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MORPHOLOGICAL VARIABILITY OF *PLAGIORHYNCHUS* (*PROSTHORHYNCHUS*) *CYLINDRACEUS* (ACANTHOCEPHALA, PLAGIORHYNCHIDAE) AND ITS IMPORTANCE IN ASSESSMENT OF TAXONOMY STRUCTURE OF THE SUBGENUS

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Morphological Variability of *Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Acanthocephala, Plagiorhynchidae) and its Importance in Assessment of Taxonomy Structure of the Subgenus. Lisitsyna O. I. — Morphological variability in cystacanths and adults of *P.* (*P.*) *cylindraceus* (Goeze, 1782) Schmidt et Kuntz, 1966, type material of *P.* (*P.*) *gallinagi* Schachtachtinskaja, 1953 and *P.* (*P.*) *gracilis* Petrochenko, 1958 were studied. Data on intermediate hosts, definitive hosts and distribution of some species from the subgenus *Prosthorhynchus* were summarized. The taxonomy of the subgenus is discussed and names *P.* (*P.*) *formosus* Van Cleave, 1918, *P.* (*P.*) *genitopapillatus* Lundström, 1942, *P.* (*P.*) *transversus* Rudolphi, 1819, *P.* (*P.*) *gallinagi* and *P.* (*P.*) *gracilis* are placed as synonyms of *P.* (*P.*) *cylindraceus.*

Key words: Acanthocephala, Plagiorhynchidae, *Prosthorhynchus*, taxonomy.

Морфологическая изменчивость *Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Acanthocephala, Plagiorhynchidae) и ее значение для оценки таксономической структуры подрода. Lisitsyna O. I. — Изучена морфологическая изменчивость цистакантов и взрослых форм *P.* (*P.*) *cylindraceus* (Goeze, 1782) Schmidt et Kuntz, 1966, типовой материал *P.* (*P.*) *gallinagi* Schachtachtinskaja, 1953 и *P.* (*P.*) *gracilis* Petrochenko, 1958, обобщены данные о промежуточных, дефинитивных хозяевах и распространении ряда видов подрода *Prosthorhynchus.* Обсуждается таксономическая структура подрода. Подтверждена инвалидность названий *P.* (*P.*) *formosus* Van Cleave, 1918, *P.* (*P.*) *genitopapillatus* Lundström, 1942, *P. (P.*) *transversus* Rudolphi, 1819. Предлагается рассматривать *P.* (*P.*) *gallinagi* и *P.* (*P.*) *gracilis* синонимами *P.* (*P.*) *cylindraceus.*

Ключевые слова: Acanthocephala, Plagiorhynchidae, *Prosthorhynchus*, taxonomy.

Introduction

The genus *Plagiorhynchus* was rewiewed by Amin et al. (1999) and the status of the subgenus *Prosthorhynchus* (Kostylev, 1915) Schmidt and Kuntz, 1966 was confirmed and determined to comprise of 21 valid species. In different survays of birds from Ukraine 7 species of this subgenus were reported: *P.* (*P.*) *cylindraceus* (Goeze, 1782) Schmidt and Kuntz, 1966; *P.* (*P.*) *formosus* (Van Cleave, 1918) Schmidt and Kuntz, 1966; *P.* (*P.*) *genitopapillatus* (Lundström, 1942) Golvan, 1956; *P.* (*P.*) *gracilis* (Petrochenko, 1958) Golvan, 1956; *P.* (*P.*) *longirostris* (Travassos, 1927) Amin, 1985; *P.* (*P.*) *rossicus* (Kostylev, 1915) Schmidt and Kuntz, 1966; *P.* (*P.*) *transversus* (Rudolphi, 1819) Golvan, 1956 (Kostylev, 1915; Holodkovsky, Kostylev, 1916; Hritsenko, 1969; Smogorzhevskaja, Hritsenko, 1969; Livshits, 1970; Smogorzhevskaja, 1976; Sharpilo, 1976; Smogorzhevskaja et al., 1978; Kornyushyn, Smogorzhevskaja et al., 1975; Kornyushyn, Iskova et al., 1980; Treshchev, Shcherbateko, 1980; Lisitsyna, 2008). The validity of two of these species, *P.* (*P.*) *cylindraceus* and *P.* (*P.*) *rossicus* is doubtless while *P.* (*P.*) *longirostris* was identified mistakenly (Lisitsyna, 2008). The status of remaining 4 species, are morphologically close to the species *P.* (*P.*) *cylindraceus* and similar to each other, is problematic.

