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NOTES ON THE ANATOMY OF SOME SPECIES OF *SPHAERIUM* S. (MOLLUSCA, BIVALVIA) FROM THE TROPICAL REGIONS WITH REVISION OF THEIR TAXONOMIC STATUS

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Заметки об анатомии некоторых тропических видов *Sphaerium* s. (Mollusca, Bivalvia) с ревизией их таксономического статуса. Корништин А. В. — Изучена анатомия 6 видов тропических сфериид. Признаки нефридиев (относительно небольшой выделительный мешок и длинная воронка нефростомы) показывают принадлежность этих видов к роду *Musculium*. Выявлена также гетерогенность по признакам сифональной мускулатуры: африканские виды *M. hartmanni* (Jickeli) и *M. stuhlmanni* (Martens) имеют наиболее сильные верхние ретракторы выводных сифонов и сходны в этом отношении с североамериканским *M. transversum* (Say). Южноамериканские *M. aequatoriale* (Clessin) и *M. forbesi* (Philippi) и, особенно, эндемики озера Титикака *M. lauricochae* (Philippi) и *M. titiacense* (Pilsbry), характеризуются редукцией упомянутых ретракторов, проявляя сходство с австралийскими видами *Sphaerinova*. Пока неясно, является ли это сходство синапоморфией или параллелизмом. Предложено новое подродовое название *Afromusculium* взамен преоккупированного *Pseudopisidium* Korniushtin 1995, с типовым видом *Pisidium incomitatum* Kuiper, 1966 из Южной Африки. Предполагается, что род *Musculium* характеризуется космополитическим распространением, в то время как ареал *Sphaerium* s. str. ограничен Голарктикой.

Ключевые слова: Sphaeriidae, *Musculium*, анатомия, тропическая Африка, Южная Америка.

Notes on the Anatomy of Some Species of *Sphaerium* s. (Mollusca, Bivalvia) from the Tropical Regions with Revision of their Taxonomic Status. Korniushtin A. V. — Anatomical characters of 6 species of tropical sphaeriids are provided. Characters of nephridium (relatively small excretory sac and long funnel) show that these species belong to the genus *Musculium*. Heterogeneity in the characters of siphonal musculature is also demonstrated: the African *Musculium hartmanni* (Jickeli) and *M. stuhlmanni* (Mandahl-Barth) have the strongest upper retractors of branchial siphon, being similar to North American *M. transversum* (Say). In the South American *M. aequatoriale* (Clessin) and *M. forbesi* (Philippi) and especially in endemics of Lake Titicaca *M. lauricochae* (Philippi) and *M. titiacense* (Pilsbry) the retractors are reduced, which is a synapomorphy or parallelism with Australian *Sphaerinova*. *Afromusculium* nom. nov. pro *Pseudopisidium* Korniushtin 1995 is proposed for the South African subgenus with type species *M. incomitatum* (Kuiper) distinguished by rudimentary siphonal retractors. Cosmopolitan distribution is supposed for *Musculium*, contrary to *Sphaerium* s. str. peculiar to the Holarctic region.

Key words: Sphaeriidae, *Musculium*, anatomy, Tropical Africa, South America.

Introduction

The genus *Sphaerium* in its broad sense includes relatively large sphaeriid clams with central or nearly central umbones, 2 tubular siphons, 2-lamellar outer demibranch and multiplied brood pouches. Taxonomic heterogeneity of the *Sphaerium* species inhabiting Holarctic region was shown in many recent publications. The highly diversificated system proposed by Russian authors (Starobogatov & Streletskaia, 1967; Alimov & Starobogatov, 1968) was not accepted in the other countries, but generic status of at least one former subgenus of *Sphaerium*, namely *Musculium* Link, 1807, has been almost unanimously recognized since Heard (1977). According to the most recent reviewers (Hornbach, 1980; Mansur & Meier-Brook, 1992), *Musculium*

is distinguished from *Sphaerium* s. str. by many peculiarities of shell form and reproduction, by specific configuration of excretory organs (long narrow funnel of nephrostome and small excretory sac without internal valve), as well as by electrophoretic enzyme spectra. Most of the species are represented in the Palaearctic or Nearctic regions: *Musculium lacustre* (Müller), *M. partumeium* (Say), *M. securis* (Prime), and *M. transversum* (Say), but several species from the Southern hemisphere were also included here: *M. tasmanicum* (Tenison Woods) and *M. novaezelandiae* (Deshayes). Usually genera *Sphaerium* and *Musculium* are distinguished from *Pisidium* as a distinct subfamily Sphaeriinae (family Sphaeriidae). Some authors (Starobogatov & Streletskaya, 1967; Korniushev, 1996) consider Sphaeriidae and Pisidiidae as different families.

Taxonomic heterogeneity of *Musculium* as such was inferred by Alimov & Starobogatov (1968) from characters of ligament and siphonal muscle scars. Investigation of musculature confirmed the general idea of this division, but the problems of names and ranks of the relevant taxa are still unsolved (Korniushev, 1996).

Many species from various tropical countries are listed now in the genus *Sphaerium* s. lato (Mandahl-Barth, 1988; Kuiper, Hinz, 1984 et al.). They were not studied anatomically and their generic placement was not checked in the course of recent revisions. Thus, further investigation of tropical sphaeriids is necessary to define the species composition of *Sphaerium* s. str. and *Musculium*, outline the distribution of these genera and clarify intra- and intergeneric affinities.

