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To the Radula Morphology and Reproductive Anatomy of the Genus *Biwamelania* (Mollusca: Cerithioidea: Pleuroceridae: Semisulcospirinae)

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The group of *Semisulcospira* Boettger, 1886 species, endemic for Lake Biwa is considered to be contained within the genus group taxa *Biwamelania* Matsuoka et Nakamura, 1981. Nevertheless, Habe [1991] confirms the validity of both genera, some malacologists [Matsuoka & Nakamura, 1981; Watanabe & Nishino, 1995; Nishino & Watanabe, 2000 and others] considers *Biwamelania* a subgenus of *Semisulcospira*, while other ones [Higo & Goto, 1993] fail to distinguish *Biwamelania* from *Semisulcospira* at all.

To clarify the taxonomic status of *Biwamelania* a comparative study of the radula morphology and the reproductive anatomy of two species *B. decipiens* (Westerlund, 1883) and *B. multigranosa* (Boettger, 1886) from the Lake Biwa was undertaken. Specimens were assigned to species based on their adult and juvenile shell morphology by a comparison with pictures given by Watanabe & Nishino [1995]. To examine the external morphology of radula and pallial genital duct, ethanol fixed specimens, collected in Lake Biwa by Dr. Oleg Timoshkin and kept in the malacological collections of Zoological Institute, Russian Academy of Sciences, St. Petersburg, were dissected. To facilitate study of the structure and function of the different parts of genital duct, histological sections at 5-7 microns were prepared. Prepared sections were stained with hematoxylin and eosin and examined under a Nikon and Olympus microscopes.

The aphyllic male genital tract of *Biwamelania* is revealed to have a common structure within the Cerithioidea sensu Golikov & Starobogatov [1987]. The male pallial gonoduct of both studied species is represented by a U-shape organ in transverse section, functioning as a prostate, like that of other pleurocerids [Dazo, 1965; Houbriek, 1988; Prozorova, 1990 and others].

The pallial oviduct of *Biwamelania* like other Pleuroceridae representatives originates from prolonged folds, transformed to the medial and lateral laminae. Pallial oviduct of both studied species is found to consist of semen-accepting pallial pocket on medial lamina, and a brood pouch located on lateral lamina under the pocket. We did not find any special structures in the top of lateral lamina of the oviduct, described for *Semisulcospira libertina* (Gould, 1859) as "proximal portion of lateral lamina" by Nakano & Nishiwaki [1989].

Sections across the semen-accepting pallial pocket of the *Biwamelania* species demonstrate primarily a non-glandular structure of pallial pocket, consisting of connective and muscular tissues. Pallial pocket of studied species is found to be filled by disintegrated sperm. That organ functions to accept semen, aggregated in spermatophores. Besides pallial pocket, medial lamina in its extreme proximal part has other small pocket-like structure with oriented spermatozoa inside and consequently functioning as a seminal receptacle. Both studied species have seminal receptacle, disposed above pallial pocket. Species *B. decipiens* differs from *B. multigranosa* in shape of its seminal receptacle, having several long protrusions [Prozorova & Rasschepkina, in print].

Thus studied representatives of the *Biwamelania* differ from these of the *Semisulcospira* by absence of a special gland in proximal part of lateral laminae. It might be estimated as an argument for generic status of *Biwamelania*, inhabiting only the Lake Biwa drainage [Prozorova & Rasschepkina, in print].

Radulae of *B. decipiens* and *B. multigranosa*, studied using Scanning Electron Microscope, are found to be similar to those of other pleurocerids (fig. 1). In detail, radulae of studied species differ each from other in shape, size and number of denticles of their rachidian and lateral teeth (fig. 1). The rachidian of *B. decipiens* is triangular, with large central denticle, flanked by three

minor denticles on each side. Central cusp of the rachidian is longer nearly twice than minor cusps (fig. 1 A). Central cusp of the *B. multigranosa* rachidian tooth, flanked by four minor denticles, is longer more than twice in comparison with its minor denticles (fig. 1 B). Asymmetrical lateral teeth of studied species radulae differ mainly in shape of their largest cusp.