A high level of variability and wide specificity to definitive hosts were probably the main reasons for describing up to 30 species in the subgenus *Prosthorhynchus.* Subsequent attempts to review the family

Plagiorhynchidae and the genus *Plagiorhynchus* (Golvan, 1956; Schmidt, Kuntz, 1966; Schmidt, 1981; Amin et al., 1999) made since the middle of the XX century, resulted in a smaller number of species placed in the subgenus *Prosthorhynchus,* and 14 names established as minor synonyms of *Plagiorhynchus* (*P.*) *cylindraceus*, including *P.* (*P.*) *formosus, P.* (*P.*) *genitopapillatus, P.* (*P.*) *transversus.* Some researchers (Yamaguti, 1963; Khokhlova, 1986) did not support such taxonomic changes due to insufficient grounds, and some species, in particular *P.* (*P.*) *gracilis* and *P.* (*P.*) *gallinagi* (Schachtachtinskaja, 1953) Golvan, 1956, were not included in the discussion. In this study the following techniques were used: 1) examination of individual morphological variations of main diagnostic characters of both infective and mature forms; 2) examination of type material; 3) analysis of the available data on species biology and distribution.

Here we present results of the examination of six putative species of this subgenus*: P.* (*P.*) *cylindraceus*, *P.* (*P.*) *formosus*, *P.* (*P.*) *gallinagi*, *P.* (*P.*) *gracilis*, *P.* (*P.*) *genitopapillatus* and *P.* (*P.*) *transversus.*

Material and methods

To study morphological variability of cystacanths of *P.* (*P.*) *cylindraceus,* the following experiments were performed. In the intermediate hosts, cystacanths were experimentally grown from eggs of two mature females, *P.* (*P.*) *cylindraceus,* 35 cystacanths from one female (experiment 1) and 104 cystacanths from the other (experiment 2). Females were taken from the intestine of *Sturnus vulgaris* collected in the Mykolaiv Oblast (near the Black Sea State Biosphere Reserve, in the Volyzhyn Forest area) on 25.06.1994. Aqueous suspensions of eggs taken from each female were placed on rotten oak leaves and fed to *Armadillidium vulgare*, the isopod intermediate host of *P.* (*P.*) *cylindraceus*, for 3.5 hours. Isopods were collected in a biotope where preliminary examination of more than 2000 specimens had revealed no natural acanthocephalan infestations. In each experiment, 60 isopods were infected and 60 uninfected isopods were kept as control. Since the period of development from egg to cystacanth in *P.* (*P.*) *cylindraceus* is about 60 days (Schmidt, Olsen, 1964; Lisitsyna, 1993). The isopods were dissected 76–86 days after the day of infestation. The prevalence of infection in experimentally infected isopods was 100% and intensity 3–18 spec., while control specimens appeared not to be infected. Cystacanths were dipped into water where they spontaneously evaginated their rostellums. Temporary mounts made in For-Berlese fluid to study the following characters: the number of rows of hooks, number of hooks per row and length of the blade of the largest (6th) hook. These three characters were chosen as obligatory for diagnostics of acanthocephalan species of the systematic group in question, and as the most appropriate for comparison of cystacanths and adult acanthocephalans. The data obtained were processed statistically: mean value (X), error of mean (m), standard deviation (S) and coefficient of variation (CV) were calculated for each characted in cystacanths and adults.

Cystacanths and adults, were compared using the same three characters (number of rows of hooks, number of hooks per row and length of blade of the largest hook) in 128 adult specimens of *P.* (*P.*) *cylindraceus* (61 ♂, 67 ♀) from the collection of the Department of Parasitology at IZAN (74 from *Sturnus vulgaris*, 44 from *Turdus merula*, Kherson Oblast and Mykolaiv Oblast, Ukraine).

Type specimens of *P.* (*P.*) *gracilis* (Petrotschenko, 1958) (syntypes N 7467, 1 ♀ from *Vanellus vanellus*; N 7472, 1 ♀ from *Sturnus vulgaris*; N 7440 a, b, 1 ♂, 1 ♀ from *Sturnus caucasicus*), VIGIS Museum, Moscow and *P.* (*P.*) *gallinagi* (Schachtachtinskaia, 1953) (syntype N 2849, 1 ♀ from *Gallinago gallinago* L., 1758*,* Azerbaijan; N 18651, 1 ♂ from *Turdus merula,* Azerbaijan, VIGIS Museum, Moscow) were also studied.

