

GENERIC AND SUBGENERIC DIVISION OF PILL CLAMS (GENUS *PISIDIUM* S.L.) ON THE BASE OF ANATOMICAL CHARACTERS

by

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Anatomical investigation of pill clams was initiated by N. Odhner, who presented the thorough descriptions of many european species (Odhner 1921; 1929 et al.). The most conspicuous anatomical characters, namely the number of demibranchs in ctenidium and the number of siphons, provided the base for subgeneric division, proposed by the mentioned author and developed then by J. Kuiper (1962). The groups of species, sharing some other anatomical characters (merging of the mantle, the mode of ovisac development) were distinguished later in each subgenus (Meier-Brook, 1970; 1986), but taxonomic status of these groups was not determined.

Investigation of pill clams, inhabiting the vast territory of the former USSR and represented in malacological collections of CIS countries provides enough material for the further development of their anatomical systematics. The revised system of the group has been published yet (Korniushin, 1992). However, it included the great number of "small species" distinguished by russian malacologists by means of the so-called "comparatorial method" (Shikov, Zatravkin, 1991). The later discussions with colleagues have shown, that the "small species" concept was not sufficiently argumented and cannot be recommended for general use. Thus, the task of elaborating the system, based on the traditional species concept, but involving all the new anatomical data, seems to be actual now. Here i present the first, preliminary version of such a system.

The following characters proved to have diagnostic value:

- presence of the branchial opening and the length of pre-siphonal mantle suture (Odhner, 1921; 1929);
- the number of siphonal retractors, number and arrangement of inner radial muscle bundles of the mantle edge (Korniushin, 1992a);
- dimensions and topographic position of the outer demibranch (Odhner, 1929);
- arrangement of the filament thickenings, from which the ovisac originates (Meier-Brook, 1970);
- the type of nephridium (closed one - dorsal lobe entirely covers the pericardial tube, open one - the tube is visible between the branches of the dorsal lobe) and proportions of the dorsal lobe (Odhner, 1929; Korniushin, 1992b).

Almost all species traditionally distinguished in the Palaearctic fauna have peculiar combinations of the mentioned characters and thus can be provided with clear anatomical diagnoses. In such groups of conchological distinct species as *Pisidium casertanum* - *P. personatum* and *P. henslowanum* - *P. supinum* - *P. lilljeborgi* - *P. waldeni*, anatomical discrimination is hindered by the considera-

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ble individual and populational variability. "Small species", established by Y. Starobogatov and his scholars, are identical in their anatomy (except some rare cases).

Anatomical investigation reveals evident affinities between species, especially within the largest subgenus designated in literature as *Cymatocyclos* Dall, 1903 (Zeissler, 1971) or *Cyclocalyx* Dall, 1903 (Burch, 1975). For example, the above-mentioned species of *P. henslowanum* group share alternation of the normal and thickened filaments in the ovisac (Odhner, 1929, Meier-Brook, 1970), weakness of the inner radial mantle muscles (Korniushin, 1992a) and open type of nephridium with square dorsal lobe (Korniushin, 1992b). *P. pulchellum* and *P. subtruncatum* both have the mantle with elongated pre-siphonal suture and strong anteriorly shifted muscle bundles, as well as closed nephridia with short and broad dorsal lobe (Odhner, 1929, Korniushin, 1992b). *P. nitidum* and *P. pseudosphaerium* also have elongated pre-siphonal suture, but the muscle bundles are weakened and evenly arranged along the mantle edge, nephridia are of the open type, with short dorsal lobe. At last, *P. casertanum*, *P. personatum* and *P. obtusale* are similar to each other in the structure of the mantle (short pre-siphonal suture, strong muscle bundles) and nephridium (closed type, square dorsal lobe).

Each of the described groups is quite distinct in the anatomical aspect. Almost all of them have synapomorphies, only the last one is based only on symplesiomorphies. Thus, there would be sufficient morphological and phylogenetic grounds to give them subgeneric rank. Respectively, the former large subgenus would become a genus, formally corresponding to *Euglesa* sensu Pirogov et Starobogatov, 1974, but having other taxonomic structure.

Status of the two species, *P. milium* and *P. hibernicum* is not clear. The former species is distinguished by very short pedal slit and concentrated mantle musculature, the latter - by peculiarities of the outer demibranch development and specific configuration of nephridium dorsal lobe. Affinities of these species with other taxa are not clear now, therefore they are regarded here as monotypic subgenera of the above-mentioned genus. However, after the further investigations their status may be changed.

