***Fuhrmanolepis beskydensis* n.sp. (Cestoda: Dilepididae) from woodcock
Scolopax rusticola L.(Aves, Charadriiformes) in Slovakia
with comments on sytematics and nomenclature
of the genus *Fuhrmanolepis* Spassky et Spasskaya, 1965**

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Summary

Fuhrmanolepis beskydensis n.sp. from woodcock, *Scolopax rusticola* L. in Slovakia is described based upon light microscope observation. The medium sized species possess a single crown of 21 'diorchid' (wrench-shaped) hooks, 28 – 30 µm long. Irregularly alternating genital pores were combined with abnormal multiple shifting of pores within the lateral margins of strobila. Number of testes 18 – 25. Cirrus-sac and evaginated cirrus are 115 – 135 x 7 – 12 and 26 x 6 – 11 µm, respectively. The species is differentiated from closely related congeneric taxons and some other morphologically similar dilepidids. An attention is being paid to taxonomy and nomenclature of *Fuhrmanolepis* Spassky et Spasskaja, 1965 regarding an emendation of mentioned genus to *Fuhrmannolepis* by Bona (1994a) and modification of its diagnosis.

Key words: Cestoda; Dilepididae; *Fuhrmanolepis*, *Fuhrmannolepis*; nomenclature; taxonomy; *Fuhrmanolepis beskydensis* n.sp.; *Scolopax rusticola*; Charadriiformes; Slovakia

Introduction

Aploparaksidae and Dilepididae belong to most numerous tapeworm groups parasitizing in *Scolopax rusticola* L. in Slovakia. Faunistic survey carried out in an area near Bardejov revealed not only the common tapeworm species (Ryšavý & Farkaš, 1982), but also other unknown taxons, such as *Fuhrmanolepis beskydensis* n.sp. Besides having dilepidid characteristics, this species displays alternating genital pores, combined with multiple abnormal shifting of the pores and changing their position within the lateral margins of the strobilae. Similar changing of genital pores has brought about formation of the genus *Diagonaliporus* Krotov, 1951 (Krotov, 1951). The species belonging to this group have then been transferred into other genera, including the *Fuhrmanolepis* Spassky et Spasskaya, 1965

(Schmidt, 1986; Spasskaya & Spassky, 1978) or into the genus *Fuhrmannolepis* (sensu Bona, 1994a). In connection with placing the new species into the original genus *Fuhrmanolepis* this paper deals with several nomenclatural and taxonomical problems of the mentioned genera.

Materials and methods

Tapeworms were recovered from the woodcock *Scolopax rusticola* L., examined within the period of 1958 – 1970 in Kurov near Bardejov, north eastern Slovakia. The specimens were fixed and preserved in alcohol-formaldehyde-acetic acid, stained in Semichon's and Blazhin's acetic carmines, dehydrated in ethanol series, cleared in clove oil and mounted into Canada balsam. They were identified based on species-specific morphological characters on permanent slides. Taxonomically important traits were studied in detail and measured under a microscope linked to a computer equipped with image analysis software (Olympus analySISdocu) and their measurements were taken by the scheme of Mas-Coma and Galan-Puchades (1991). The present descriptions are based on evaluation of tapeworm specimens collected from 15 individuals of *S. rusticola*. Measurements are in micrometers (µm), except where indicated.

Results

Fuhrmanolepis beskydensis n.sp.

Type-hosts: *Scolopax rusticola* L.

Type-locality: Cigelka (Bardejov district)

Site of infection: Small intestine

Prevalence: Less frequent (number of specimens not counted due to the missing scolices hooks and other taxonomically significant features). Identified 2/15, i.e. 13.3 % of hosts

Material studied: Holotype No. 201/61b; Paratypes: 202/61š, 201/61e

Type material deposited in the Helminthological collection

Fig. 1. *Fuhrmanolepis beskydensis* n.sp.