To compare morphometric parameters of mature individuals *P.* (*P.*) *gallinagi* and *P.* (*P.*) *gracilis* with adult individuals *P.* (*P.*) *cylindraceus*, 18 specimens (11 ♂ and 7 ♀) from *Sturnus vulgaris* and 12 specimens (7 ♂ and 5 ♀) from *Turdus merula*, Kherson Oblast and Mykolaiv Oblast, Ukraine) were measured (in mm).

Results

Morphological variability of cystacanths *P.* (*P.*) *cylindraceus* experimentally grown in the intermediate host. Experiment 1. Number of rows of hooks in parental female was 19, in brood 15–20 (♂) and 14–21 (♀); number of hooks per row 13, in brood 13–16 (♂, ♀); length of blade of the largest hook is 0.070 mm, in brood 0.060–0.078 (♂) and 0.064–0.083 (♀). Experiment 2. Number of rows of hooks in parental female was 16, in brood 15–19 (♂) and 15–21 (♀); number of hooks per row 14–15 (in alternate rows), in brood 13–16 (♂) and 13–17 (♀); length of blade of the largest hook is 0.075, in brood 0.060–0.077 (♂) and 0.065–0.080 (♀). The results of the statistical analysis are presented in table 1 and figure 1. These data provide evidence of variability *P.* (*P.*) *cylindraceus* in three selected characters. The coefficient of variation (CV) was from 4.2% to 9.9%.

Comparison of *P.* (*P.*) *cylindraceus* cystacanths and adults using the three selected characters did not reveal any significant differences (table 1). The shorter blade of the largest hook in cystacanths as compared to adult acanthocephalans may be explained by the unnaturally high intensity of infection of intermediate hosts in the experiments that

Таблица 1. Морфометрия экспериментально выращенных цистакантов *P.* (*P.*) *cylindraceus* и взрослых форм

Table 1. Morphometry of experimentally grown cystacanths *P.* (*P.*) *cylindraceus* and mature individuals

Character	n	min	max	X ± m	S	CV (%)
Cystacanths, experiment 1	35					
Number of rows of hooks						
♂	17	16	20	16.9 ± 0.28	1.17	6.92
♀	18	14	21	17.3 ± 0.40	1.71	9.88
Number of hooks per row						
♂	17	13	16	14.7 ± 0.197	0.81	5.51
♀	18	13	16	14.5 ± 0.176	0.75	5.17
Length of blade of the 6th hook						
♂	17	0.060	0.078	0.066 ± 0.0009	0.004	5.61
♀	18	0.064	0.083	0.073 ± 0.001	0.005	6.16
Cystacanths, experiment 2	104					
Number of longitudinal rows of hooks						
♂	49	16	19	17.6 ± 0.195	1.37	7.78
♀	55	15	21	18.1 ± 0.16	1.18	6.5
Number of hooks per row						
♂	49	13	16	14.4 ± 0.099	0.69	4.72
♀	55	13	17	14.3 ± 0.08	0.60	4.20
Length of blade of the 6th hook						
♂	49	0.060	0.078	0.070 ± 0.0016	0.006	9.27
♀	55	0.065	0.080	0.073 ± 0.0006	0.005	6.44
Mature individuals	128					
Number of longitudinal rows of hooks						
♂	61	15	21	17.0 ± 0.19	1.55	9.12
♀	67	15	20	17.0 ± 0.21	1.68	9.87
Number of hooks per row						
♂	61	12	17	14.5 ± 0.15	1.18	8.14
♀	67	12	18	14.0 ± 0.14	1.17	8.36
Length of blade of the 6th hook						
♂	61	0.060	0.089	0.076 ± 0.0067	0.0052	6.84
♀	67	0.068	0.095	0.082 ± 0.00066	0.0054	6.56

may have affected the dimensions of the parasites, and that hooks can grow more during the pubescent period in the definitive host (Podesta, Holmes, 1970; Tarashevski, 2000).

