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for the sea urchins. Sea urchin performances in parametres such as growth, survival, food conversion ratio (FCR), protein and energy use, gonad production, and gonad color were evaluated. Growth from spawning to commercial size (45 mm) on the seaweed diet took *ca* 36 months, FCR on a wet weight basis ranged between 5-7, and survival rates from settlement were 70-80%. Three months before harvest, prepared diets are introduced in order to improve raw growth. Nitrogen budget of the integrated system was evaluated as well.

CREATION ON-LINE ILLUSTRATION KEYS OF POLAR BRITTLESTARS WITH HELP WEBKEY-X SYSTEM.

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Possibilities, granted by computer technologies allow to use multientry polytomic keys, which essentially change the procedure of identification as qualitative (it is possible to use only some of available diagnostic characters in any combination), and quantitatively (it reduces time usually spent on identification with the help of traditional keys); interactive keys also allow to identify animals based on separate organs or without of some organs, carrying important diagnostic characters. It is supposed, that the created programs will not use algorithm of reduction of taxa set, but recalculation of probability of belonging to each taxon of an "image" of identified specimen based on accumulated steps. Such approach allows more precise identification even with user errors in a character state choice. Of special interest are the keys, which appeared last years, which use possibilities, granted by the Internet protocols. The monoentry keys are constructed easily by tools of the hypertext. Effective key can be constructed using only minimum set of tags of the HTML language. Such key can be supplement by Java-scripts and applets by very useful possibilities. Unfortunately, still attempts are limited to create the Internet multientry key working with the standard database, for example, through the interface CGI or ODBC. But fast development of tools of the global network, Internet creates new possibilities for new and interesting implementations of multientry keys essentially raising efficiency of diagnostics. It makes attempt to create webkey for arctic and antarctic brittlestars (http://www.zin.ru/projects/webkey-x/index.html).

EVOLUTION OF ECHINOIDS IN THE TRIASSIC AND EARLY JURASSIC: JUST HOW BIASED IS THE FOSSIL RECORD?

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The fossil record of echinoids is rich and well sampled from the Middle Jurassic onwards, but by this time many of the major modern groups of echinoid had evolved. The Lower Jurassic and Triassic record by contrast is sparse but contains taxa critical for understanding and dating the early diversification pattern. Molecular and morphological data on the 13 of the 14 orders generate congruent phylogenetic hypotheses allowing us to apply non-parametric molecular dating methods for comparison with fossil evidence. There is good overall congruence between the two dating methods, although there is also evidence that part of the earliest history of echinoid diversification is as yet unsampled. Several strong biases afflict the Triassic and Lower Jurassic marine rock record, which may account for this discrepancy.

The entire process of development from eggs to juveniles in the sea-star, *Coscinasterias acutispina* was observed. Mature ova are about 140μm in diameter. The first cleavage occurs 1.5 hours after insemination at 22°C. The embryos develop into a bipinnaria, through the wrinkled blastula stage, by total and equal cleavage. The bipinnaria has a 3rd coelomic pouch on the left side of the larval stomach. Twenty-four days after insemination, the bipinnaria becomes a brachiolaria. Eight days thereafter, the adult rudiment is formed on the posterior portion of the brachiolaria, and 5 hydrolobes are obvious in the rudiment. Thirty-seven days after insemination, the 6th hydrolobe is formed. Sixty-one days after insemination, the brachiolaria begins to metamorphose. Two days thereafter, their metamorphosis is completed. Newly metamorphosed juveniles have 6 arms, and 2 pairs of tube-feet exist in each arm. These juveniles have one anus and one hydropore on their interradial area. Nine months after metamorphosis, they still have 6 arms, and each arm bears 22 pairs of tube-feet. These observations show that *C. acutispina* undergoes indirect development as bipinnaria and brachiolaria, with 5 hydrolobes formed initially and the 6th hydrolobe appearing subsequently. Although Lawrence and Komatsu (1990) reported that the formation of supernumerary arms of species undergoing indirect development occurs after the completion of metamorphosis, newly metamorphosed juveniles have 6 arms. Therefore, this study suggests the need to elucidate the relationship between the time of supernumerary arm formation in multiarmed asteroids and their developmental type in detail.

74. SYMBIOTIC RELATION BETWEEN ANTARCTIC OPHIUROIDS OF GENUS *Ophiacantha*.

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Large percent of brooding species among Antarctic echinoderms and, in particular, among brittlestars, in comparison with echinoderms of Arctic Region and other regions of the World Ocean, attracts attention for very long time (Ludwig, 1904; Oestergren, 1912; Mortensen, 1920, etc.). Now approximately 30 species or nearly 30% of a total number of ophiuroids living in the Antarctic area are known. In samples collected by a scientific vessel "Islas Orcadas" (cruise 575, station 97, June 9, 1975, near S. Georgia) the specimens of two close ophiacanthid species were detected: *O. vivipara* Ljungman, 1870 (6-7 arms, brooding) and *O. pentactis* Mortensen, 1936 (5 arms, non-brooding). Six-armed juvenile has found in one bursa of the specimen of five-arm non-brooding species O. pentactis. Based on this find supposition was made about presence of juvenile symbiosis (probably parasitism) in Antarctic brittlestars of genus *Ophiacantha*. In 1999 G. Hendler with colleagues has described similar phenomenon for tropical ophiuroid species, and from different genera (Hendler et al., 1999). The authors of the article have named the phenomenon "babysitting" (in Russian: nursement (?), brooding) or brood parasitism. As juveniles of six-arm brooding species *O. vivipara* would penetrate in bursae of non-brooding species *O. pentactis*, I prefer to consider the given phenomenon as juvenile symbiosis or, probably, even juvenile parasitism. This proposition will help to solve many taxonomic problems of these two species which appear during long history of research of Antarctic brittlestar's fauna (Koehler, 1907; Mortensen, 1920, 1936, etc.). This work is supported by grant of the Smithsonian Institution and Project N11 of subprogram «Investigation of the Antarctic Region» of FAP «The World Ocean».