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VERSITA

Redescription of *Diporotaenia colymbi* Spasskaya, Spassky et Borgarenko, 1971 (Cestoda, Cyclophyllidea, Schistotaeniidae) and amended diagnoses of *Diporotaenia* Spasskaya, Spassky et Borgarenko, 1971 and Diporotaeniinae Ryzhikov et Tolkacheva, 1975

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Abstract

Diporotaenia colymbi Spasskaya, Spassky et Borgarenko, 1971 (Cestoda, Cyclophyllidea, Schistotaeniidae) is redescribed from *Tachybaptus ruficollis* (L.) in Turkmenistan. An amended generic diagnosis of *Diporotaenia* Spasskaya, Spassky et Borgarenko, 1971 is proposed. The taxonomy of Schistotaeniidae Johri, 1959 and the generic composition of its subfamilies, Schistotaeniinae Johri, 1959 and Diporotaeniinae Ryzhikov et Tolkacheva, 1975, are discussed. The genera *Ryjikovilepis* Gulyaev et Tolkacheva, 1987, *Isezhia* Gulyaev et Konyaev, 2004, *Mircia* Konyaev et Gulyaev, 2006 and *Decarabia* Konyaev et Gulyaev, 2005 are considered as members of the subfamily Diporotaeniinae. An amended diagnosis of the latter subfamily is proposed.

Keywords

Cestoda, grebes, Amabiliidae, Schistotaeniidae, *Diporotaenia*, diagnosis

Introduction

According to the previous revisions (Ryzhikov and Tolkacheva 1981, Jones 1994) the cyclophyllidean family Amabiliidae Braun, 1900 is characterised by the lack of a true vagina and vaginal orifice, and the presence of additional female seminal ducts. Despite the recent studies on the morphology of several genera within the family (Gulyaev and Tolkacheva 1987; Gulyaev 1990, 1992; Vasileva *et al*. 2003a, b; Gulyaev and Konyaev 2004a, b; Konyaev and Gulyaev 2005), the taxonomy of amabiliids remains still insufficiently clarified and, to some extend, controversial. This does not allow the clarification of the most valuable morphological criteria at family and subfamily levels.

Diporotaenia colymbi Spasskaya, Spassky et Borgarenko, 1971, described from the little grebe, *Tachybaptus ruficollis* (Pall.) (Podicipediformes) from Tadzhikistan, has an important position within the family Amabiliidae. In contrast to the other amabiliid cestodes, which have no true vaginal orifice, *D. colymbi* has two separate genital pores, one male and one female, situated on the opposite lateral proglottis margins. This feature, in addition to the peculiar structure of its scolex, was the main reason for the erection of the new genus, *Diporotaenia* Spasskaya, Spassky et Borgarenko, 1971. Furthermore, Ryzhikov and Tolkacheva (1975) proposed a transformation within Amabiliidae, separating it into three subfamilies, i.e. Amabiliinae Braun, 1900, Schistotaeniinae Johri, 1959 and the monotypic subfamily Diporotaeniinae Ryzhikov et Tolkacheva, 1975. The redescription of *D. colymbi* published by Ryzhikov and Tolkacheva (1981) revealed the species has no true vagina; it has rather an additional seminal duct, which is connected with the seminal receptacle and takes the functions of a vagina. In addition, the authors considered as a specific feature of *D. colymbi* the absence of any accessory ducts joining the seminal receptacles of the neighbouring proglottides, which are typical for amabiliids of another subfamily of Amabiliidae, i.e. Schistotaeniinae.

According to the taxonomic transformation of Amabiliidae proposed by Spassky (1992), the family includes only *Ama-*

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bilia Diamare, 1893, a parasite of flamingos. All cestode genera parasitising grebes were transferred in the family Schistotaeniidae Johri, 1959 with its two subfamilies Schistotaeniinae and Diporotaeniinae. On the basis of the similar shape and structure of the rostellar hooks, Spassky (1992) transferred the genera *Tatria* Kowalewski, 1904 and *Joyeuxilepis* Spassky, 1947 to Diporotaeniinae, keeping the diagnosis of the subfamily unchanged. This decision is in contrast to the opinion of Ryzhikov and Tolkacheva (1981), who considered Diporotaeniinae as a monotypic subfamily.

Until now, the morphology of *D. colymbi* remains still insufficiently studied and the interpretations of the structure of its female genital ducts are controversial. This does not allow clarification of the main features with importance at higher taxonomic levels (i.e. subfamilies of Schistotaeniidae). The aim of the present paper is to present a detailed redescription of *D. colymbi* and to clarify the main taxonomic characters and species composition of Diporotaeniinae.