Investigation of the syntype (mature female *P.* (*P.*) *gallinagi* from the type host *G. gallinago*) and 1 male collected in the type locality from *T. merul*a enabled us to add to the species description. In particular, the length of the blades of the largest hooks varies from 0.072–0.080 and root length is 0.056–0.064; neck length is up to 0.19; length of proboscis receptacle can reach 1.92.

The description of *P.* (*P.*) *gracilis* was also modified after investigation of syntypes: three mature females from *V. vanellus*, *S. vilgaris*, *S. caucasicus* and one male from *S. caucasicus*. Particularly, the proboscis armature was observed to include 18–20 rows of 14–16 hooks, and the length of hook blades of the largest hooks was 0.078–0.084.

However, even using improved distinguishing characters for *P.* (*P.*) *gallinagi* and *P.* (*P.*) *gracilis* do not give their reliable differentiation from *P.* (*P.*) *cylindraceus* (table 2).

Data on definitive and intermediate hosts and distribution of parasites from the group in question are presented in table 3. For all of them, passerine birds, and sandpipers or, rarely, representatives of other bird orders may serve as definitive hosts. However, these acanthocephalans can become mature only in passerines and sandpipers. The intermediate hosts are, where known, terrestrial isopods. The geographic range of *P.* (*P.*) *cylindraceus* includes localities where acanthocephalans were found under five other names.

Table 2. Comparison of mature individuals *P. (P.) cylindraceus, P. (P.) gallinagi* and *P. (P.) gracilis*
Таблица 2. Сравнение промеров *P. (P.) cylindraceus, P. (P.) gallinagi* и *P. (P.) gracilis*

Species, number of individuals	Number of rows of hooks	Number of hooks per row	Body size (length x width)	Proboscis (length x width)	Proboscis receptacle (length x width)	Neck length	Length of lemnisks	Length of blade of the largest hook	Testicles (♂) and eggs (♀) (length x width)
P. (P.) cylindraceus *									
18 ♂	15–21	12–17	5.16–11.83 x 0.9–2.3	0.86–1.31x 0.17–0.31	1.48–2.37x 0.31–0.55	0.12–0.22	1.52–4.3	0.067–0.089	0.50–1.71x 0.41–0.90
12 ♀	15–20	13–17	8.93–14.06 x 1.5–2.8	0.86–1.36x 0.21–0.43	1.84–2.53x 0.45–0.62	0.12–0.25	1.14–3.92	0.070–0.089	0.065–0.080 x 0.027–0.038
P. (P.) cylindraceus **									
11 ♂	14–17	15–18	7.79 x 1.67–1.88 8.97–11.06 x	1.15–1.21 x 0.21–0.24	—	—	—	0.070–0.072	—
12 ♀	14–17	15–18	2.06–2.55	1.24–1.39 x 0.24–0.27	—	—	—	0.073–0.076	0.064–0.078 x 0.025–0.028
P. (P.) cylindraceus ***									
♂	17–19	14–16	6.30–10.70 x 1.29–1.47	1.00 x 0.23–0.27 1.10–1.25 x	1.50–2.00 x 0.40–0.48	0.19	3.40–3.85 x 0.10–0.12	0.080–0.083	0.82–1.20 x 0.75–0.82
♀	17–19	14–16	9.20–13.10 x 1.65–2.50	0.27–0.28	1.95–2.25 x 0.46–0.48	0.19–0.20	3.60–4.40 x 0.09–0.17	0.080–0.088	0.065–0.0925 x 0.030–0.0375
P. (P.) gallinagi ****									
♂ ad.	17	16	10.19 x 2.50	1.28 x 0.31	2.28 x 0.69	0.19	Invisible	0.080	0.30 x 0.30
♀ ad.	17–18	15	10.68 x 2.70	11 x 0.31	1.92	—	Invisible	0.074	0.070 x 0.033
P. (P.) gracilis ****									
1 ♂	18	14–15	deformed	formed	1.70 x 0.44	Invisible	Invisible	0.078–0.082	0.55 x 0.55
3 ♀	18–20	15–16	10.5 x 2.30	1.17–1.20 x 0.26–0.30	2.19–2.35 x 0.31	0.14	Invisible	0.078–0.084	0.066 x 0.028

* Ukraine — measurements of specimens from collection;
** South Africa — measurements after Amin et al., 1999;
*** Bulgaria — measurements after Z. Dimitrova et al., 1999;
**** Measurements of syntypes.

