DISTRIBUTION OF FRESHWATER BRYOZOANS IN IBARAKI PREFECTURE, CENTRAL JAPAN, WITH REFERENCE TO WATER QUALITY

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Sixteen species of freshwater bryozoans, including 14 phylactolaemates and 2 gymnolaemates, have been previously reported in the literature as occurring in Japan. A distributional survey of freshwater bryozoans was recently conducted in freshwater habitats in Ibaraki Prefecture; eleven phylactolaemates (*Fredericella sultana*, *Plumatella fruticosa*, *P. vorstmani*, *P. emarginata*, *P. casmiana*, *P. repens*, *Stephanella hina*, *Hyalinella minuta*, *Lophopodella carteri*, *Asajirella gelatinosa*, *Pectinatella magnifica*) and one gymnolaemate (*Paludicella articulata*) were identified on the basis of characteristics of colonies and statoblasts. Some species, especially *P. magnifica*, *P. emarginata*, and *P. repens*, were found at many of the sites investigated. In contrast, some species, such as *F. sultana*, *S. hina*, *H. minuta*, *L. carteri*, and *A. gelatinosa*, were found in only a few localities. In addition to distributional information, some relationships between the habitats of freshwater bryozoans and certain aspects of water quality are reported and discussed in this study.

TWO NEW FAMILIES OF SUBTERRANEAN AMPHIPODS (CRUSTACEA) FROM JAPAN

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We collected three interesting subterranean amphipods, *Eoniphargus kojimai* Ueno, 1955 and two undescribed species, sp. 1 and 2, which are close to *E. kojimai*. *E. kojimai* and sp. 2 were collected sympatrically from Shizuoka; sp. 1 and 2 were sympatric in Wakayama; and only sp. 1 was found at Tokushima. *E. kojimai* was originally assigned in Gammaridae and later transferred to an unnamed family by Barnard & Barnard (1983). After detailed morphological examination, we came to the surprising conclusion that a new family should be erected for *E. kojimai* and sp. 1, and another new family for sp. 2. We are working to construct a molecular phylogeny of 14 species in 7 families, including these three species, by using the nucleotide sequences of a part of the 28S rRNA gene.

THE OCCURRENCE PATTERN OF DICYEMID MESOZOANS (PHYLUM DICYEMIDA) IN *AMPHIOCTOPUS FANGSIAO*

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The renal sacs of 507 individuals of *Amphioctopus fangsiao* were examined to study the occurrence pattern of dicyemid mesozoans. Five dicyemid species, *Dicyema colurum*, *D. erythrum*, and three undescribed species, were found in 506 individuals of *A. fangsiao*. Several variations in occurrence patterns of dicyemid species were present in each octopus individual or in each side of renal sacs. All five species were never simultaneously present in a single octopus individual. From one to four dicyemid species were present in a single octopus individual. However, all four dicyemid species did not co-occur in a single renal sac. In two octopus individuals, only the right side of renal sac harbored a single dicyemid species. In 40 (8%) octopus individuals, different dicyemid species were found in each side of renal sac. There were 14 occurrence patterns of dicyemid species. In contrast, the same dicyemid species were present in both renal organs of 466 (92.1%) octopus individuals, in which 438 individuals harbor a single dicyemid species, *D. erythrum* or *D.* sp. B. In *A. fangsiao* 46 host individuals harbored more than single dicyemid species in a single renal organ.

IDENTIFICATION OF ASTACIN-LIKE SQUID METALLOPROTEASE IN CUTTLEFISH, *SEPIA ESCULENTA*

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Squids that belong to Cephalopoda can be further classified into Sepiida and Teuthida. We have reported that the textures and rheological properties of processing gels made from the mantle muscle of cuttlefish are greatly different from the gel proterties of Japanese common squid. Astacin-like squid metalloproteinase (ALSM) was originally isolated from mantle muscle of Japanese common squid and hydrolyzed myosin heavy chain with high specificity. Myosin is a major constituent of mantle muscle; therefore, we considered that the difference of hydrolysis level of myosin, which is induced by the change in distribution of ALSM isoform and/or in their activity, alters the properties of gels. Three isoforms of ALSM were purified and its cDNA clones were isolated from Teuthida; however, whether the Sepiida has ALSM remains to be elucidated. In the present study, we examined the presence of ALSMs in cuttlefish by Western blot and isolated two cDNA clones. Both isoforms were expressed in the liver and distributed in digestive organs, but not in mantle muscle. Thus, absence of ALSM from mantle muscles, which is distinct from Japanese common squid, seems to affect the properties of gels.