Materials and methods

Two specimens of *D. colymbi* were studied. They were from the Collection of the Centre of Parasitology, A.N. Severtsov Institute of Ecology and Evolution, Moscow, Russian Academy of Sciences (CPIEE). Cestodes were collected by V.I. Golovkova from *Tachybaptus ruficollis* from two localities in Turkmenistan. Specimens were fixed in alcohol, stained in carmine and mounted in Canada balsam. For the purposes of the current study, one of the scoleces was re-mounted in Berlese's medium in order to facilitate the observation of the rostellar hooks. These two specimens were previously studied and redescribed by Ryzhikov and Tolkacheva (1981). In addition, three type-specimens of *D. colymbi* from *T. ruficollis* in Tadzhikistan from the collection of L.F. Borgarenko were re-examined by one of the authors (VDG).

Two terms describing types of the rostellar apparatus (Gulyaev and Konyaev 2004b) were used. The 'acanthorhynchoid' type of rostellar apparatus is characterised by the presence of a long, evertile rhynchus, armed with small spines or hooklets, the rostellum is able to withdraw separately from the apex of the rhynchus and the rostellar hooks blades are directed posteriorly when the rostellum is withdrawn. The 'schistotaeniid' type of rostellar apparatus is characterised by a rostellum which coalesces with the apex of the rhynchus and the rostellar hook blades are directed anteriorly when the rostellum is withdrawn.

The observations and the drawings were made using Leitz Dialux 22 EB microscope. Phase-contrast microscope Axiolab was used for particular examination of the rostellar hooks and the cirrus armament. The metrical data are given as the range, the mean in parentheses and the number of measurements or counts taken (n). The measurements are given in micrometres unless where otherwise stated.

Results

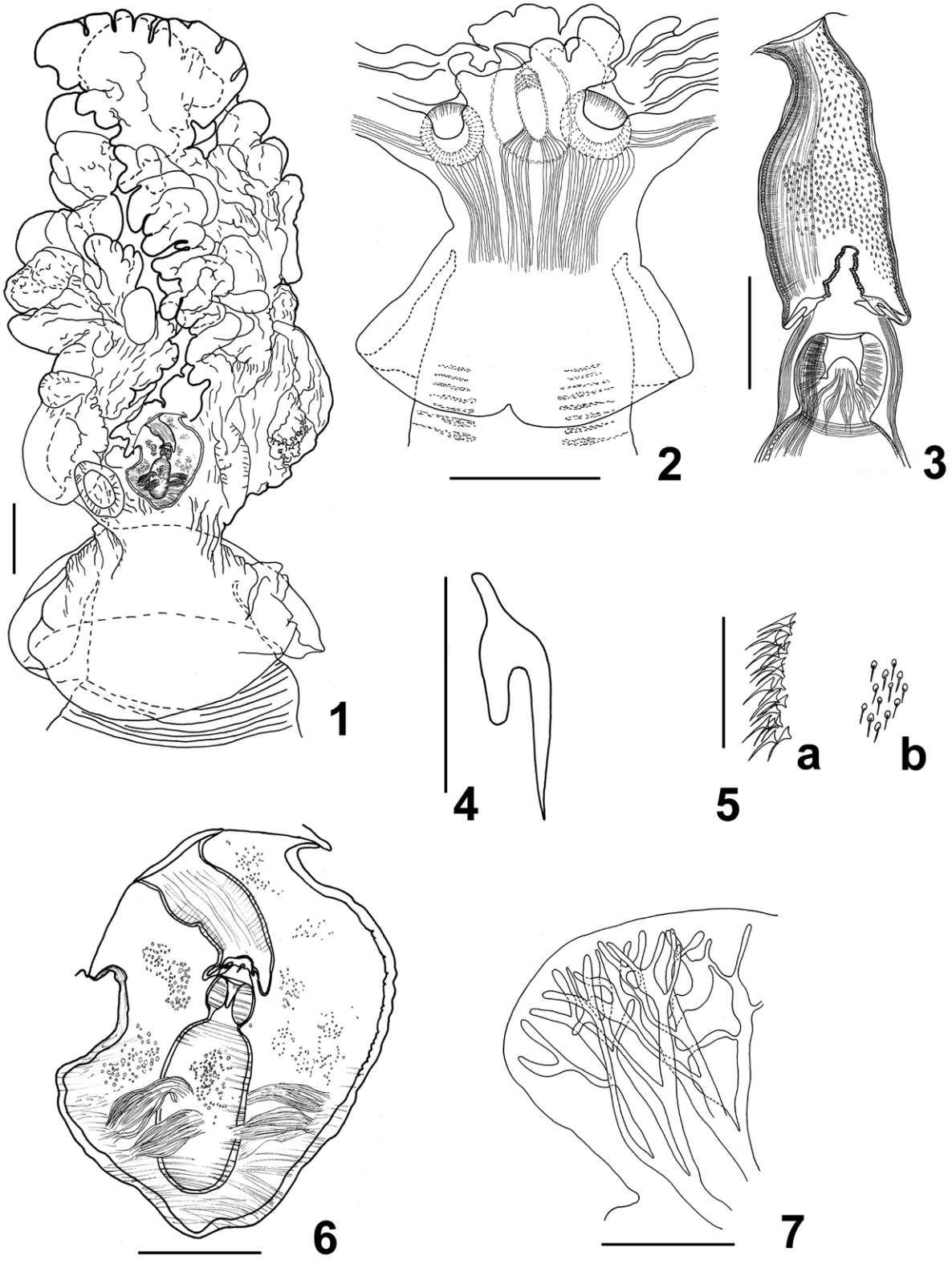
Diporotaenia colymbi Spasskaya, Spassky et Borgarenko, 1971

