



Freshwater Bryozoa of Okinawa, Japan, with descriptions of *Rumarcanela* gen. nov. (Phylactolaemata: Plumatellidae) and two new species

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Abstract

We identified nine species of phylactolaemate bryozoans collected from ponds and dams on Okinawa Island, Japan. This is the first report on freshwater bryozoans from Okinawa and includes the first record of *Plumatella javanica* from Japan. Phylactolaemate species were identified on the basis of colony and statoblast morphology and are illustrated by light microscopy and scanning electron microscopy (SEM). We detected two new plumatellid species that, like *Plumatella minuta* and *Plumatella vorstmani*, have a transparent, weakly chitinized colony and hypertubercles on the floatoblast fenestra. A previous molecular study showed these four species to form a clade separate from *Plumatella* and *Hyalinella*. We here establish the new genus *Rumarcanela* to accommodate these species and describe *Rumarcanela gusuku* n. sp. and *R. yanbaruensis* n. sp. We discuss the dispersal of bryozoans to and from Japan by birds carrying statoblasts and provide a key to the Phylactolaemata of Japan.

Key words: Freshwater Bryozoa, new species, Okinawa, Phylactolaemata, Plumatellidae, *Rumarcanela gusuku*, *Rumarcanela yanbaruensis*, *Rumarcanela minuta*, *Rumarcanela vorstmani*

Introduction

The bryozoan class Phylactolaemata comprises only species inhabiting fresh water. Plumatellidae, the largest phylactolaemate family, contains about 55 species worldwide. To date, 24 plumatellid species in six genera have been reported from southern and southeastern Asia, 10 species in two genera from Europe, 15 species in three genera from North America, and 11 species in three genera from Japan. The most speciose plumatellid genus is *Plumatella*, with about 40 species. Their colonies are reportedly well chitinized and partially adherent, show dichotomous antler-like branching or form a fused mass, and produce both sessoblasts and floatoblasts as dormant bodies. *Hyalinella*, a genus closely related to *Plumatella*, currently contains only two species (Wood *et al.* 2006). Their colonies are thick and transparent, with less profuse branching than in *Plumatella*; individual zooids are indistinct, usually arranged linearly, and lack interzooidal septa; and colonies produce only floatoblasts. Species of the East-Asian genus *Gelatinella* have characters intermediate between *Hyalinella* and *Plumatella*; colonies are thick and gelatinous rather than heavily chitinized and produce only sessoblasts.

In fact, characters distinguishing *Hyalinella* from *Plumatella* are not clear-cut, a problem referred to by various authors as the “*Hyalinella* problem” (Toriumi 1956b, 1972; Bushnell 1965b, c; Lacourt 1968, 1975; Wiebach 1973; Ricciardi & Wood 1992; Mukai 1999). This problem arises partly because the diagnosis of *Hyalinella* is based on the transparency and thickness of the colony wall (ectocyst), but the condition of the ectocyst depends to some extent on environmental factors; for example, it tends to be heavier in sheltered waters with a heavy suspension of sediment (Wood & Okamura 2005). Several species originally assigned to *Hyalinella* have been transferred to *Plumatella* (Lacourt 1968; Wiebach 1973; Ricciardi & Wood 1992; Wood *et al.* 2006). Discussions of the relationship between *Plumatella* and *Hyalinella* (Lacourt 1968; Wiebach 1973) have focused mainly on characters of the ectocyst, and the generic placement of some species has remained unstable.

In 2005–2007, the first author collected phylactolaemate bryozoans on Okinawa Island (hereafter referred to as ‘Okinawa’) in the Japanese subtropics. This island had been poorly studied; despite a long history of phylactolae-