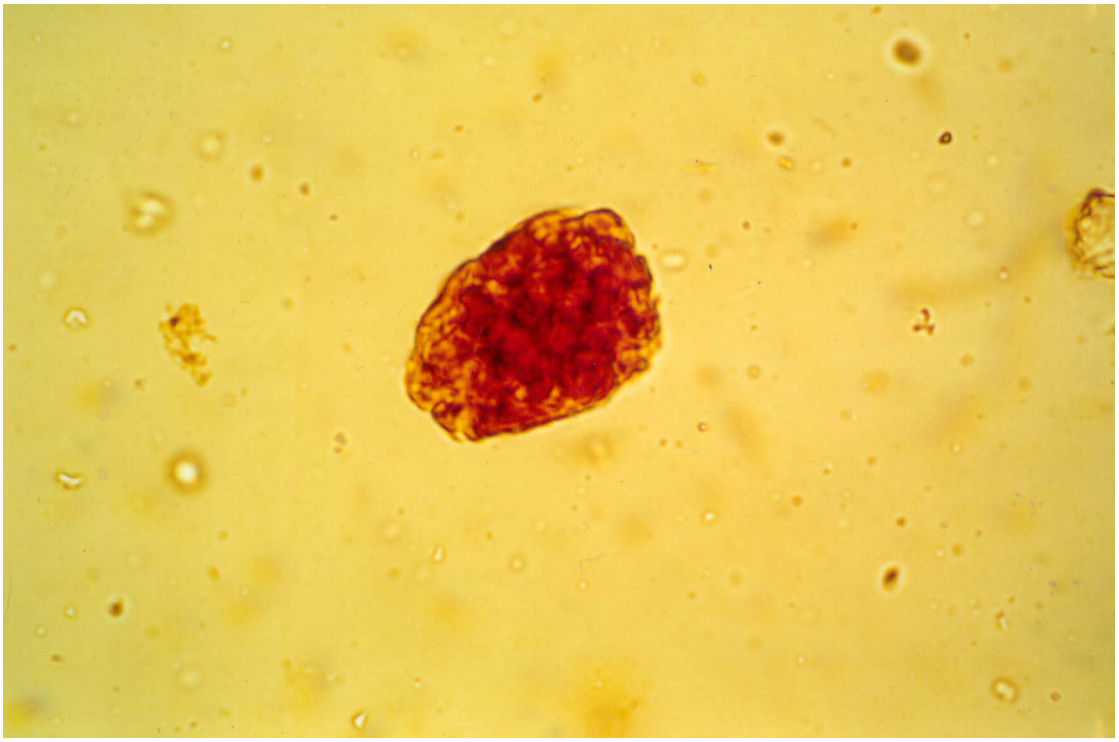

Table T1. Samples included in this study.

Core, section, interval (cm)	Depth (mbsf)
180-1109D-	
35R-4, 74.5–76.5	670.84
35R-5, 80.5–83	672.41
36R-5, 108–110	683.48
37R-2, 67–68	688.14
37R-5, 9–10	691.82
38R-4, 35–38	700.11
38R-5, 106–109	702.32
39R-2, 78–80	707.39
40R-3, 52–55	717.17
41R-3, 19–21	727.47
42R-2, 64–66	736.44
43R-3, 69–71	746.5
45R-2, 96–98	765.66
180-1115C-	
29R-1, 25–28	552.05
29R-3, 44–46	554.73
30R-2, 58–61	562.51
30R-5, 31–34	566.32
31R-1, 4–6	571.04
31R-1, 54–56	571.54