Specimens studied: From *Tachybaptus ruficollis*: Lake Chaskak, Turkmenistan, Coll. No. CPIEE 13298, 24.05.1962, a slide containing one gravid specimen, stained whole-mount; Karakums Canal, Turkmenistan, Coll. no. not mentioned, 18.05.1962, a slide with strobila of a gravid specimen, stained whole-mount; the scolex of the same specimen was remounted in Berlese's medium.

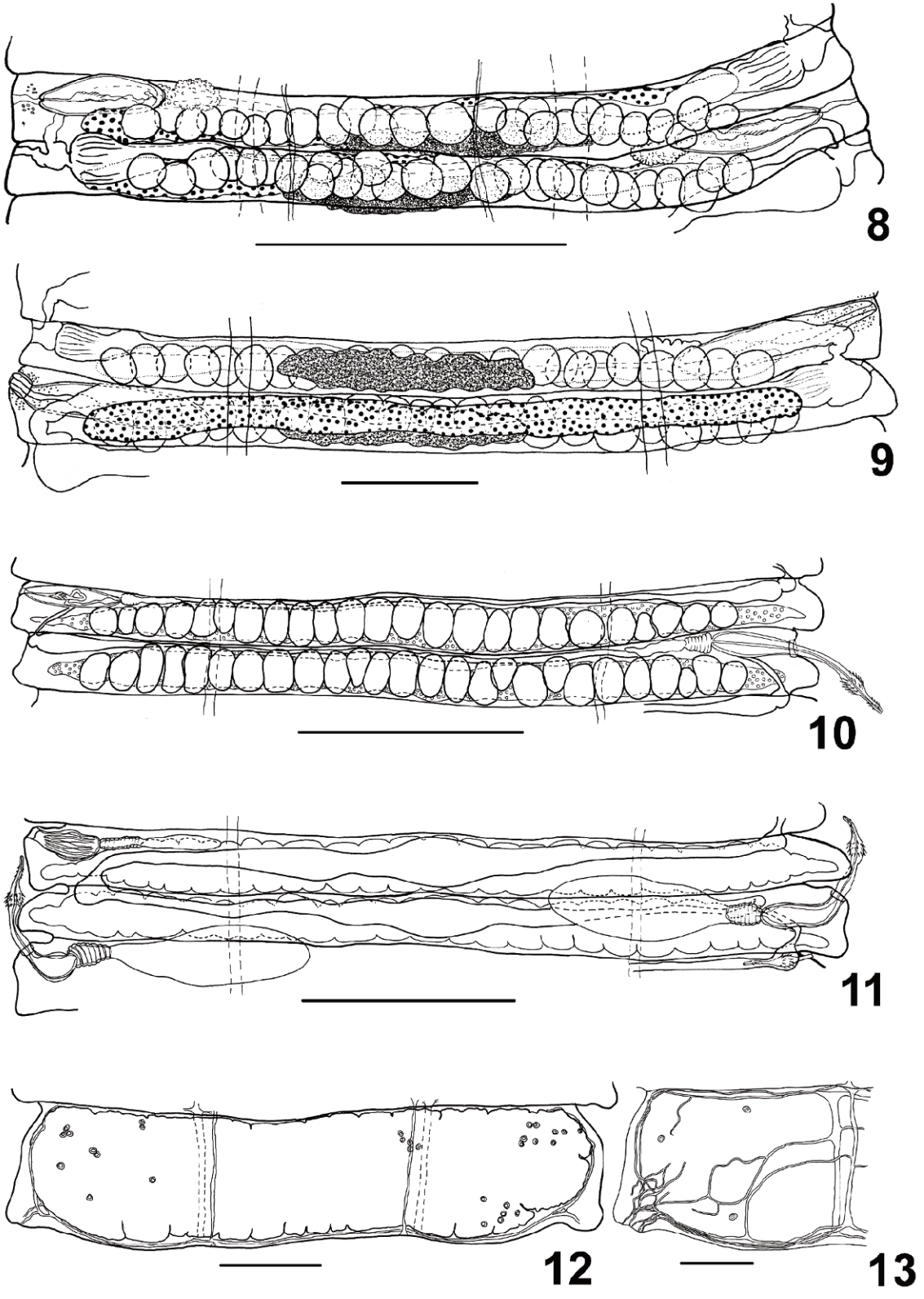
Redescription (Figs 1–20)