Table 3. Data on definitive, intermediate hosts and distribution of species in question from subgenus *Prosthorhynchus*

Таблица 3. Сведения об окончательных, промежуточных хозяевах и распространении обсуждаемых видов подрода *Prosthorhynchus*

Species	Definitive hosts	Intermediate hosts	Distribution	Source
P. (*P.*) *cylindraceus*	Passerine, sandpipers, rarely ducks, birds of prey	Isopoda: Oniscoidea	Eurasia, North America, Australia, South Africa	Yamaguti, 1963; Amin et al., 1999; Smales, 2010; Dimitrova, 2009
P. (*P.*) *formosus*	Passerine	Isopoda: Oniscoidea	North America, Eurasia	Yamaguti, 1963; Sinitzin, 1929; Schmidt, Olssen, 1964; Ikramov, 1992
P. (*P.*) *gallinagi*	Sandpipers and passerine	Unknown	Caucasus	Schachtachtinskaja, 1953; Vaidova, 1978
P. (*P.*) *genitopapillatus*	Passerine, rare sandpipers	Unknown	Eurasia	Petrochenko, 1958; Yamaguti, 1963
P. (*P.*) *gracilis*	Passerine, sandpipers, rarely ducks	Unknown	Eurasia, Australia	Petrochenko, 1958; Yamaguti, 1963; Khokhlova, 1986;
P. (*P.*) *transversus*	Passerine	Isopoda: Oniscoidea	Eurasia	Yamaguti, 1963; Ikramov, 1992

Discussion and conclusion

When Golvan (1956) performed his revision of the genus *Prosthorhynchus* Kostylev, 1915, he suggested that 8 names, including *P. genitopapillatus* and *P. transversus*, were synonyms of *P. cylindraceus*. Later Schmidt and Kuntz (1966) revised the family Plagiorhynchidae and placed the genus *Prosthorhynchus* as a subgenus within the genus *Plagiorhynchus* Lühe, 1911, at the same time describing three more species: *P.* (*P.*) *taivanensis, P.* (*P.*) *bulloki* and *P.* (*P.*) *golvani*. Subsequently Schmidt (1981) synonymised *P.* (*P.*) *formosus* Van Cleave, 1918 (comparing American material to European), and *P.* (*P.*) *taivanensis* Schmidt, Kuntz, 1966 with *P.* (*P.*) *cylindraceus*. As we mentioned before, such taxonomic changes were not supported by some researchers. Yamaguti (1963) and Khokhlova (1986) considered *P.* (*P.*) *formosus, P.* (*P.*) *genitopapillatus* and *P.* (*P.*) *transversus* as individual species. Golvan (1994) listed 27 species within the subgenus and included *P.* (*P.*) *gallinagi, P.* (*P.*) *genitopapillatus, P.* (*P.*) *gracilis*, *P.* (*P.*) *transversus* as valid. Dimitrova et al. (1999) described *P.* (*P.*) *cylindraceus* based on material from starlings from Bulgaria, but placed *P.* (*P.*) *genitopapillatus* and *P.* (*P.*) *transversus* as synonyms of *P.* (*P.*) *cylindraceus*. Amin et al. (1999) based their description of *P.* (*P.*) *cylindraceus* on material from four species of sandpipers from the South Africa. These authors also had a chance to examine specimens *P.* (*P.*) *formosus,* collected by Van Cleave (1918, 1942) from the North America, who had described and did not find any significant differences from *P.* (*P.*) *cylindraceus*. In their article they gave the key to species of the subgenus *Prosthorhynchus* consisting of 21 species including *P.* (*P.*) *genitopapillatus, P.* (*P.*) *gracilis* and *P.* (*P.*) *gallinagi*. These authors recognized *P.* (*P.*) *genitopapillatus* (using name *P. genitopapillosus*) as valid and supported this by referring to the presence of prominent papilla on the posterior end in females. However, Lundström (1942) in his description of *P.* (*P.*) *genitopapillatus,* noted prominences, looking like papillae, surrounding male's genital pore. We saw wrinkles in the area of male's genital pore in many specimens belonging to other species of the family Plagiorhynchidae, and we therefore do not consider these formations to be stable characters. In 2008, two more species of the subgenus were described from Vietnamese birds, *P.* (*P.*) *digiticephalus* Amin, Van Ha, Heckmann, 2008 from *Porzana fusca* L., 1776 and *P.* (*P.*) *megareceptacilis* Amin, Van Ha, Heckmann, 2008 from *Gallinago gallinago* and *Myophonus coeruleus* (Scopoli, 1786) (Amin et al., 2008). Both