A-scolex; B-rostellum hook (holotype); C-strobila proglottids with alternating genital pores (holotype); D-strobila proglottids, visible 'shifting' of pores, combined with their alternating within two last proglottids (paratype); E-hermaphroditic proglottis (holotype)

at the Parasitological Institute SAS, Hlinkova 3, 040 01 Košice, Slovak Republic and in the Helminthological collection of the East Slovak Museum, Košice

Etymology: Specific name of the cestode has derived from the name of Nízke Beskydy mountain range in the northern Slovak borderland, where its type locality is situated.

Mature strobila 70.5 – 86 x 0.718 – 0.975 mm. Scolex 290 – 359 in diameter (Fig.1A). Suckers 140 – 180 x 109 – 154, unarmed. Rostellar pouch extending to posterior margin of suckers. Rostellum 117 x 28 – 30. Apical disk 55 wide, armed with 21 "diorchid" (wrench-shaped) hooks in a single row (Fig.1B). Hooks 28 – 30 long. Blade 7 – 8, base 22 – 24. Width of hook 7. Segments usually wider than longer. Premature proglottids first develop primordia of male genital organs. Then they differentiate into 18 – 25

testicules and irregularly alternating openings of genital pores (Fig. 1C), often situated slightly sublaterally. Abnormal shifting of genital openings through median part of 1 – 4 segments to opposite lateral margins (Fig.1D; 2 A, B) was observed in holotype in four cases and in paratype in seven cases. Second paratype is juvenile. The segment containing shifting of genital porus near vitellarium, or posteriorly, usually narrowed. Sometimes deformed - as if his caudal half were formed from up to three connate halves of the segments with separated margins. (Fig. 1D – second segments and 2B). The genital organs in those segments are often grouped together and therefore in the total preparations they form dark, hardly differentiable aggregations of various structures. Osmoregulatory canals in these segments are missing. Despite this fact it seems that some organs and structure "rotate" without apparent

Fig. 2. *Fuhrmanolepis beskydensis* n.sp.
A-shifting of genital pores within strobila margins; B-shifting of genital pores with narrowed and deformed postmature proglottid (holotype)

rotation of external strobila. In other cases, neither narrowing of segments nor their deformations in site of shifting are apparently visible (Fig. 1D-sixth segment; 2A; 4). After irregular alternating or shifting of genital pores, in strobila there is a row of segments (6-25 or more) with unilateral genital openings. In one case we observed in paratype 54 segments with unilateral openings. In hermaphroditic segment 385 x 715 (Fig. 1E), testicles are 39 – 62 in average, located in medium area of the segments between osmoregulatory canals posterior to ovarium and vittellarium. Loops of vas deferens in anterior part of segments. Distinctively developed cirrus sac (CS) 115 – 135 x 7 – 12, more or less of undulate shape. (Fig. 3B). Depending on a degree of undulation, CS may overlap poral osmoregulatory canals. In mature proglottides CS indistinct, thin-walled, with 1 – 2 coils of internal vas deferens. It opens into small genital atrium in central, sometimes 'caudal' third of the segment margin, surrounded by relatively strong muscles. Evaginated, finely spinned cirrus slightly conical, protruding to 26, at base 6 – 11 in diameter. Indistinct vagina with less distinct preatrial vaginal sphincter (?) posteriorly to CS. Lobular two-winged ovary in aforementioned segment 385 x 715 has 444 in the longer diameter in the anterior part of the segment. (Fig. 1E). Receptaculum seminis and Mehlis's gland at ovarian isthmus. Vitellarium lobular, transversely elongated, 130 in diameter, posterior to ovary.

In postmature proglottides, net-like uterus develops (Fig. 3A) while ovarium and vitellarium degenerate. Testes visible for a long time. Periodically appearing in gravid proglottides. Loops of vas deferens very distinct also in these segments.