(For metrical data see Table I). Short cestodes with craspedote strobila, consisting of 115–120 transversely elongate, slightly trapezoid proglottides; immature and young mature proglottides without lateral enlargements; mature proglottides with considerably short and wide lateral enlargements. Scolex with variable width and two well defined parts (Figs 1 and 2). Anterior part cauliflower-shaped, with four elongate, folded appendages, situated between suckers; lateral appendages 1.11 mm long, consisting of numerous leaf-like lobes with highly folded surface; dorsal and ventral appendages considerably shorter than lateral (Fig. 2). Each lobe of appendages with numerous muscle fibres within it and osmoregulatory branches, ending blindly within tegument (Fig. 7). Posterior part of scolex with velum forming collar, hanging over neck and first proglottides (Figs 1 and 2); posterior margin of velum with two deep incisures, one ventral and one dorsal; measurements of collar 500–530 × 960–1,080 (n = 2), thickness 58–108 (n = 2). Suckers round, situated between appendages of anterior part of scolex (Fig. 2); its surface covered with numerous small spines, larger (3–4) at suckers margins (Fig. 5a, b). Rostellar apparatus situated apically, in groove formed by four appendages (Figs 3 and 6). Rhynchus covered with numerous small spines (Fig. 3); scoleces with everted rhynchus not available. Rostellar hooks with unknown number; one of scoleces has 3 remaining hooks (Fig. 6); each hook with long, straight blade with slightly curved tip; guard well-developed, handle shorter than guard (Fig. 4). Rostellar sheath does not cross line of posterior margins of suckers (Fig. 6); walls muscular, four large retractor muscles situated within rostellar sheath, penetrating walls and participating in formation of inner longitudinal musculature of strobila. Rostellum sac-like, its walls with well-developed radial musculature; its anterior part invaginating independently from apex of rhynchus; blades of rostellar hooks turned posteriorly when rostellum withdrawn (Figs 3 and 6).

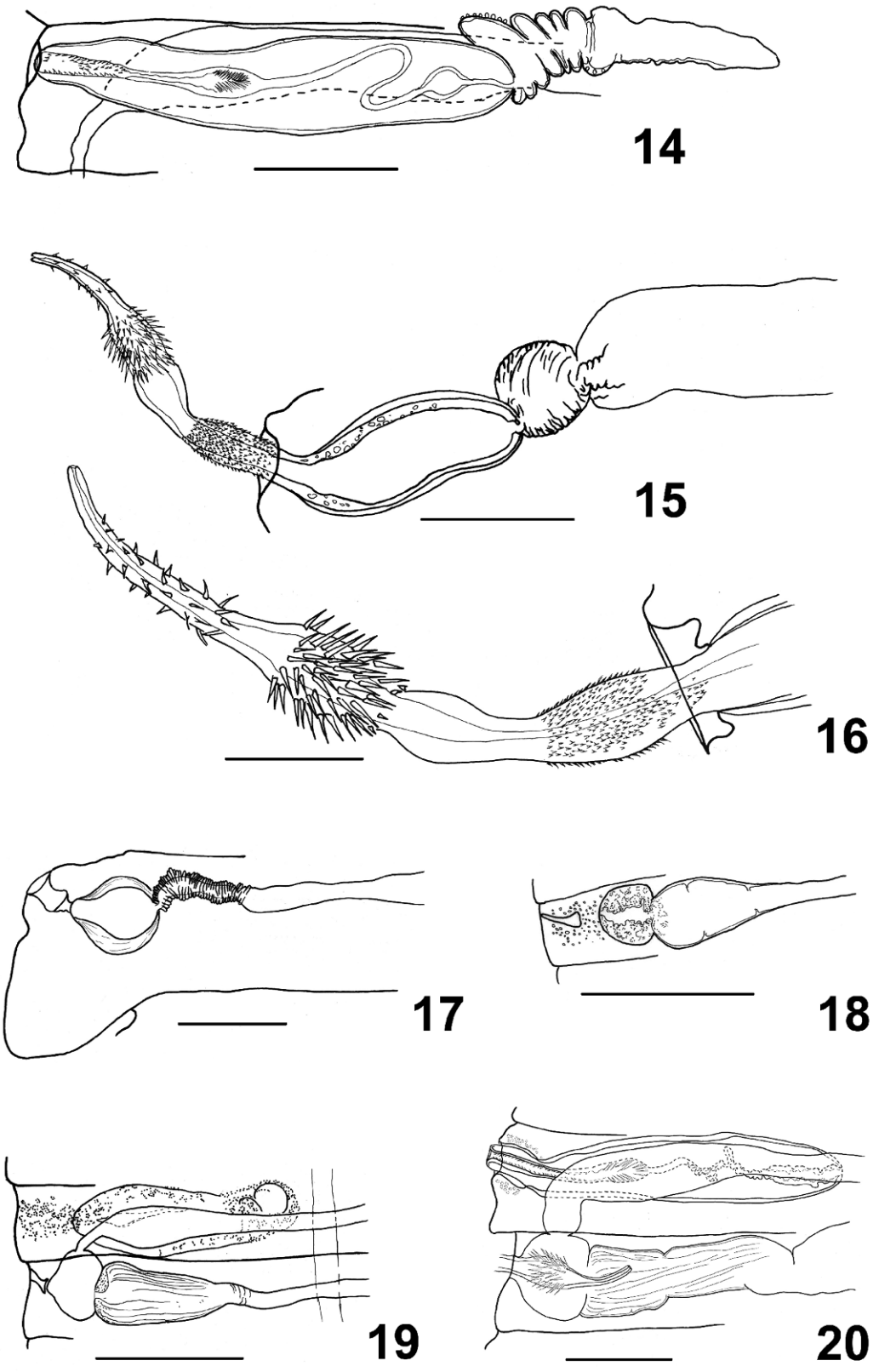
Neck very short, with length 66 and width 470–510. Internal segmentation appearing earlier than external, starting at 0.8 mm from base of velum. Osmoregulatory canals two pairs; dorsal canals disposed centrally (Fig. 8); both dorsal and ven-