species differ from those discussed above in the terminal position of the genital pore in males (subterminal *P.* (*P.*) *cylindraceus)* while *P.* (*P.*) *digiticephalus* also differs by considerable number of hooks per each row (23–24 vs. 12–18 in *P.* (*P.*) *cylindraceus*). Smales (2010) described another species of the subgenus, *P.* (*P.*) *cossyphicola*, parasitizing birds in Africa. The species differs from other species of the subgenus by smaller proboscis size (not longer than 0.78 mm) and by proboscis armature (16 rows of 12–13 hooks).

Our studies have demonstrated significant variability in *P.* (*P.*) *cylindraceus* in the three main diagnostic characters used for identification of species in this subgenus (table 1, fig. 1). At the same time, the range of values for these characters in experimentally grown cystacanths includes values of these characters as described for the other five species (including *P.* (*P.*) *gallinagi* and *P.* (*P.*) *gracilis*) analyzed in this study (fig. 2). These data can serve as confirmation of the synonymy of *P.* (*P.*) *formosus, P.* (*P.*) *genitopapillatus* and *P.* (*P*). *transversus* with *P.* (*P.*) *cylindraceus* as indicated by earlier researchers (Schmidt, 1981; Amin et al., 1999).

The species *Prosthorhynchus gallinagi* was originally described from material from snipe from Azerbaijan (Schachtachtinskaja, 1953) and not differentiated from other species common in passerine birds. Later, in Azerbaijan, acanthocephalans under this name were found in the intestine of thick-knees, starlings, blackbirds and even in common raccoons (Sadykhov, 1973; Vaidova, 1978), but the authors did not support such identification by providing original descriptions and drawings. Petrochenko (1958) in the description of *Prosthorhynchus gracilis* differentiated it from *P. scolopacidis* Kostylev, 1915, *P. rossicus* Kostylev, 1915 and *P. rostratus* Marval, 1902, instead of from *P. gallinagi*. He did not consider *P. cylindraceus*, because he, after A. Meyer (1933), placed it within the genus *Centrorhynchus* Lühe, 1911. Examination of all information available for these two species confirmed our hypothesis that *P.* (*P.*) *gallinagi* and *P.* (*P.*) *gracilis* are synonyms of *P.* (*P.*) *cylindraceus*.

The comparison of mature specimens of *P.* (*P.*) *cylindraceus* using nine morphological characters (Ukraine, collection of the Department of Parasitology, IZAN) with data

