CRUSTACEAN RESEARCH, NO. 37: 26–34, 2008

Reproduction and embryonic diapause in the hermit crab *Pagurus nigrofascia*

Shinji Mishima and Yasuhisa Henmi

***Abstract.*—Vertical distribution and reproductive biology of the hermit crab *Pagurus nigrofascia* were researched from March 2003 to February 2005 along an intertidal boulder shore in Fukuoka, a warm temperate region of Japan. In the spring, *P. nigrofascia* was widely distributed throughout the intertidal area but moved to the upper intertidal area in the summer and to the middle intertidal area in the autumn. In the winter, most crabs were found in the lower intertidal area, as many had moved into the subtidal area. Most females produced a brood in March and released larvae in December after an extremely long incubation period of 9 months. From March to October, the embryos were in diapause, and the eggs were completely filled with yolk. In November, all embryos began to develop, and most broods hatched in December. New recruits appeared in March and April and grew slowly. These reproductive characteristics of *P. nigrofascia* were similar to those observed in a previous study in Hakodate, a cold temperate region of Japan. However, in Fukuoka, brood production and larval release occurred approximately 2 months earlier and females exhibited higher fecundity than in Hakodate.**

Introduction

Pagurus nigrofascia Komai, 1996, is an intertidal hermit crab that has been collected from only a few localities along the coast of Japan. The northern and southern limits of this specie s are Hakodate (type locality) and Amakusa, respectively. Goshima *et al.* (1996) examined the reproductive biology of *P. nigrofascia* in Hakodate, a cold temperate region of Japan, and reported that this species usually produces a brood in May, but the eggs do not show clear development until November. After an embryonic diapause of 6–7 months, the eggs began to develop and hatched the following February; therefore, *P. nigrofascia* populations in Hakodate exhibited a long ovigerous period of approximately 9 months.

Pagurus is a major genus of hermit crabs that includes at least 147 species (McLaughlin *et al.*, 1993). However, diapause has not been reported for any developmental stages (embryonic, larval, or imaginal) in the genus, with the exceptions of *P. nigrofascia* and likely *P. alatus* (Mura *et al.*, 2006). Diapause in crustaceans has primarily been reported for inland water species, and its adaptive significance is either unknown or varies by species or developmental stage (Alekseev & Starobogatov, 1996).

In some *Pagurus* species, the geographical variation in reproductive traits is quite remarkable (Wada *et al.*, 2005). The reproductive characteristics of *P. nigrofascia* in other habitats may differ from those observed in Hakodate (Goshima *et al.*, 1996). In this report, we describe the reproductive characteristics and seasonal migration of *P. nigrofascia* in Fukuoka, a warm temperate region of Japan, and compare our results with those from Hakodate. In addition, we discuss the significance of embryonic diapause in *P. nigrofascia*.