Figs 1–7. *Diporotaenia colymbi* Spasskaya, Spassky et Borgarenko, 1971, specimens from *Tachybaptus ruficollis* in Turkmenistan. **1.** Scolex, lateral view. **2.** Scolex, dorso-ventral view. **3.** Withdrawn rhynchus. **4.** Rostellar hook. **5.** Armament of suckers: **a**, spines on margins of suckers; **b**, spines on centre of suckers. **6.** 'Acanthorhynchoid' rostellar apparatus with rostellar sheath, withdrawn rhynchus and rostellum. **7.** Branches of osmoregulatory canals within appendages of scolex. Scale-bars = 250 μm (1), 500 μm (2), 50 μm (3), 20 μm (4 and 5), 100 μm (6 and 7)



Figs 8–13. *Diporotaenia colymbi* Spasskaya, Spassky et Borgarenko, 1971, specimens from *Tachybaptus ruficollis* in Turkmenistan. **8** and **9.** 'Female' mature proglottides (8 – dorsal view, 9 – ventral view). **10.** 'Male' premature proglottides (dorsal view). **11.** Copulating 'male' mature proglottides (dorsal view) with common sinusoidal vaginal duct. **12.** Gravid proglottis. **13.** Branches of osmoregulatory canals in lateral enlargements. Scale-bars = 300 μm (8, 9, 13), 500 μm (10–12)



Figs 14–20. *Diporotaenia colymbi* Spasskaya, Spassky et Borgarenko, 1971, specimens from *Tachybaptus ruficollis* in Turkmenistan, terminal genital ducts. **14.** Cirrus-sac (not fully developed). **15.** Cirrus-sac in copulating proglottis. **16.** Everted cirrus. **17.** Contracted cirrus-sac after copulation (cirrus extirpated). **18.** Female atrium (early stage of development). **19.** Female atrium and copulatory part of vagina. **20.** Female atrium with extirpated cirrus within copulatory vagina. Scale-bars = 100 μm (14, 15, 17–20), 50 μm (16)

tral canals with transverse anastomoses at posterior margin of proglottis; numerous branches of canals pass into lateral fields of proglottides and form fine osmoregulatory reticulum (Fig. 13).

Primordia of male and female gonads appear simultaneously, further strobilar development protogynous; female genital atrium and vagina develop earlier than male copulatory apparatus and ovary. Ovary well-developed at 51st–54th proglottides; fertilization of oocytes, reduction of ovary and transfer of eggs in uterus occurs at 55th–57th proglottides. Male gonads develop later; spermatozoa appear in external seminal vesicle at 66th–68th proglottides; next 18–20 'male' mature proglottides contain male and female copulatory apparatus, developing uterus and degenerating testes.

'Female' mature proglottides (Figs 8 and 9) 1,530–1,600 wide; length at level of male pore 100–111, at opposite lateral margin 70–74. Ovary (Fig. 9) transversely elongate, crosses ventral osmoregulatory canals into lateral fields of proglottis, ventral to testes. Vitellarium elliptical, slightly lobed, submedian (Fig. 9). Female genital pores regularly alternating, opposite to male pores (Figs 8 and 9); female atrium divided into two parts by thin hymen; external part very short, tubular (Figs 18 and 19); internal part consisting of small vesicle, 40–48 in diameter when empty, highly enlarging (66–87 in diameter) when full of sperm (Fig. 19); female atrium connecting with seminal receptacle of preceding proglottis by thin upward duct, 50–60 long (Fig. 19). Vagina with two distinct parts; copulatory part tubular, enlarging with further development, clearly distinguished from female atrium by small orifice; diameter 50–55; walls consisting of numerous longitudinal muscle fibres (Fig. 19). Copulatory part of vagina gradually passing into long, wide, tubular conductive part functioning as seminal receptacle (Figs 11, 19 and 20), passing along anterior proglottis margin, turning posteriorly in lateral field and joining with female genital atrium of subsequent proglottis. Thus common, sinusoidal accessory vaginal duct between proglottides is formed (Fig. 11).

