

Reproductive biology of the deep-sea octocoral *Drifa glomerata* in the Northwest Atlantic

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Abstract The present study examined the mode and timing of reproduction of poorly understood deep-water octocorals and the environmental factors that may influence their reproductive patterns. Data on reproductive characteristics of the octocoral *Drifa glomerata* (Alcyonacea: Nephtheidae) collected between 2004 and 2007 at ca. 100–330 m depth off Newfoundland and Labrador (eastern Canada) were compared among years, months and depth ranges. No male gonad was ever observed during the study. The ratio of fertile colonies possessing large pinkish polyps with oocytes/planulae was >50% throughout the year. The number of brooded planula larvae within a single fertile polyp varied between 1 and 10 for a total of approximately 40–3,000 in a whole colony. The size of oocytes and/or planulae was consistently greater in the polyps than in the branchlets, indicating that the development pathway of oocytes to planulae is from the branchlets to the polyps. Although larval production seemed to persist year round,

the onset of major planulation events occurred in December–January of two consecutive years, when large mature planulae were released in correlation with the first increase of photoperiod and maximum temperature at 150 m. A second peak in planulation between April and early June followed the phytoplankton bloom. Seasonal trends were more apparent in colonies from <200 m, and the planula index varied among sampling depths and years. Larval release in a live colony under laboratory conditions occurred between January and June 2008, closely following predictions based on field samples.

Introduction

Deep-sea corals are important components of marine ecosystems because of their contribution to the maintenance of biodiversity. They provide crucial habitats for fish and other marine organisms such as sponges, echinoderms and crustaceans (Buhl-Mortensen and Mortensen 2005; Costello et al. 2005). They are usually long-lived, but extremely slow-growing (Sherwood and Edinger 2009) and susceptible to physical disturbance (Hall-Spencer et al. 2002; Freiwald et al. 2004; Mortensen and Buhl-Mortensen 2005). With the development of new equipment and technologies, opportunities are increasing to study their distribution, biology and vulnerability (Freiwald et al. 2004; Gass and Willison 2005; Guinotte et al. 2006; Wareham and Edinger 2007).

Research on the reproductive biology of deep-sea corals has mainly focused on scleractinians (Brooke and Young 2003; Waller 2005; Waller and Tyler 2005; Waller et al. 2005, 2008; Flint et al. 2007), and much less attention has been given to the reproduction of alcyonaceans (soft corals) and other octocorals (Eckelbarger et al. 1998;

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