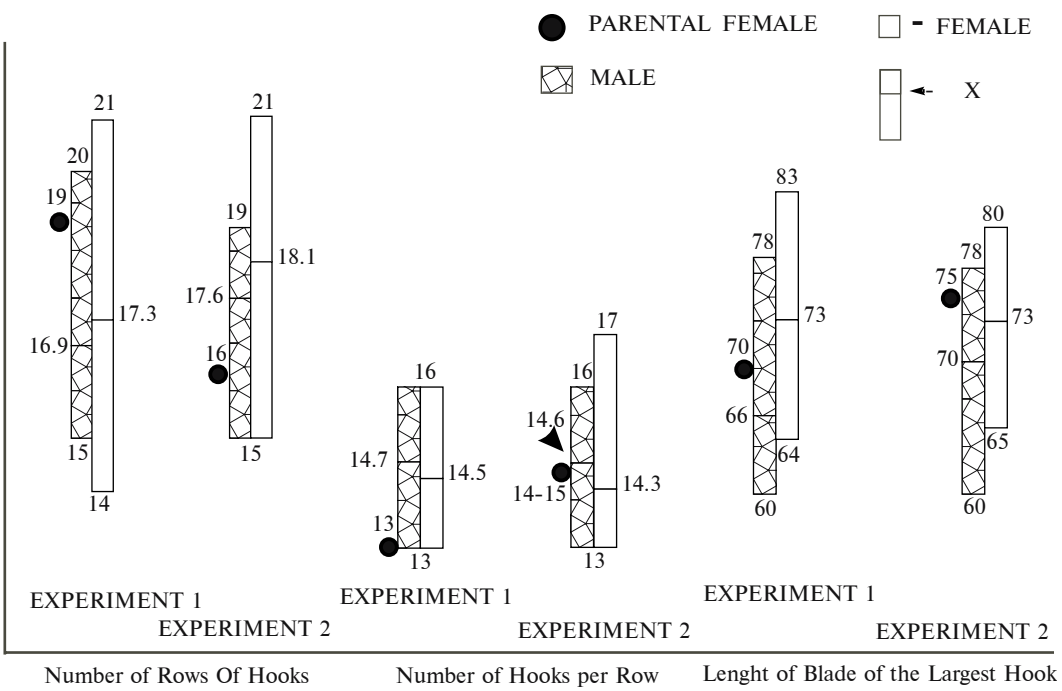

Fig. 1. Morphometry of experimentally grown cystacanths *P.* (*P.*) *cylindraceus*.

Рис. 1. Морфометрия экспериментально выращенных цистакантов *P.* (*P.*) *cylindraceus*.

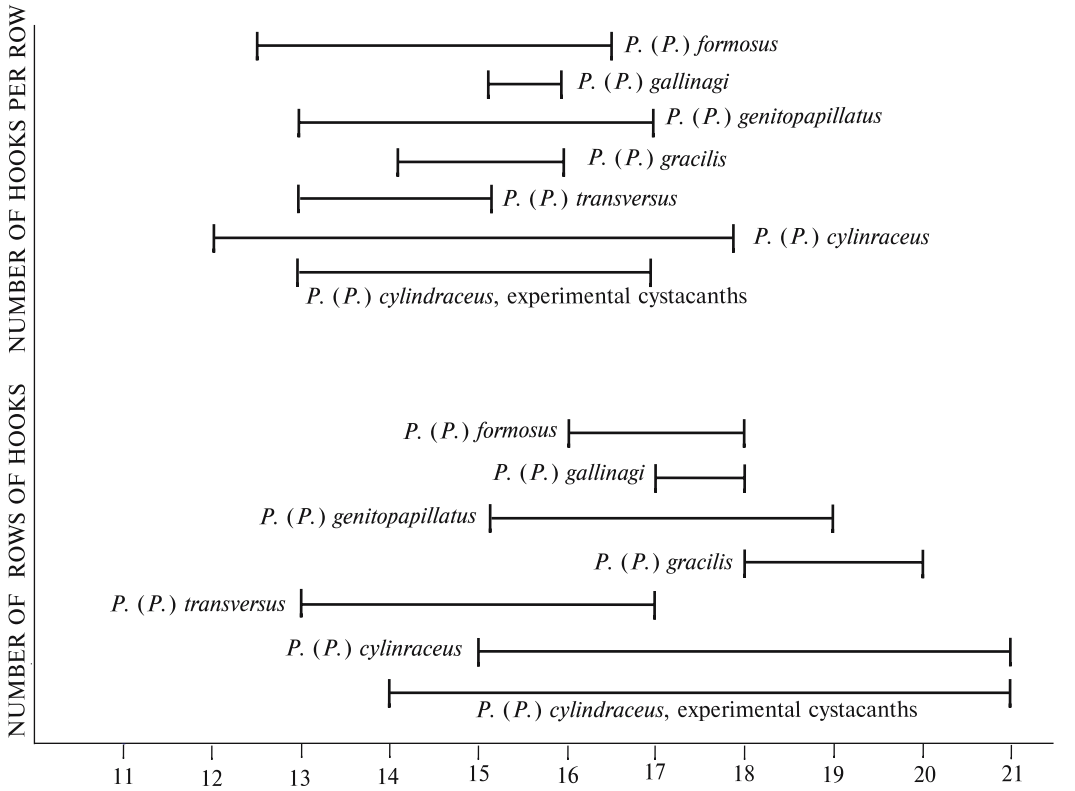

Fig. 2. Data comparison by two characters in cystacanths *P.* (*P.*) *cylindraceus* [experimentally grown] and mature individuals *P.* (*P.*) *cylindraceus* [summarized data by material from Ukraine (author's own collection), Bulgaria (Dimitrova et al., 1999) and Southern Africa (Amin et al., 1999)]; *P.* (*P.*) *formosus* (measurements of type specimens from Amin et al., 1999), *P.* (*P.*) *gallinagi* (summarized data of the first description and processing of type specimens); *P.* (*P.*) *genitopapillatus* [by first description (Lundström, 1942 from Petrochenko, 1958)], *P.* (*P.*) *gracilis* (summarized data of the first description and processing of type specimens); *P.* (*P.*) *transversus* [by first description (Rudolphi, 1819 from Meyer, 1933)].