Male genital primordia starting their development in 'female' mature proglottides; fully developed in postmature proglottides with developing uterus. Testes (Figs 8–10) round, numerous, situated in single narrow row dorsal to female gonads; mostly in median field, 4–6 testes situated in each lateral fields. Male genital atria regularly alternating, opening at anterior 1/3–1/2 of lateral proglottis margin. Cirrus-sac (Figs 10, 14 and 15) cigar-shaped, situated in lateral field, dorsal to seminal receptacle, usually does not reach poral ventral osmoregulatory canals; walls of cirrus-sac with prominent diagonal muscle fibres; during copulation, cirrus-sac contracts and remains contracted after traumatic copulation and extirpation of cirrus (Fig. 17). Measurements of developing cirrus-sac with

Table I. Metrical and meristic for *Diporotaenia colymbi* Spasskaya, Spassky et Borgarenko, 1971 from *Tachybaptus ruficollis* (L.)

Source		**Spasskaya *et al*. (1971)**	**Ryzhikov and Tolkacheva (1981)**	**Present study**		
Locality		**Tadzhikistan**	**Turkmenistan**		**Turkmenistan**	
		range	**range**	**range**	**mean**	**n**
Strobila	length (mm)	18–22	15	19–22	–	2
	width (mm)	4.5	–	2.8–3.0	–	2
Scolex	width	1,000–1,680	–	810–1,760	–	2
Suckers	length	–	260–330	240–270	–	2
	width	–	140–220	210–270	–	2
Rostellum	length	–	198	160–180	–	2
	width	–	–	70–72	–	2
Rostellar sheath	length	–	360	330–350	–	2
	width	–	–	240–270	–	2
Rostellar hooks	length	–	18	22–23	–	2
Testes	number	15–16	21–23	22–27	24	18
	length	–	30–40	76–87	81	18
	width	–	30–40	57–81	70	18
Cirrus-sac	length	157–207	273	282–310	297	4
	width	–	60	57–62	59	4
Cirrus	length	185	240–246	240–250	246	7
Ovary	width	–	220–252	1,200–1,300	–	2
	length	–	–	50–80	–	2
Vitellarium	width	–	24	450–560	–	2
	length	–	48	57–62	59	7
Ripe eggs	length	39–44	–	27–30	28	11
	width	39	–	21–26	24	11
Onchospheres	length	25	–	15–20	17	11
	width	–	–	17–22	18	11
Embryonic hooks	length	8–9	–	7–8	7	11

withdrawn cirrus 210–240 × 53–68 (Fig. 14); measurements of contracted cirrus-sac with evaginated cirrus 140–170 × 70–80. External seminal vesicle consisting of well-differentiated prebursal and proximal parts. Prebursal part ('sperm expulsor') elongate, muscular, in lateral field of proglottis (Figs 11, 14 and 15); its size variable, depending on functional condition, 85–100 × 700–850 when full of sperm and 110 × 21 when contracted. Proximal part elongate, sac-like, thin-walled, crossing poral osmoregulatory canals and almost reaching midline of proglottis (Figs 11 and 14); measurements 470–660 × 130–150 when full of sperm. Both prebursal and proximal parts of external seminal vesicle without prostatic cells; cirrus-sac and external seminal vesicle without common outer sheath.

Evaginated cirrus cylindrical, with conically tapering end; it could be divided into five parts, differing in diameter and type of armament (Figs 15 and 16). Parabasal part with measurements 70 × 30, armed with dense, small, triangular spines; median part wider than parabasal, consisting of two regions, usually its proximal half unarmed, distal half armed with powerful, straight, blade-shaped spines, 12–14 long; apical portion of cirrus conically tapering, with pipette-like end; covered at its base with scarce claw-shaped spines (4–6 long) and usually ending with small, unarmed, tapering portion; in few 'male' mature proglottides, median part of cirrus found detached within female atrium after traumatic copulation (Fig. 20). Internal seminal vesicle absent (Fig. 14); ejaculatory duct enlarged when full of sperm and fills up almost entire cirrus-sac (Fig. 15).

Young uterus transversely elongate, tubular, passing ventrally to testes; with further maturation uterus enlarges, forming numerous short sacculations; fully developed uterus fills entire proglottis, including cortex of lateral enlargements (Fig. 12). Gravid proglottides measure 580–760 × 2,800–3,000; ripe eggs numerous, oncospheres oval.