Material and methods

Seven species and subspecies of *Sphaerium* s. lato distributed in tropical Africa and South America were available for this study. *Sphaerium hartmanni hartmanni* (Jickeli) from Sudan was represented at the malacological collection of Zoological Institute in Sankt-Petersburg (ZIN). The type lot of *S. h. bangweolicum* Haas was studied at Senckenberg Museum in Frankfurt/Main (SMF). The lots of *S. stuhlmanni* Martens from Lake Victoria as well as those of *S. lauricochae* (Philippi) and *S. titicacense* (Pilsbry) from Lake Titicaca were loaned from the Natural History Museum, London (NHML). The other 2 South American species, namely *S. aequatoriale* Clessin and *S. forbesi* (Philippi) were obtained from the Museum National d'Histoire Naturelle, Paris (MNHN) and collection of Claus Meier-Brook, Tübingen, Germany. Original identifications, whenever available, were checked by the author and some of them were corrected. Figures of shells and hinges are provided here in order to confirm identifications.

All the mentioned species were represented by the lots fixed in alcohol. Several (3 to 5) specimens from each lot were dissected. Nephridia were studied in situ; siphons with their musculature were withdrawn, stained by water eosine and mounted on slides in Canada Balsam. Gills were stained by Grenacher's carmine and mounted in the same manner. Anatomical terminology is provided according to Mansur & Meier-Brook (1992) and Korniushev (1996).

It is necessary to mention, that the genera *Sphaerium* and *Musculium* are understood here in the same way as by Heard (1977), and Mansur & Meier-Brook (1992). Any discussion on the further splitting of both genera seems to be premature.

Results

In the principal characters of the body plan, all studied species are similar to the Holarctic species of the subfamily Sphaeriinae (in the broad sense). They have 2 siphons: the upper one with a pair of retractors, the lower one with 2 pairs. The outer demibranch is rather developed (about 1/3 the height of the inner one) and has 2 more or less distinguishable lamellae. Several brood pouches develop in each gill simultaneously.

The other characters indicate that the species observed here belong to the genus *Musculium*. These are: thin and fragile shell, relatively narrow hinge plate, long funnel of nephridium and small excretory sac without internal valve. Anatomical peculiarities of each species are discussed below together with considerations on species affinities.

Musculium hartmanni hartmanni (Jickeli 1874) (Fig. 1)

Material: Sudan, White Nile below Bor, coll. 26 May 1964 by A. Monakov, ZIN, registered as *Sphaerium abissinicum*, ♂1-3.

Material was originally preserved in formalin, therefore its present condition is not good for anatomical work. However, some of the important characters are distinguishable. Nephridia are of the open type (pericardial portion visible between the branches of dorsal lobe) with elongated dorsal lobe; their internal structure was not studied. Siphonal retractors are long and strong, with their scars clearly separated

