Exploring the life-cycle of Ceratolithus cristatus Kamptner

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Coccolithophores are characterised by a heteromorphic life-cycle that is composed of two morphologically distinct phases, one haploid and commonly holococcolith-producing, the other diploid and bearing heterococcoliths. The life-cycle association of *Ceratolithus cristatus* Kamptner, however, traditionally involves a heterococcolith-producing phase that occurs simultaneously with a nannolith-bearing phase, and it has been described as producing three different types of calcareous structures (Alcober & Jordan, 1997; Young et al., 1998). The nannolith-constructed phase of *C. cristatus* is represented by horseshoe-shaped ceratoliths, whereas the heterococcolith-bearing phase is associated with either hoop-shaped interlocking heterococcoliths or overlapping planolith-type heterococcoliths that bear a central opening surrounded by a collar.

During IODP Expedition 359, several plankton samples were acquired from the Maldives surface waters, most of which were subsequently studied via SEM. Two samples, Plkt-38 and Plkt-45, which were retrieved on the 20th and 24th of November, 2015, respectively, revealed the existence of several *C. cristatus* combination coccospheres, two of which bore all three morphologically distinct coccolith types – horseshoe-shaped *C. cristatus* var. *telesmus* ceratoliths, delicate hoop-shaped coccoliths and circular *Neosphaera coccolithomorpha* var. *coccolithomorpha* Lecal-Schlauder planoliths. These findings, combined with similar observations of different *Ceratolithus* morphotypes from the Canary Islands (Sprengel & Young, 2000) and the NW Mediterranean Sea (Cros & Fortuño, 2002), provide further evidence to associate the *C. cristatus* HET *nishidae* and the *C. cristatus* HET *coccolithomorpha* forms with, respectively, *rostratus*-type and *telesmus*/*cristatus*-type ceratoliths. This allows a simplification of the taxonomic terminology for these forms. We also discuss the potential role of hoop-shaped coccoliths in the *Ceratolithus* life-cycle and the role of the hoops in its biomineralisation process.

References

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