

using scanning and transmission electron microscopes. The fertilized egg was adhesive type, have a single micropyle resembling the pathway of sperm in the area of the animal pole. An outer surface of the fertilized egg envelope was arranged by adhesive structures irregularly. In section of fertilized egg envelope, the egg envelope consists of two layers, an outer adhesive twofold layer with mushroom-like cluster and an inner lamellae layer consisting of four layers. These ultrastructural characters of fertilized egg envelope from long nose barbel can be utilized in taxonomy of teleost.

C110

한국산 누치속 (*Hemibarbus*) 3종 어류의 골격의 형태적 특징 I. 두부골격

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한국산 누치속 어류 3종인 누치 (*H. labeo*), 참마자 (*H. longirostris*), 그리고 어름치 (*H. mylodon*)의 두부골격의 형태적 특징을 조사했다. 두개골격의 형태, 봉합방식에서 3종간 서로 상당한 차이가 나타났는데, 이 중에서 특히 전사골, 전서골, 기저후두골의 형태와 좌우 액골과 노정골 사이의 봉합형태에서 매우 다르게 나타났다. 한편 내장골격 중 안위골의 제 1 안하골 (누골)의 형태, 또 이들과 측사골과의 관절부위, 그리고 제 4, 5 안하골의 감각관 구조, 현수골에서는 중 및 후익상골의 형태, 설궁부에서는 기설골의 형태, 간설골의 관절부위 등에서 종간 차이가 잘 나타나고 있었다. 악부의 전상악골 상단부 형태, 설궁부에서는 미설골의 형태, 인두치 등에서는 3종간 형태적으로 많은 차이를 나타내고 있었다.

C111

한국산 누치속 (*Hemibarbus*) 3종 어류의 골격의 형태적 특징 II. 척주 및 부속지 골격

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한국산 누치속 어류에는 누치 (*H. labeo*), 참마자 (*H. longirostris*), 어름치 (*H. mylodon*) 3종이 존재한다. 이들 어류의 척주와 부속지 골격에 대하여 종간 형태적 특징을 조사한 결과 제 1~4추골 (Centrum)이 소리를 듣는 구조로 변형된 Weberian apparatus에서 Transformator가 누치와 어름치는 짧았으나, 참마자는 길었다. 제 2 신경궁 (Neural arch 2)의 전단은 누치는 수직으로 뺨어 있으나, 참마자와 어름치는 타원형 모양을 하고 있었다. 제 4신경극 (Neural spine 4)에서 누치는 일직선으로 바늘 형태이나, 참마자와 어름치는 후면이 만입된 형태를 하고 있다. 절골 (claustrum)의 형태는 누치와 참마자는 주상골과 분리되었으나, 어름치는 주상골에 약간 들어간 형태를 하고 있었고, 삼입골은 3종이 모두 다른 형태를 보여주고 있었다. 제 8추골의 전관절돌기 (Prezygopophys)가 누치는 짧으나, 참마자와 어름치는 길었다. 미부골격에 있어서 부미축골과 추체와의 관절형태에서 누치는 부동관절의 비유착된 상태를 보이고 있으나, 참마자와 어름치는 추체에 유착된 것으로 나타났다. 한편, 등지느러미 근담기골의 전돌기가 누치와 참마자는 가늘고 긴데 비해, 어름치는 둥글고 넓었다. 견대에서는 누치와 어름치의 오혜골공에 비해 참마자의 오혜골공이 작았고, 요대에서는 3개의 사출골 중 2개의 사출골의 결합 상태가 서로 다르게 나타나고 있었다.

C112

Functional Morphology of the Gills in Clam, *Ruditapes philippinarum*

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The fine structure and its functional characteristics of the gills in the clam, *Ruditapes philippinarum* are studied with light and electron microscopes. The gills of *R. philippinarum* are composed of two pairs of

branchial lamellae. Each branchial lamella has functional unit of the branchial gills, the gill filaments. The branchial lamella is consist of about 25 - 30 filaments. The width of each filament is approximately 28 mm, and has longitudinally oriented folds along its surface. The gill receives hemolymph from the artery and supplies all the filament. The passage of hemolymph is hemolymphatic canal in the central region of the filament and the water flows between these filaments. The epidermis of filament is made of columnar and squamous epithelial cells. Each epithelial cell has numerous mitochondria, microvilli and thin longitudinal rows of cilia run along the filament.

C113

Fine Structural Analysis of the Hemocytes During the Molt in a Spider, *Araneus ventricosus*

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The functional modification of the spider hemocytes between the molt and intermolt period were investigated using cytochemical and fine structural observations. By the cytochemical methods of the hemocytic separation with the density of percoll gradients, the hemocytes of the spider *Araneus ventricosus* were classified into four main groups which were hyaline leucocytes, granulocytes, oenocytoids, and molting hemocytes (leberidocytes). The granulocytes were further divided into two subtypes according to the color variations of the Wright's-Giemsa stain; basophilic and acidophilic granulocytes. It has been observed that molting hemocytes which appeared only the molting period were oriented from the acidophilic granulocytes. This hemocytes appeared 2 to 4 days before molting and then reached the peak at just molting and 1-2 day after and disappeared

slowly 10 to 12 days later. The most characteristic feature of the molting hemocytes were cytoplasmic swellings by the ingestion of certain materials. Both of Sudan black B staining for lipids and the periodic acid-Schiff (PAS) staining for carbohydrates produced a negative result for the molting hemocytes.

C114

Fine Structural Analysis of the Cell Death During the Tail Degeneration in the Tadpole, *Rana nigromaculata*

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Fine structural modification of the progressed cell death in the tail epithelium of the tadpole, *Rana nigromaculata*, were analysed using transmission electron microscope. The initial indication of the apoptosis was condensation of chromatin within the nuclear envelope, and nuclear breakdown and cytoplasmic condensation were followed. Subsequent cytoplasmic buddings of the apoptotic cell were produced by membrane-bounded cell fragments with relatively well preserved organelles. Another interesting findings were that of the appearance of lysosome-rich cell at the vicinity of apoptotic cells. This distinctive lysosome-rich cells were also a kind of cutaneous epidermal cells which constitute tadpole skin. Apparently, the processes of degradation and ingestion of the damaged apoptotic cells were accomplished by the aid of these cells. At early stage of the degradation, well preserved organelles and nuclear fragments can be identified in the cytoplasm of lysosome-rich cells, however they soon reduced to lysosomal residual bodies through the progressive degradation.

C115