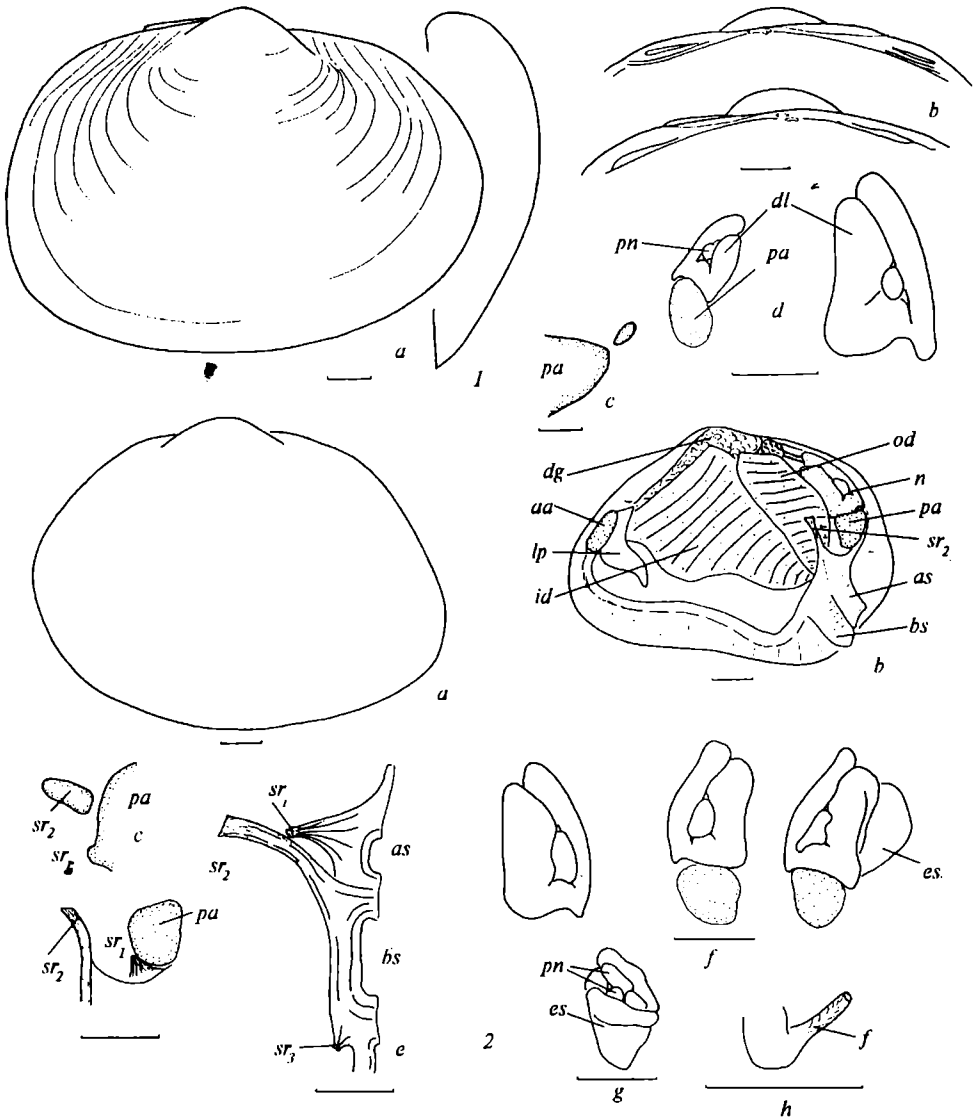


Рис. 1–2. Анатомия *Musculium hartmanni*. 1. *Musculium hartmanni hartmanni* из Судана, колл. ЗИН: а — правая створка латерально и фронтально; б — замок; с — задние мускульные отпечатки; d — нефридии дорсально. 2. *Musculium hartmanni bangweolicum*, паратипы, SMF: а — раковина (левая створка) латерально; б — анатомия; с — задние мускульные отпечатки; d — верхние сифональные ретракторы латерально; e — сифональные мускулы изнутри; f — нефридии дорсально; g — нефридий вентрально; h — воронка нефростомы; aa — передний аддуктор; as — анальный сифон; bs — бронхиальный сифон; dg — пищеварительная железа; dl — дорсальная лопасть нефридия; es — выделительный мешок; id — внутренняя полужабра; lp — лабиальные пальцы; n — нефридий; od — выделительный мешок; id — внутренняя полужабра; lp — лабиальные пальцы; n — нефридий; od — наружная полужабра; pa — задний аддуктор; pd — перикардиальный проток; sr1 — ретрактор анального сифона и его отпечаток; sr2 — верхний ретрактор бронхиального сифона и соответствующий отпечаток; sr3 — нижний ретрактор того же сифона. Масштабная линейка 1 мм.

Fig. 1–2. Anatomy of *Musculium hartmanni*. 1. *Musculium hartmanni hartmanni* from Sudan; ZIN: a — right valve laterally and frontally; b — hinge; c — posterior muscle scars; d — nephridia dorsally. 2. *Musculium hartmanni bangweolicum*; paratypes; SMF: a — shell (left valve) laterally; b — gross anatomy; c — posterior muscle scars; d — upper siphonal retractors laterally; e — siphonal muscles from the inner side; f — nephridia (dorsal view); g — nephridium ventrally; h — funnel of nephridium; aa — anterior adductor; as — anal siphon; bs — branchial siphon; dg — digestive gland; dl — dorsal lobe; es — excretory sac; id — inner demibranch; lp — labial palps; n — nephridium; od — outer demibranch; pa — posterior adductor; pn — pericardial portion of nephridium; sr1 — retractor of the anal siphon or its scar; sr2 — upper retractor of the branchial siphon or respective scar; sr3 — lower retractor of the branchial siphon. Scale bar 1 mm.

from those of posterior adductors (Fig. 1, c). The number of brood pouches in dissected specimens was 2 to 3, with 5 embryos each.

Musculium hartmanni bangweolicum (Haas, 1936) (Fig. 2)

Material: Paratypes: Lake Bangweulu, coll. in October 1931 by Haas, SMF 8789.

Some of the fixed animals have extended siphons; both siphons are of almost equal length and tubular shape. All siphonal muscles are well developed; especially long and strong are the upper retractors of branchial siphon, their scars lay apart from those of posterior adductors (Fig. 2, c).

Nephridia are of the open type, with elongated dorsal lobe. Size and shape of excretory sac is typical for *Musculium* (Fig. 2, g); internal valve absent. Funnel is long and narrow (Fig. 2, h).

Brood pouches were not studied.

Remarks. Both studied subspecies of *M. hartmanni* are similar in their narrow protruding umbone and narrow hinge plate, but can be distinguished by shell outline. Their close affinity is confirmed here by characters of siphonal musculature. Taking into account this affinity and clear generic characters of nephridium observed in *M. hartmanni bangweolicum*, one may suppose that the variety of forms distributed in the largest river systems of Africa and regarded by Mandahl-Barth as subspecies of *Sphaerium hartmanni* belongs to the genus *Musculium* as well. Conchological characters of the mentioned forms agree with this supposition. Similar dorsal view of nephridia in both lots of *M. hartmanni* described here is also notable.

Large shell (more than 10 mm long), absence of nepionic caps, slightly elevated ligament, strong siphonal retractors and open type of nephridium indicate some similarity of the species discussed here to *Musculium transversum* (Say) from North America (anatomically described by Korniushev, 1996).

