EVIDENCE OF ACTUAL COPULATION IN THE BURROW IN THE FIDDLER CRAB, *UCA LACTEA* (DE HAAN, 1835) (DECAPODA, BRACHYURA, OCYPOLIDAE)

BY

TAKAO YAMAGUCHI
Aitsu Marine Biological Station, Matsushima-cho, Amakusa-gun, Kumamoto 861-6102, Japan

ABSTRACT

A total of 205 *Uca lactea* females, which were reared in the laboratory for more than two months without the presence of males, were used to determine if crabs copulate in males’ burrows. The females were released in the field and were enticed by courting males into their burrows. Pairs in the burrows were caught after 24 minutes or more. The occurrence of copulation in males’ burrows was proven by the presence of spermatophores in the vagina. About 60% of the females were inseminated two hours after staying in males’ burrows.

RÉSUMÉ

Un total de 205 *Uca lactea* femelles, élevées en laboratoire pendant plus de deux mois sans la présence de mâles, ont été utilisées pour déterminer si les crabes copulent dans les terriers des mâles. Les femelles ont été relachées sur le terrain et ont été entrainées par les mâles dans leurs terriers. Les couples dans les terriers ont été capturés après 24 minutes ou plus. La copulation dans les terriers a été prouvée par la présence de spermatophores dans les vagins. Environ 60% des femelles ont été inséminées deux heures après être restées dans les terriers des mâles.

INTRODUCTION

Numerous papers have been published on the mating system of the fiddler crabs (Christy & Salmon, 1984; Christy, 1987; Goshima & Murai, 1988; Salmon & Zucker, 1987; Goshima et al., 1996). I reported earlier that *Uca lactea* (De Haan, 1835) copulates following two different kinds of courtship: on the surface and underground. In surface copulation the mating pair copulates at the burrow of the courted female while in underground copulation the pair copulates in the burrow of the courting male (Yamaguchi, 1971). It is not difficult to observe surface copulation. The courting male walks directly to a nearby feeding female. The courted female runs into her burrow into which the male inserts the tips of the walking legs of either side. Stimulated by the vibrating walking legs, the female
comes out. The male further stimulates the female by plucking her carapace with his minor cheliped, after which the crabs copulate for three to four minutes. The large cheliped of the male plays no special role in surface copulation. Even males which have lost their large chelipeds copulate without difficulty. In underground copulation, the courting male stands near the entrance of his burrow and waits for wandering females to come near. Females which have fully ripened ovaries abandon their burrows, wander and respond to counting males. Males actively direct claw waving toward females. When a wandering female comes close to a courting male, the male runs into its burrow. Usually the courted female follows the male, and enters the burrow; however, it comes up within several seconds and enters the burrow of another courting male. The female thus enters and leaves the burrows of ten or more males before she finally stays in a male's burrow. The male plugs the burrow in 5 to 30 minutes and the pair stays together in the burrow for a few days (Goshima & Murai, 1988). In many species of fiddler crabs of genus *Uca*, the two kinds of courtship have been recognized (Crane, 1975). However, it was not confirmed that the pair actually copulated in the burrow, as it was impossible to observe the behaviour of the crabs underground. Attempts to observe crabs in burrows in aquaria were not successful either. So far I surmised that crabs copulate in the burrow because of the special enticing behaviour of courting males and the presence of both male and female in the burrow. To analyze the sexual behaviour of the fiddler crabs in more detail, crab behaviour in the burrow should be examined (cf. Yamaguchi, 1971).

Goshima & Murai (1988) reported the pair of crabs to stay in the burrow for a few days until the female spawns; they assumed that the pair copulates underground. Underground pairs separate soon after an ebb tide when the male emerges and is followed by the ovigerous female. the male then abandons its burrow and seeks a new one. The female closes his burrow and incubates her clutch. This observation by Goshima & Murai (1988) strongly suggests that the pair of crabs copulates in the burrow, however, direct evidence was lacking.

**STUDY AREA AND METHODS**

All observations and tests were carried out at an intertidal sand and mud flat of the Nagaura Islands, Amakusa, Japan, located at 4 km from the Aitsu Marine Biological Station. Tests were carried out on 9 and 22 July, 3, 4, 6, 7, 9, 11 and 23 August 1984; 14, 16 and 31 July, 13, 14, 15 and 16 August 1985; and on 11 and 17 July 1986. All females used in the tests were reared without males in the laboratory for periods of two months to more than one year. They were caught at Nagaura Island and put in plastic containers 45 cm wide × 60 cm long