COMPARATIVE MORPHOLOGY OF MALE REPRODUCTIVE SYSTEM OF CEPHALOPOD MOLLUSKS

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For a long time the classification and interrelationships among cephalopod mollusks had been uncertain because of their complicated and advanced anatomy and absence of well-preserved skeletal system. One of the most progressive principles in cephalopod classification is based on the structure of their reproductive system. To date general features of the reproductive system in this group was described for octopuses and squids. However, it was difficult to observe the structure of the reproductive system of cuttlefish especially in the last stage because the degradation of testis and spermatophore sac occurred just after copulation. In the present work we investigated the fine structure of testis, spermatophore sac, and spermatophores of the male cuttlefish Sepiella japonica. We also investigated the structure of the layers of spermatophore coats and fine structure of the separate parts of spermatophore, including head of spermatophore, ejaculatory tube, cement body and seminal reservoir, using microscopy. We compared the reproductive system among octopuses, squids and cuttlefishes and made a suggestion about interrelationships among coleoid cephalopods.

LAND MOLLSUCAN FAUNA OF IRIOMOTE ISLAND

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Only forty-five species of land molluscs have been reported from two subtropical islands, Ishigaki and Iriomote Islands. However, no species of the genus *Chamalycaeus* has been reported from Ishigaki and Iriomote Islands. Thorough our field survey of land molluscs at Iriomote Island in May 2005, an undescribed species of the genus *Chamalycaeus* is discovered. This species is morphologically very similar to *Chamalycaeus okinawaensis* collected from Okinawa Main Island and *Chamalycaeus purus* is distributed in Amami-ohshima, but the size of shell is the largest. On the basis of these features, I will discuss biogeographical features of Iriomote Island.

MORPHOLOGY AND ECOLOGY OF UPOGEBIA INHABITING THE SANDSTONES OF THE INTERTIDAL ZONE IN IRIOMOTE ISLAND, RYUKYUS, JAPAN

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We found 5 species of *Upogebia* from the stones in Iriomote Island, Okinawa Prefecture, Japan. Three of five species are new species, and the other species, e.g. *Upogebia snelliusi* and *U. foresti* are the first record in Japan. These *Upogebia* made a burrow exceeded 20 cm deep in the stone, and their burrows were Y-shaped with chambers and small branches. In mud shrimp, genital openings were usually found only on the coxa of the 5th pereiopod (type 1 male) and on the coxa of the 3rd pereiopod (female). However, in some *U. snelliusi* and *U. foresti*, genital openings were found on the coxae of both the 3rd and 5th pereipopods (type 2 male). The number of type 2 male was the same as the female, and the ratio of type 2 male was constant at about 50% through a year. On the other hand, the number of type 1 male was very few and their size was less than 5mm. It was suggested that the male of *U. snelliusi* and *U. foresti* normally have genital openings on both the 3rd and 5th pereiopod. Immature male of these species may have genital openings only on the 5th pereiopod, then they get to have them on the 3rd pereiopod after maturation.

VISUALIZATION OF BACTERIOCYTES IN THE TROPHOSOME OF THE BEARD WORM, *OLIGOBRACHIA MASHIKOI*

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Beard worms inhabit originally abyssal seas or cold seas in the world. In the Tsukumo Bay in Noto Peninsula protruded into the Sea of Japan, we have one species of beard worms, *Oligobrachia mashikoi*, in spite that this area is a shallow and warm bay. Beard worms harbor chemosynthetic bacteria in their somatic cells which are called bacteriocytes, since they lack a mouth and a digestive tract. Bacteriocytes are distributed complicatedly in the posterior parts of the body, which is regarded as the trophosome. However, it is hard to look what shape does the group of bacteriocytes form in the trophosome. In the present study, we conducted a whole mount *in situ* hybridization method with a RNA probe which has a complementary sequence of bases composing 16SrRNA of the symbionts. As a result, it became clear that bacteriocytes have encircled a dorsal