Musculium stuhlmanni (Martens, 1897) (Fig. 3)

Material: Lake Victoria, coll. by M. Graham 1930, NHML ♂ 1930.8.12.16-...

A specimen available for anatomical study had contracted siphons. However, one may deduce their strong development from thick layer of circular muscles distinguishable on the mantle preparations. Siphonal retractors are very strong (Fig. 3, e), with the

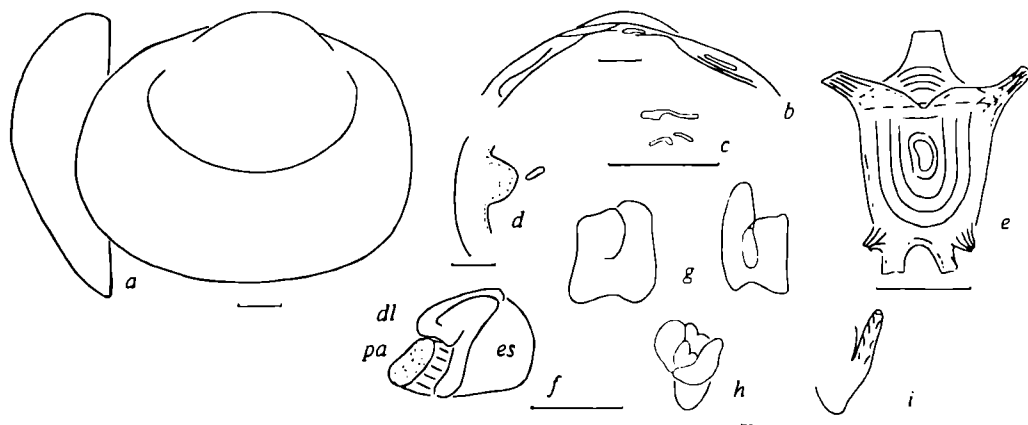


Рис. 3. *Musculium stuhlmanni* из оз. Виктория, NHML: a — левая створка латерально и фронтально; b — замок левой створки; c — кардинальные зубы (вверху — правой створки; внизу — левой); d — задние мускульные отпечатки; e — сифональные мускулы с внутренней стороны; f — нефридий латерально; g — нефридии дорсально; h — нефридий вентрально; i — воронка нефростома. Сокращения те же, что на рис. 1—2. Масштабная линейка 1 мм.

Fig. 3. *Musculium stuhlmanni* from Lake Victoria, NHML: a — left valve laterally and frontally; b — hinge of the left valve; c — cardinal teeth (above — of the right valve; below — of the left valve); d — posterior muscle scars; e — siphonal muscles from the inner side; f — nephridium laterally; g — nephridia dorsally; h — nephridium ventrally; i — funnel of nephridium. Abbreviations the same as in the Fig. 1—2. Scale bar 1 mm.

scars separated from those of adductors.

Both open and closed types of nephridium were observed. Dorsal lobe has square form. Funnel is long (Fig. 3, *i*), excretory sac relatively large (Fig. 3, *f, h*) (in comparison with the previous species), no internal valve was found in the latter. Each of 3 brood pouches contained 1 or 2 embryos.

Remarks. Conchologically, this species is characterized by a round outline and relatively broad umbones. Its placement to the genus *Musculium* is indicated by the long funnel of nephridium. In configuration of the excretory sac, the species is somewhat intermediate between *Musculium* and *Sphaerium* (Dreher-Mansur, Meier-Brook, 1992), but is closer to the former in having no internal valve. The mentioned characters of nephridium are also shared with *Musculium incomitatum* (Kuiper) described by Korniuschin (1995).

Musculium aequatoriale (Clessin, 1879) (Fig. 4–5)

Material. Bogota, Columbia, coll. by Lindig in 1862, MNHN; Quito, Equador, coll. of Claus Meier-Brook.

Some of the studied specimens had partially extended siphons, both of tubular shape; in specimens from Quito (Fig. 4, *d*) somewhat longer than in those from Bogota (Fig. 5, *b*). At least apical parts of siphons are separated from each other. Siphonal muscles are well developed, but relatively short (Fig. 5, *c, e*). Contrary to the previous species, upper retractor of the branchial siphon does not extend beyond the upper internal angle of the posterior adductor (Fig. 5, *c*). The relevant scars are well distinguishable but merged to each other (Fig. 4, *c*).

Both open and closed nephridia were observed; open type (Fig. 4, *e*; 5, *d*) seems to be more frequent; dorsal lobe of nephridium is evidently elongated. In the internal structure (Fig. 4, *f*), nephridia are very similar to those of *Musculium lacustre* (Müll.) described and figured by Korniuschin (1996): funnel long, excretory sac rather small, without internal valve.

Usually 3 brood pouches containing 3 to 5 embryos were observed in each gill.

Remarks. Having rather large elongated shell this species demonstrates some similarity to *Musculium transversum* (Say) distributed in North America. At the same time, it differs by somewhat reduced siphonal musculature. Upper retractors of the branchial siphons are shorter even than in *M. lacustre*.

Musculium forbesi (Philippi, 1869) (Fig. 6)

Material: Bogota, Columbia, coll. by Lindig in 1862, MNHN; Siripata, Lake Titicaca, depth 13.7 m, coll. 30 July 1937, collectors σ 1001/2, NHML.