Рис. 2. Сравнение по двум признакам у цискантов *P.* (*P.*) *cylindraceus* (экспериментально выращенных) и у половозрелых форм *P.* (*P.*) *cylindraceus* [обобщенные данные по материалу из Украины (собственный материал), Болгарии (Dimitrova et al., 1999) и Южной Африки (Amin et al., 1999); *P.* (*P.*) *formosus* (промеры типового материала по: Amin et al., 1999); *P.* (*P.*) *gallinagi* (обобщенные данные первоописания и обработки типовых экземпляров); *P.* (*P.*) *genitopapillatus* [по первоописанию (Lundström, 1942)], *P.* (*P.*) *gracilis* (обобщенные данные первоописания и обработки типовых экземпляров); *P.* (*P.*) *transversus* [по первоописанию (Rudolphi, 1819 по: Meyer, 1933)].

for specimens from other parts of geographic range of *P.* (*P.*) *cylindraceus,* namely from Bulgaria and South Africa (Amin et al., 1999; Dimitrova et al., 1999) and with the type specimens of *P.* (*P.*) *gallinagi* (VIGIS Museum, Moscow) and (*P.*) *gracilis* (VIGIS Museum, Moscow) also did not reveal significant differences (table 2, fig. 2) between the three putative species.

The available data on definitive and intermediate hosts, and distribution of parasites under these six names do not provide any additional reasons for species differentiation (table 3).

We did not perform DNA tests though we consider such examinations necessary at least for comparison of *P.* (*P.*) *cylindraceus* from birds of Europe and from birds of America. Until now, it is not known why *P.* (*P.*) *cylindraceus* from North America, Australia and Western Europe demonstrate the ability to undergo paratenic parasitism (Dollfus, Golvan, 1961; Nickol, Oetinger, 1968; Smales, 1988), but representatives of the same species from Eastern Europe do not. In Eastern Europe, juvenile individuals of this parasite were found only in the intestinal lumen of the insectivores (Tkach, 1989).

Consequently, taking into consideration the results of these studies, the subgenus *Prosthorhynchus* of the genus *Plagiorhynchus* includes 20 species:

P. (*P.*) *scolopacidis* (Kostylev, 1915) Schmidt and Kuntz, 1966, type species of subgenus
P. (*P.*) *angerense* (Travassos, 1926) Schmidt and Kuntz, 1966
P. (*P.*) *asymmetricus* Belopolskaja, 1983
P. (*P.*) *bullocki* Schmidt and Kuntz, 1966
P. (*P.*) *cossyphicola* Smales, 2010
P. (*P.*) *cylindraceus* (Goeze, 1782) Schmidt and Kuntz, 1966
P. (*P.*) *digiticephalus* Amin, Van Ha, Heckmann, 2008
P. (*P.*) *golvani* Schmidt and Kuntz, 1966
P. (*P.*) *limnobaeni* (Tubangui, 1933) Golvan, 1956
P. (*P.*) *longirostris* (Travassos, 1927) Amin, 1985
P. (*P.*) *malayensis* (Tubangui, 1935) Schmidt and Kuntz, 1966
P. (*P.*) *megareceptacils* Amin, Van Ha, Heckmann, 2008
P. (*P.*) *nicobarensis* (Soota and Kansal, 1970) Zafar and Farooqi, 1981
P. (*P.*) *ogati* (Fukui and Morisita, 1936) Schmidt and Kuntz, 1966
P. (*P.*) *pigmentatus* (Marval, 1902) Meyer, 1932
P. (*P.*) *pittarum* (Tubangui, 1935) Schmidt and Kuntz, 1966
P. (*P.*) *reticulatus* (Westrumb, 1821) Golvan, 1956
P. (*P.*) *rheae* (marval, 1902) Schmidt and Kuntz, 1966
P. (*P.*) *rossicus* (Kostylev, 1915) Schmidt and Kuntz, 1966
P. (*P.*) *varispinus* Wang, 1966

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