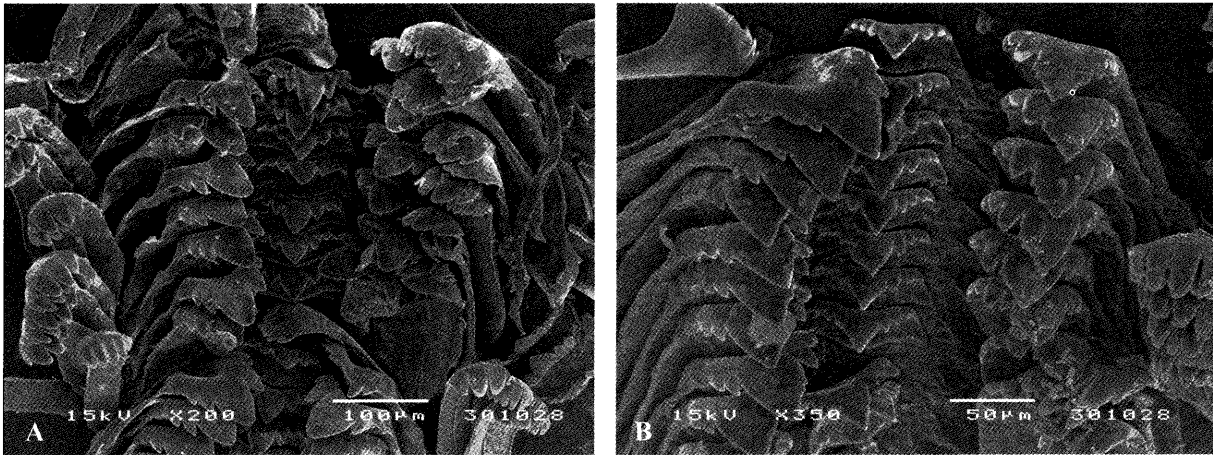


Figure 1. Radula segment of two endemic species of the genus *Biwamelania* from Lake Biwa: A – *B. decipiens* (Westerlund, 1883); B – *B. multigranosa* (Boettger, 1886).

That cusp in the *B. decipiens* radula is regular triangular, with rounded edge (fig. 1 A). The largest denticle of the *B. multigranosa* lateral tooth is irregular triangular in shape and having pointed edge (fig. 1 B). Both interior and exterior marginal teeth of studied species are very similar in shape (see fig. 1).

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References

- Dazo B.C., 1965. The morphology and natural history of *Pleurocera acuta* and *Goniobasis livescens* (Gastropoda: Cerithiacea: Pleuroceridae) // *Malacologia*. 3: 80.
- Golikov A.N. & Ya.I. Starobogatov, 1987. Systematics of the order Cerithiiformes and its position within the subclass Pectinibranchia. In: *Molluscs, Results and perspectives of investigation, Abstracts of Eighth meeting of the investigation of molluscs*. Leningrad "Nauka" 8: 23-28 (in Russian).
- Habe T., 1991. A catalogue of the non-marine freshwater mollusks of Japan // *The reports of the Tokyo Malacological Society* 55: 3-9.
- Higo S. & Yo Goto, 1993. *A Systematic List of Molluscan Shells from the Japanese Is. and the Adjacent Area*. Yuku, Osaka, 693 pp (in Japanese).
- Houbrick R.S., 1988. Cerithioidean phylogeny // *Malacological Review*. 4: 88-128.
- Matsuoka K. & T. Nakamura, 1981. Preliminary report of the freshwater molluscs from the Pleistocene Kataka Formation of the Kobiwako group in Shiga Prefecture, Japan // *Bulletin of Mizunami Fossil Museum* 8: 105-126.
- Nakano D. & S. Nishiwaki, 1989. Anatomical and histological studies on the reproductive system of *Semisulcospira libertina* (Prosobranchia: Pleuroceridae) // *Venus (Japanese Journal of Malacology)* 48(4): 263-273.
- Nishino M. & N.C. Watanabe, 2000. Evolution and Endemism in Lake Biwa, with Special Reference to its Gastropod Mollusc Fauna. In: Rossiter A. & H. Kawanabe (eds), *Ancient Lakes: Biodiversity, Ecology and Evolution*. Academic Press, San Diego, San Francisco, New York, Boston, London, Sydney, Tokyo 31: 151-180.
- Prozorova L.A., 1990. The reproductive biology of molluscs in family Pachychilidae (Gastropoda, Cerithiiformes) // *Zoologicheskij Zhurnal* 69: 24-37 (in Russian).
- Prozorova L.A. & A.V. Rasshepkina, (in print). Reproductive anatomy of the genera *Semisulcospira* and *Biwamelania* (Mollusca, Cerithioidea) from Lake Biwa // *Hydrobiologia*.
- Watanabe N.C. & M. Nishino, 1995. A study on taxonomy and distribution of the freshwater snail, genus *Semisulcospira* in Lake Biwa, with description of eight new species // *Lake Biwa Study Monograph*. № 6. 36 p.