While revising the remaining groups of *Pisidium* s. lato, one should take into account differences in the mode of ovisac development (Meier-Brook, 1970). This character differentiates *P. amnicum* from the other species of *Pisidium* s. str., at least from *Pisidium dilatatum* Westerlund (= *P. subtilestriatum* Lindholm).

Besides, the latter has evident descending lamella in the outer demibranch (contrary to all other *Pisidium* species). Therefore it should be included in another genus designated here as *Lacustrina* Sterki, 1916. Subgenera *Neopisidium* Odhner, 1921 (except *N. conventus*), *Odhneripisidium* Kuiper, 1921, *Afropisidium* Kuiper, 1962 are rather similar in anatomical aspect and may be united in one genus. According to the mode of ovisac development all the taxa observed here form two suprageneric groups: the one including genera *Pisidium* and *Neopisidium* and the other comprising *Lacustrina* and *Euglesa* (*P. conventus*) may be included in the latter one or regarded as a distinct genus). The status of these two groups

is not determined here, but each of the surely has a long way of independent evolution if not an independent origin.

All considerations presented above, resulted in the following system (only European species included).

Genus *Pisidium* C. Pfeiffer, 1821

- *P. amicum* (Müller, 1774)

Genus *Neopisidium* Odhner, 1921

Subgenus *Neopisidium* s. str.

- *Neopisidium* (*Neopisidium*) *moitessierianum* (Paladilhe, 1866)

Subgenus *Odhneripisidium* Kuiper, 1962

- *Neopisidium* (*Odhneripisidium*) *tenuilineatum* (Stelfox, 1918)

Subgenus *Afropisidium* Kuiper, 1962

Genus *Lacustrina* Sterki, 1916

- *Lacustrina dilatata* Westerlund, 1897
(syn. *Pisidium subtilestriatum* Lindholm, 1909)

Genus *Euglesa* Leach in Jenyns, 1832

Subgenus *Euglesa* s. str.

- *Euglesa* (*Euglesa*) *personata* (Malm, 1855)
- *Euglesa* (*Euglesa*) *casertana* (Poli, 1791)
- *Euglesa* (*Euglesa*) *rosea* (Scholtz, 1843)
- *Euglesa* (*Euglesa*) *obtusalis* (Lamarck, 1819)
- *Euglesa* (*Euglesa*) *hinzi* (Kuiper, 1975)

Subgenus *Henslowiana* Fagot, 1792

- *Euglesa* (*Henslowiana*) *henslowiana* (Sheppard, 1823)
- *Euglesa* (*Henslowiana*) *supina* (A. Schmidt, 1851)
- *Euglesa* (*Henslowiana*) *lilljeborgi* (Clessin, 1886)
- *Euglesa* (*Henslowiana*) *waldeni* (Kuiper, 1975)

Subgenus *Pseudeupera* Germain, 1913

- *Euglesa* (*Pseudeupera*) *subtruncata* (Malm, 1855)
- *Euglesa* (*Pseudeupera*) *pulchella* (Jenyns, 1832)

Subgenus *Cingulipisidium* Pirogov & Starobogatov, 1974

- *Euglesa* (*Cingulipisidium*) *nitida* (Jenyns, 1832)
- *Euglesa* (*Cingulipisidium*) *pseudosphaerium* (Schlesch, 1947)

Subgenus *Tetragonocyclas* Pirogov & Starobogatov, 1974

- *Euglesa* (*Tetragonocyclas*) *miliun* (Held, 1836)

Subgenus *Hiberneuglesa* Starobogatov in Dolgin, 1983

- *Euglesa* (*Hiberneuglesa*) *hibernica* (Westerlund, 1894)

Subgenus *Conventus* Pirogov & Starobogatov, 1974

- *Euglesa* (*Conventus*) *conventus* (Clessin, 1877)

Comments:

1. Applicability of the generic name *Lacustrina* Sterki to *Pisidium dilatatum* Westerlund should be chequed up by anatomical investigation of the type species *P. idahoense* Roper, 1890. Identity of *P. dilatatum* Westerlund and *P. subtilestriatum* Lindholm is confirmed by investigation of material stored in the collection of Zoölogical Institute (St. Petersburg, Russia).
2. Following the point of view developed by Pirogov and Starobogatov (1974) i accepted generic name *Euglesia* Leach in Jenys, 1832 as vald. However, i assume that nomenclatorial problems concerning this group are intricate and a special discussion on this matter is needed.
3. I consider *Pisidium roseum* Scholtz, 1832 a "good" species and include it in the genus *Euglesia*. It is well distinguished from *E. casertana* (Poli) by the large outer demibranch and some other characters. A special publication on this matter is in preparation.

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