Discussion

Species level

The morphology and armament of the scolex, the shape and armament of the cirrus, the structure of gonads and genital ducts of the specimens studied are very similar to the morphological data of both the original description (Spasskaya *et al*. 1971) and the subsequent redescription by Ryzhikov and Tolkacheva (1981). Metrical data also correspond well (see Table I), with two exceptions concerning the measurements of the female gonads. Ryzhikov and Tolkacheva (1981) reported measurements of the vitellarium "0.024 × 0.048 mm", which are considerably smaller than these observed in the present study (maximum width 450–560). Ovary is 220–252 µm wide in Ryzhikov and Tolkacheva (1981) *vs* 1,200–1,300 µm in the present study. Probably, Ryzhikov and Tolkacheva (1981) have measured much younger vitellarium and ovary. Another reason could be the difficulty in recognising the exact size of the gonads. We re-examined the same specimens as Ryzhikov and Tolkacheva (1981) and the margins of the vitellarium and the ovary were not easy to see, moreover they are situated ventrally to the testes. In addition to the above-described specimens from Turkmenistan, one of the authors (VDG) re-examined three of the type-specimens of *D. colymbi* from *T. ruficollis* in Tadzhikistan and confirmed their conspecificity.

The present redescription of *D. colymbi* gives several new morphological details on the morphology of the scolex. These are the asymmetry of the dorso-ventral and lateral appendages of the anterior part of the scolex, and the presence of additional armament of the suckers and rhynchus. In addition, the rostellum withdraws separately from the apex of the rhynchus. These features are similar to the 'acanthorhynchoid' type of rostellar apparatus previously observed in some other Schistotaeniinae (Gulyaev and Konyaev 2004b). The shape of the rostellar hooks is not exactly 'aploparaksoid' as defined by Ryzhikov and Tolkacheva (1981) since the hook has a distinct handle.

The present study significantly improves the description of the genital ducts. Our results confirmed the presence of well-defined female atrium situated opposite to the male pore and the presence of a distinct vagina consisted of two well-differentiated parts. The presence of a common sinusoidal vaginal duct between proglottides has not been observed until now in *D. colymbi*. The description of the male genital system adds the following new characters: the transformation of the prebursal part of the external seminal vesicle into the muscular sperm expulsor, the lack of a common outer sheath of the cirrus-sac and the external seminal vesicle and the lack of the internal seminal vesicle. Current results give a detailed description of the cirrus armament.

Generic level

The above mentioned new features observed in *D. colymbi* give grounds to propose some amendments to the generic diagnosis of *Diporotaenia* Spasskaya, Spassky et Borgarenko, 1971:

Diagnosis: Strobila of medium size, craspedote. Mature proglottides with short, wide lateral enlargements. Scolex with cauliflower-shaped anterior part and posterior part with velum forming collar hanging over neck and first proglottides. Anterior part of scolex consisting of four folded, elongated appendages, situated between suckers; lateral appendages much longer than dorsal and ventral. Suckers oval, covered with small spines. Rhynchus armed with numerous small spines. Rostellum sac-like, withdrawing independently from apex of rhynchus. Rostellar hooks in one row; hook with long blade and well-developed guard and handle; blades directed posteriorly when rostellum is withdrawn. Rostellar sheath sac-like, with four large retractor muscles. Osmoregulatory canals two pairs, with transverse anastomoses between them and numer-

ous lateral branches; dorsal canals disposed medially. Strobilar development protogynous. Copulation traumatic. Male and female atria present at opposite lateral proglottis margins, regularly alternating. Genital ducts pass between dorsal and ventral osmoregulatory canals. Testes numerous, in single row. Male copulatory apparatus without additional outer sheath. External seminal vesicle without prostatic cells; prebursal part forms muscular sperm expulsor. Internal seminal vesicle absent. Cirrus powerfully armed with three different types of spines. Vagina present, consisting of two well-defined parts; copulatory part enlarged, with muscular walls; conductive part tubular, functioning like seminal receptacle and forming common, accessory, sinusoidal vaginal duct between proglottides. Uterus transversely elongate, sacciform, with numerous short sacculations; fully developed uterus filling entire proglottis. Parasites of grebes (Podicipediformes, *Tachybaptus*). Central Asia. Type-species: *Diporotaenia colymbi* Spasskaya, Spassky et Borgarenko, 1971.

