

Reef sites

Ranges of obligate coral-dwelling crabs extend northward as their hosts move north



Fig. 1 One of the northernmost *Acropora solitaryensis* colonies at Tateyama, Japan

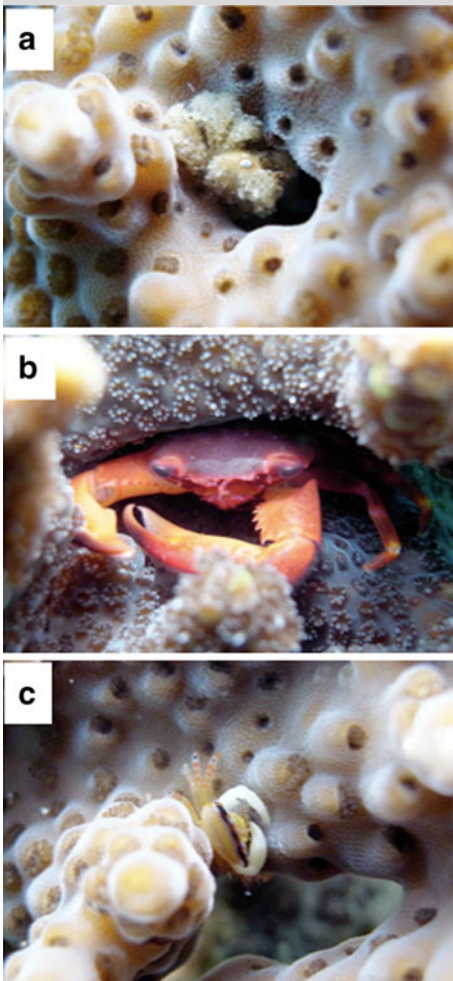


Fig. 2 Obligate coral-dwelling crabs associated with the northernmost *Acropora solitaryensis* colonies. **a** *Cymo melanodactylus*, **b** *Trapezia cymodoce*, and **c** Tetraliidae sp.

Recent sea-surface temperature warming may allow poleward range expansions of warm-water coral species into temperate areas. In Japan, *Acropora solitaryensis* Veron and Wallace, 1984 showed a poleward range expansion to Tateyama, on the southern tip of the Boso Peninsula (34°59'N and 139°47'E), based on the historical occurrence records and recent surveys (Yamano et al. 2011). The Boso Peninsula is located downstream of the Kuroshio warm current and is the northernmost known coral community in the Pacific, although it is located beyond the limit of the coral reef distribution (Shimoike 2004).

In July 2011, we observed five *A. solitaryensis* colonies on sedimentary rock substrate at water depths of ~12 m in Tateyama (Fig. 1). Four of the colonies served as hosts for obligate coral-dwelling crabs, *Cymo melanodactylus* Dana, 1852 (on one *A. solitaryensis* colony) (Fig. 2a), *Trapezia cymodoce* (Herbst, 1801) (on two colonies) (Fig. 2b), and Tetraliidae sp. (on one colony) (Fig. 2c). These were the northernmost records for *A. solitaryensis* and its associates *C. melanodactylus* and *T. cymodoce* in their distribution ranges (Minemizu 2000). The radius of *A. solitaryensis* colonies ranged from 6 to 15 cm, suggesting that settlement occurred several years between 1994 and 2004, according to the published radius expansion rate (0.9 cm/year; Yamano et al. 2011). Our observations suggest rapid establishment by crab symbionts after warm-water coral settlement, which may lead to changes in biodiversity in temperate areas during global warming.

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