Configuration of siphons was not studied. Arrangement of siphonal muscles is similar to that in *M. aequatoriale*, but upper retractors of the branchial siphon are evidently shorter (Fig. 6, *d, g*). Their scars are seen as small appendages of adductor muscle scars (Fig. 6, *c*).

Nephridia of the open or closed type (Fig. 6, *e*); the latter type dominates. In comparison with the previous species, dorsal lobe is somewhat shorter, internal structure of nephridia does not differ (Fig. 6, *f*).

The dissected specimens had 3 brood pouches per gill with 1 to 3 embryos each.

Remarks. This species differs from *M. aequatoriale* by smaller size and more convex shell with clearly distinguished embryonic part. Its umbones are often definitely shifted posteriorly; such shells resemble those of *Pisidium* and were sometimes taken for the latter genus (Kuiper, Hinz, 1984). Anatomically, *M. forbesi* differs from *M. aequatoriale* by more reduced siphonal musculature, especially upper retractors of the branchial siphons, and shorter dorsal lobe of nephridium.

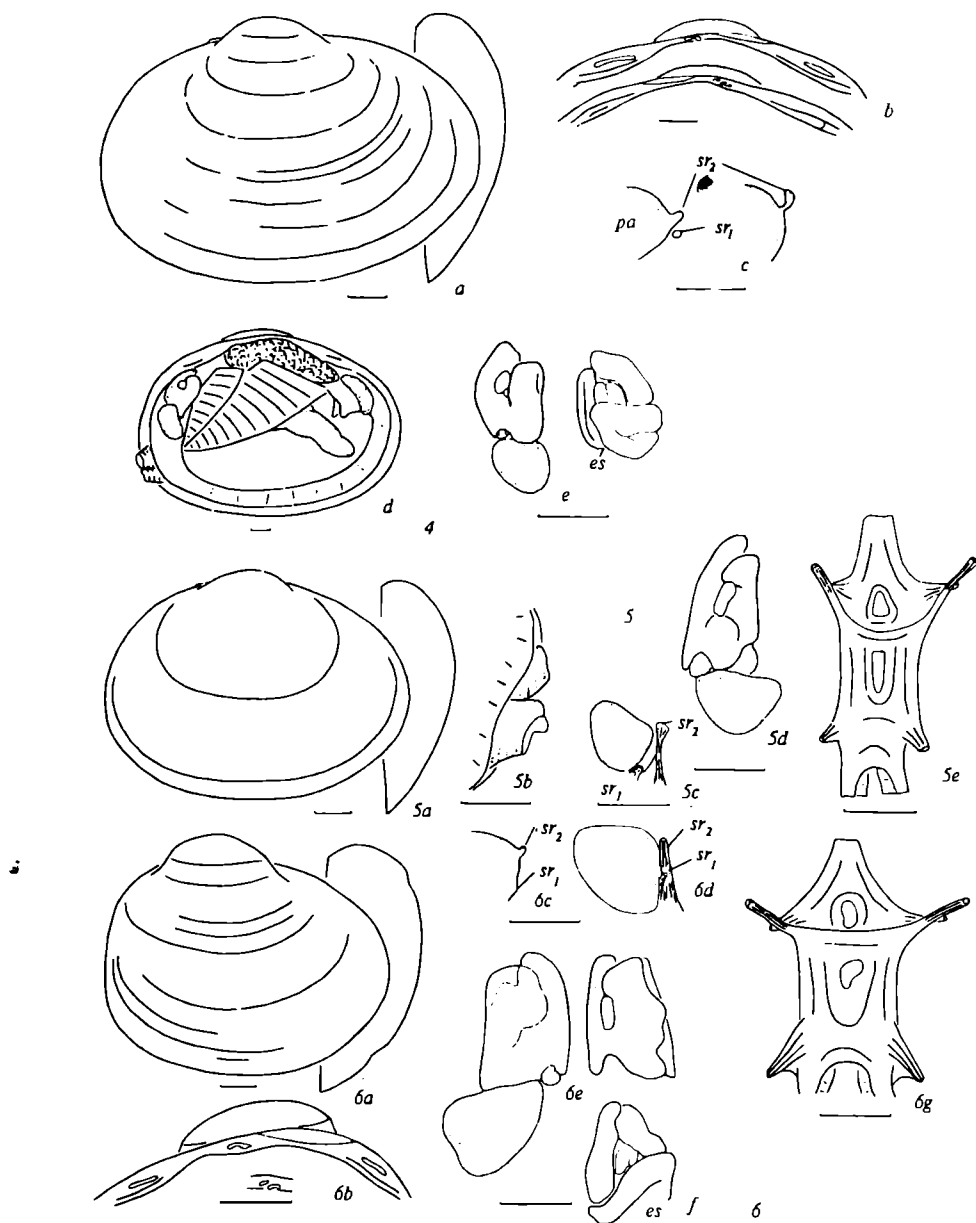


Рис. 4—6. Анатомия южноамериканских *Musculium*. 4. *M. aequatoriale* из Кито, коллекция К. Майер-Брока: *a* — правая створка латерально и фронтально; *b* — замок; *c* — задние мускульные отпечатки; *d* — анатомия; *e* — нефридии дорсально и вентрально. 5. *M. aequatoriale* из Боготы, MNHN: *a* — левая створка латерально и фронтально; *b* — сифоны фиксированного экз.; *c* — верхние сифональные ретракторы латерально; *d* — нефридий дорсально; *e* — сифональные мускулы с внутренней стороны. 6. *M. forbesi* из Боготы, MNHN: *a* — левая створка латерально и фронтально; *b* — замок; *c* — задние мускульные отпечатки; *d* — верхние сифональные ретракторы латерально; *e* — нефридии дорсально; *f* — нефридий вентрально (часть выделительного мешка не показана); *g* — сифональные мускулы с внутренней стороны. Сокращения те же, что на рис. 1—2. Масштабная линейка 1 мм.