Family level

Our current observations on the morphology of *Diporotaenia* confirm some of the conclusions of the revision of the Amabiliidae by Spassky (1992). The present study confirms some similarities between two subfamilies of Schistotaeniidae (Schistotaeniinae and Diporotaeniinae). The presence of a common vaginal duct between the proglottides was considered previously as a typical character of the Schistotaeniinae (see Johri 1959, Ryzhikov and Tolkacheva 1981). Recently, it was observed and recorded in various species, i.e. *Ryjikovilepis dubininae* (Ryzhikov et Tolkacheva, 1981) Gulyaev et Tolkacheva, 1987 (see Gulyaev 2005), *Joyeuxilepis biuncinata* (Joyeux et Baer, 1943) Spassky, 1947 (see Vasileva *et al*. 2003b), *Decarabia pilatus* (Borgarenko et Gulyaev, 1991) Konyaev et Gulyaev, 2005 (see Konyaev and Gulyaev 2005), and now, in *D. colymbi* as well. A common accessory vaginal duct is not present in *Amabilia* Diamare, 1893 and its presence seems to be a synapomorphy for Schistotaeniinae plus Diporotaeniinae. Another common character of these two subfamilies is the lack of a cirrus or the entire male copulatory apparatus in the proglottides with developed uterus due to their extirpation during the traumatic copulation.

Judged by the morphology of the type-genera, *Schistotaenia* Cohn, 1900 and *Diporotaenia*, despite similarities in morphology of the genital systems, Schistotaeniinae and Diporotaeniinae differ considerably in the structure of their rostellar apparatus. *Diporotaenia* has the 'acanthorhynchoid' type of the rostellar apparatus (see above), which has been previously described as a specific feature of both *Tatria* Kovalewski, 1904 and *Joyeuxilepis* Spassky, 1947 (Gulyaev 1989, Borgarenko and Gulyaev 1990). Recently, this type has also been recorded for species of *Ryjikovilepis* Gulyaev et Tolkacheva, 1987, *Isezhia* Gulyaev et Konyaev, 2004, *Mircia* Konyaev et Gulyaev, 2006 and *Decarabia* Konyaev et Gulyaev, 2005. The presence of an 'acanthorhynchoid' type of the rostellar apparatus in *Diporotaenia*, *Tatria* and *Joyeuxilepis* agrees with the revision of Spassky (1992), who regarded them as members of the Diporotaeniinae. In addition to these genera, on the basis of the similarities in the structure of the rostellar apparatus, we consider the genera *Ryjikovilepis*, *Isezhia*, *Mircia* and *Decarabia* as belonging to the same subfamily. Recently, one of the authors (GPV) had the opportunity to study specimens of *Laterorchites bilateralis* (Fuhrmann, 1908) Fuhrmann, 1932 from *Tachybaptus dominicus* (Linnaeus, 1766) from Paraguay from the collection of the Natural History Museum, Geneva (Coll. No. 37980). The observations conform the presence of an 'acanthorhynchoid' type of rostellar apparatus in this species, which supports the decision of Spassky (1992) to include *Laterorchites* Fuhrmann, 1932 in the Diporotaeniinae. Thus, in our opinion, the Schistotaeniinae should include only *Schistotaenia* and *Pseudoschistotaenia* Fotedar et Chishti, 1976.

In view of the present clarification of some important morphological criteria of Diporotaeniinae and the increase of the number of genera in it, some amendments of the diagnosis of the subfamily proposed by Ryzhikov and Tolkacheva (1975) is needed. The peculiar morphology of the scolex of *Diporotaenia* as well as the presence of a female genital atrium are considered significant only at the generic level and are excluded from the subfamily diagnosis.

Diporotaeniinae Ryzhikov et Tolkacheva, 1975

Diagnosis: Strobila of medium size, craspedote. Mature proglottides with lateral enlargements. Scolex with four suckers, usually armed with small spines. Rhynchus usually armed with numerous small spines; tegument of its apex does not coalesce with rostellum. Rostellar apparatus 'acanthorhynchoid', with rostellum withdrawing separately from apex of rhynchus. Rostellar hooks in single row, blades directed posteriorly when rostellum withdrawn. Rostellar sheath sac-like. Osmoregulatory canals two pairs, with transverse anastomoses between them. Copulation traumatic; cirrus extirpated after it. Male pores regularly alternating. Testes from three to numerous. External seminal vesicle present. Internal seminal vesicle absent. Cirrus with powerful armament of spines. Common accessory vaginal duct between proglottides present. Uterus sac-like. Parasites of grebes (Podicipediformes). Type-genus: *Diporotaenia* Spasskaya, Spassky et Borgarenko, 1971. Other genera: *Tatria* Kowalewski, 1904; *Laterorchites* Fuhrmann, 1932; *Joyeuxilepis* Spassky, 1947; *Ryjikovilepis* Gulyaev et Tolkacheva, 1987; *Isezhia* Gulyaev et Konyaev, 2004; *Decarabia* Konyaev et Gulyaev, 2005; *Mircia* Konyaev et Gulyaev, 2006.

Spassky (1992) regarded Amabiliidae and Schistotaeniidae as sister taxa and members of a superfamily Amabilioidea Braun, 1900. However, the differences in the morphology of *Amabilia* and schistotaeniids give grounds to consider this statement as doubtful. Obviously, some further studies, including detailed redescription of *A. lamelligera* (Owen, 1832) Diamare, 1893, on the basis of both new material and type-

specimens, could help in clarification of the relationships between these cestode groups.

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