Fig. 4—6. Anatomy of South American *Musculium*. 4. *M. aequatoriale* from Quito, collection of C. Meier-Brook: *a* — right valve laterally and frontally; *b* — hinge; *c* — posterior muscle scars; *d* — gross anatomy; *e* — nephridium dorsally and ventrally. 5. *M. aequatoriale* from Bogota, MNHN: *a* — left valve laterally and frontally; *b* — siphons (in the alcohol fixed specimen); *c* — upper siphonal retractors laterally; *d* — nephridium dorsally; *e* — siphonal muscles from the inner side. 6. *M. forbesi* from Bogota, MNHN: *a* — left valve laterally and frontally; *b* — hinge; *c* — posterior muscle scars; *d* — upper siphonal retractors laterally; *e* — nephridia dorsally; *f* — nephridium ventrally (the part of excretory sac not shown); *g* — siphonal muscles from the inner side. Abbreviations the same as in the Fig. 1—2. Scale bar 1 mm.

Musculium lauricochae (Philippi, 1869) (Fig. 7–8)

Material: Isla Titicaca, depth 7.8 m, coll. 26 July 1937, collectors ♂ 967/6, NHML; La Lagunillas, SE end, stony shore, weeds, depth 0.3 m, coll. 2 September 1937, collectors ♂ 1166/9, NHML; La Saracocha, Lake Titicaca, depth 25–30 m, coll. 5 September 1937, collectors ♂ 1218/5, NHML.

Siphons of the studied specimens were contracted; one may suppose from the weakness of circular musculature (Fig. 7, g), that they are rather short. Siphonal retractors weak; upper retractor of branchial siphon does not extend beyond the inner angle of adductor muscle (Fig. 8, b), its scar is not distinguishable (Fig. 7, d).

Nephridia may be of the open or closed type; proportions of the dorsal lobe are approximately the same as in *M. forbesi* (Fig. 7, f; 8, c). Excretory sac is small, funnel long.

The number of brood pouches simultaneously developing in the gill varies: 1 to 3 pouches were observed, remains of several older pouches are usually distinguishable in front of the first one containing embryo. The number of young per pouch is 1 to 5.

Remarks. This species is characterized by evidently shifted umbone. Probably for that reason the lots from NHML collection observed here were preliminarily identified as *Pisidium* spp. However, anatomical characters indicate their affinity to *Musculium*.

Musculium titicacense (Pilsbry, 1924) (Fig. 9)

Material: Lake Titicaca off Catachaca, depth 1.3 m, *Chara* among scattered Tortora, coll. 30 August 1937, ♂ 1130/6, NHML; Taman, depth 56–61 m, coll. 17 September 1937, ♂ 1322, NHML.

This species is distinguished by relatively small outer demibranch, but this character is probably associated with smaller size of the animal. Siphons and siphonal retractors are approximately in the same condition as in the previous species.

Nephridia of the open and closed types were observed. Dorsal lobe is evidently shortened, especially in small specimens. Internal structure of nephridium is the same as in *M. lauricochae*.

Maximum 2 brood pouches were found in gills of dissected specimens.

Remarks. *Musculium titicacense* is the smallest among South American species observed here. Because of small size and evidently shifted umbo, it was originally included in the genus *Pisidium* and re-described as a species of *Sphaerium* by Kuiper & Hinz (1984). In anatomical aspect, it is very near to *M. lauricochae*; its peculiar characters, namely small outer demibranch, shortened dorsal lobe of nephridium and limited number of brood pouches are probably correlated with size. Such a correlation was shown earlier for the Palaearctic species (Korniushin, 1996).

Discussion

The data provided here shows that the genus *Musculium* is much more diverse than considered earlier (Heard, 1977; Mansur & Meier-Brook, 1992): a number of African and South American species belong here. Many tropical species traditionally included in *Sphaerium* s. lato are still not studied anatomically; however, one may suppose from the shell characters (Mandahl-Barth, 1988 et al.) that they are closely related to the *Musculium* species observed here. Thus, it seems quite probable that the genus *Sphaerium* s. str. is not represented in the tropical regions and includes only Holarctic (Palaearctic and Nearctic) species. On the contrary, *Musculium* is characterized by a wide (probably cosmopolitan) distribution. This kind of distribution, as well as variety of habitats and considerable diversity in shell and anatomical characters between species from different continents suggest an ancient origin of the genus. It stands in some disagreement with the data of other investigators showing that *Musculium* is rather advanced group (Dreher-Mansur, Meier-Brook, 1992).

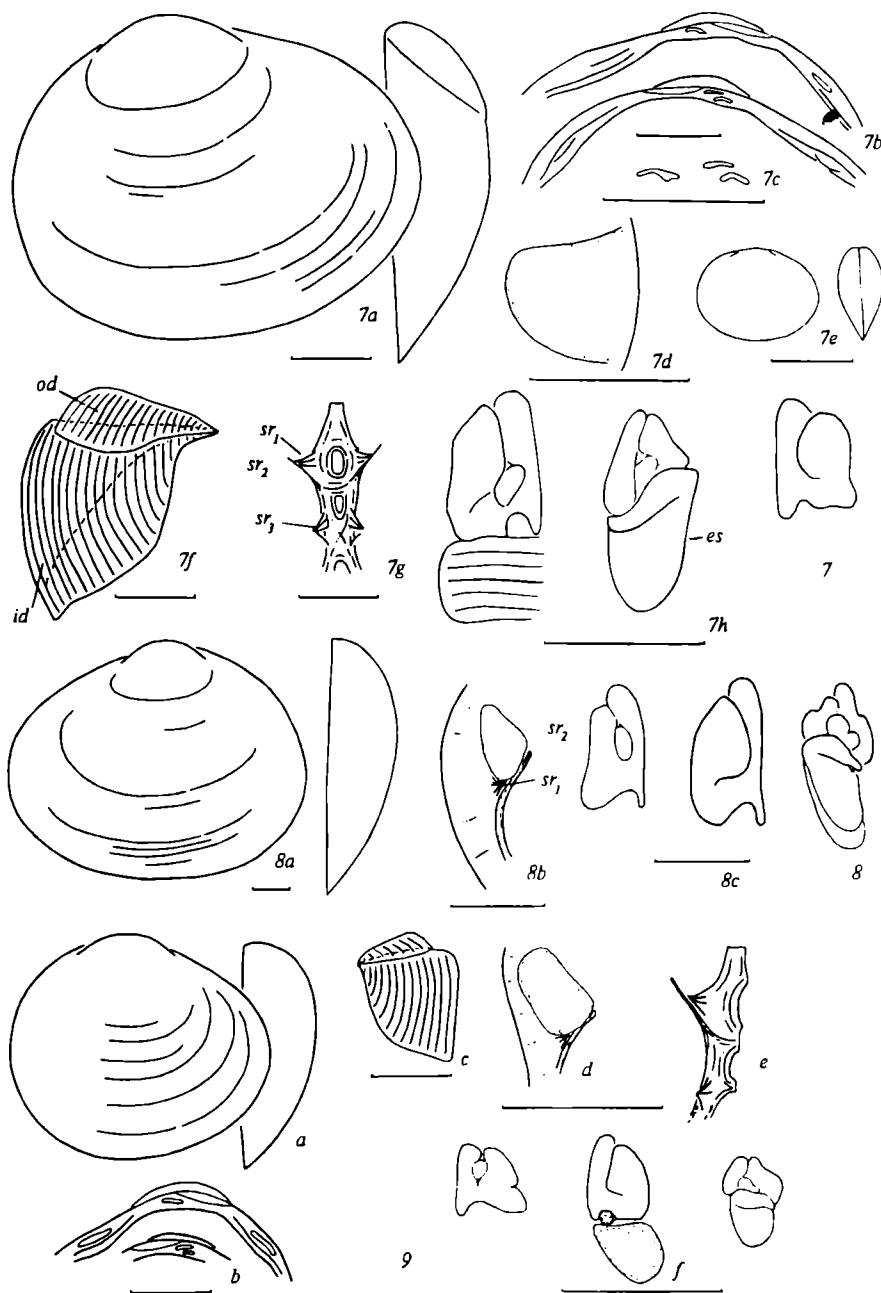


Рис. 7—9. Анатомия видов *Musculium* из оз.Титикака. 7. *M. lauricochae* из Isla Titicaca, NHML: *a* — левая створка латерально и фронтально; *b* — замок; *c* — кардинальные зубы; *d* — задние мускульные отпечатки; *e* — раковина молодого экз. латерально и фронтально; *f* — жабра; *g* — сифональные мускулы с внутренней стороны; *h* — нефридии дорсально и вентрально. 8 — *M. lauricochae* из La Lagunillas, NHML: *a* — левая створка латерально и фронтально; *b* — верхние сифональные ретракторы латерально; *c* — нефридии дорсально и вентрально. 9 — *M. titicacense* из Taman, NHML: *a* — правая створка латерально и фронтально; *b* — замок; *c* — жабра; *d* — верхние сифональные ретракторы латерально; *e* — сифональные мускулы с внутренней стороны; *f* — нефридии дорсально и вентрально. Сокращения те же, что на рис. 1—2. Масштабная линейка 1 мм.

Fig. 7—9. Anatomy of *Musculium* species from Lake Titicaca. 7. *M. auricochae* from Isla Titicaca, NHML: *a* — right valve laterally and frontally; *b* — hinge; *c* — cardinal teeth; *d* — posterior muscle scars; *e* — shell of the young specimen laterally and frontally; *f* — gill; *g* — siphonal muscles from the inner side; *h* — nephridia dorsally and ventrally. 8 — *M. lauricochae* from La Lagunillas, NHML: *a* — left valve laterally and frontally; *b* — siphonal retractors laterally; *c* — nephridia dorsally and ventrally. 9 — *M. titicacense* from Taman, NHML: *a* — right valve laterally and frontally; *b* — hinge; *c* — gill; *d* — upper siphonal retractors laterally; *e* — siphonal muscles from the inner side; *f* — nephridia dorsally and ventrally. Abbreviations the same as in the Fig. 1—2. Scale bar 1 mm.

Taxonomic heterogeneity of the genus *Musculium* may be supposed from the differences in siphonal musculature described here. At least 3 species groups are distinguishable by the degree of siphonal retractors development. The first group includes large forms with long and strong upper retractors of the branchial siphon: *M. transversum*, *M. hartmanni*, *M. stuhlmanni* and some poorly known forms from East Asia (Korniushin, 1996, these data). If monophyly of this group is confirmed, the name *Paramusculium* Alimov et Starobogatov, 1968 (type species *Cyclas transversa* Say, 1829) may be available as a subgeneric name.

In the type species of *Musculium* — *Tellina lacustris* Müller, 1774 and several North American species siphonal retractors are less developed, but also rather long and strong (Korniushin, 1996). This group is considered in Russian literature since Alimov and Starobogatov (1968) as *Musculium* s. str.; it has an evident synapomorphy — separated embryonic shell which forms a cap (calycula).

The third group comprises the species with evidently reduced upper retractors of branchial siphons (most probably an apomorphy): *Musculium tasmanicum* from Australia and *M. incomitatum* (Kuiper) from South Africa (Korniushin, 1995) as well as South American *M. aequatoriale*, *M. forbesi*, *M. lauricochae* and *M. titicacense*. Alongside characters of siphonal musculature, the mentioned species (except *M. aequatoriale*) are characterized by noticeable posterior shift of umbones, being similar in this aspect to *Pisidium*. Embryonic shell may be well distinguishable, but never forms a cap, thus the group under consideration hardly can be derived from *Musculium lacustre* group, and more probably has the roots within the group which includes *M. transversum* and *M. hartmanni*. One also cannot exclude parallel reduction of siphonal musculature in several taxa, taking into account presence of species with strong muscles on different continents (*M. transversum* in America, *M. hartmanni* in Africa and some species in East Asia).

Several subgeneric and generic names were suggested for species observed above. Particularly, the genus *Sphaerinova* Iredale 1943 was established for the Australian species included now in *Musculium* and monotypic subgenus *Pseudopisidium* Korniushin 1995 was introduced for *Musculium incomitatum* (Kuiper, 1966), distinguished by rudimentary upper retractors of the branchial siphon. It is not possible to provide subgeneric division in *Musculium* at this stage of investigation, but one nomenclatorial confusion needs to be settled. It appeared that the name *Pseudopisidium* was used earlier for designation of another genus (Tashiro, Kozai, 1989). In order to avoid the homonymy, we propose here the new name to substitute the preoccupied one.

Afromusculium nom. n.

Pseudopisidium Korniushin, 1995, Tashira, Kozai, 1989

Type species: *Pisidium incomitatum* Kuiper, 1966.

Short diagnosis: umbones of adult specimens evidently shifted posteriorly; ligament enclosed or partially visible from the dorsal side, but not convex; upper retractors of the branchial siphon reduced and tightly adjoin posterior adductor, the scars of these muscules cannot be distinguished from the adductor scar; outer demibranch is much smaller than the inner one and has small but distinct descending lamella; excretory sac of nephridium rather large, but not extended, without internal valve; funnel long. Complete description is given by Korniushin (1995).

The subgeneric status of the South American species with reduced siphonal musculature is not defined. Until anatomical investigation of the tropical *Musculium* is fin-

ished, we hesitate to provide taxonomic name for the South American group, nor include it in any of the taxa established earlier.

It is notable that endemic species from the Lake Titicaca are similar in their principal anatomical characters to the widely distributed *M. forbesi*. The differences concern mainly the size and shell outline. Thus, despite the evolution in conditions of isolation, all 3 species remain closely related. Degree of affinity of the species from Titicaca to the other South American ones is approximately of the same level as that of Baicalian species to their Siberian ancestors (Korniushev, 1996).

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ЗАМЕТКА

Amphipoea crinanensis (Lepidoptera, Noctuidae) — первая находка в Восточной Европе [The First Record of *Amphipoea crinanensis* (Lepidoptera, Noctuidae) in East Europe]. — В массовых сборах на свет, поступивших на определение в Зоологический музей Московского университета, обнаружен *A. crinanensis* (Burrows, 1908): ♂ и несколько экз. плохой сохранности, Тверск. обл., Лесной р-н, Борисовское, 8.08.1994 (Комочков); ♂, Тверск. обл., Центрально-Лесной запов., 1996 (без даты) (Сокова); ♂, Владимирской обл., Судогский р-н, Брыкино, 23.07.1996 (Усков); , Рязанской обл., Окский запов., 29.06.1995 (Блинушов). Ранее вид был известен из Шотландии, Германии (север Шлезвиг) и Дании. В Польше, Беларуси, Литве, Латвии и Эстонии до настоящего времени не обнаружен. — А. В. Свиридов (Зоологический музей Московского университета).