Reticulated uterus also retained in the segments with eggs filling almost whole space. Eggs round to oval, without filaments. Native 69 – 78 x 54 – 57. External envelope in permanent slides unclear, 35-42 x 34-36. Embryophore 21 – 33 in diameter, surface seeded with minute spines. Embryonal hooks 9 – 11 long (Fig. 3L.)

Holotype: 70.5 x 0.975 mm. Scolex 290 in diameter, suckers 140 – 164 x 109 – 117. Twenty-one rostellar hooks 28 – 29 long. Testicles 18 – 25 in number. Cirrus sac 115 – 131 x 7 – 12, cirrus slightly conical up to 24 long; at proximal parts 8 – 11 wide. Ovary lobular. Uterus reticulate. Spinned embryophore 29 – 33. Embryonal hooks 9 – 11 µm.

Discussion

A) Differential diagnosis

According to the way of genital pore openings, *F. beskydensis* n.sp. is the most similar to *F. schikhobalovae* (Krotov, 1951). New species differs in: a) a number of 21 rostellar hooks in comparison to 16 in *F. schikhobalovae*; b) shape of hooks (cfr. Fig. 3D; 3E); c) a greater number of testicles 18 – 25 in comparison to 8 – 12 in *F. schikhobalovae*; d) width of burs cirri 7 – 12 µm in diameter, in comparison to 18 µm in *F. schikhobalovae*. According to Krotov (1951), bursa cirri is very thin, extending behind poral excretory canals and without visible margins turning to vas deferens, 6 µm (?) wide. e) Shape and jagged structure of vitellarium in contrast to round one in *F. schikhobalovae*; f) reticulated uterus (Fig. 3A) as against horse-shoe-shaped uterus in *F. schikhobalovae* (Fig. 3C); g) irregularly alternating genital pores in combination to multiple shifting of pores within lateral margins of strobila through 1 – 4 segments (Fig. 1D., 2A, B). In *F. schikhobalovae* this is known as one-of transition of genital pores from one segment's margin to another within 12 segments. Krotov (1951) considers this number to be a species-specific. Voge's findings (1952a, 1952b) could be mentioned here as they demonstrated that the intraspecific variability including the frequency of some types of structural abnormalities of a species must also be considered a typical characteristic of the species in question.

Bona (1994a) considers mentioned shifting in the species of the genus *Diagonaliporus* Krotov, 1951 to be a rotation of a strobila and not a shifting of pores, as proved by the spiral course of the longitudinal musculature and osmoregulatory canals. In *F. beskydensis*, these structures are not visible in the parts where the shifting takes place. However, there is more to it than meets the eye. Had it been just the case of strobila rotation, the sublaterally located genital pores would have then gradually transited (altogether by 180°), e.g. from the top side of strobila to the bottom one.

Fig. 3. *Fuhrmanolepis* spp.

A, B - *F. beskydensis* n.sp. A-postmature proglottis; B-cirrus sac; C-*Fuhrmanolepis schikhobalovae* - postmature proglottis with horse-shaped uterus (according to Krotov, 1951); D-K- hooks of compared dilepidids, lenght 28-34 µm according to various authors; D-*Fuhrmanolepis beskydensis* n.sp.; E-*Fuhrmanolepis schikhobalovae* (according to Krotov 1951); F — I - *Fuhrmanolepis scolopacina*, (F,G- our observations; H- according to Spasskaya and Spassky, 1978); I- *Choanotaenia cayennensis* (Fuhrmann, 1907) var. *scolopacis* (according to Joyeux and Baer, 1939); J, K- *Taenia* embryo, hooks lenght 29-34 µm; (according to Krabbe, 1869) L-*Fuhrmanolepis beskydensis* n.sp. egg.

In the given example (Fig. 2A; 2B) the pores are shifting only from the left margin of the segments through the median area of proglottis towards the right margin. In addition to it, it is known that some organs “follow” the opening of genital ducts in the segments even in the case of regular or irregular alternating. It is for instance the case of the ovary, where the poral wing is often less developed than aporal ones (Fig. 1E). Mechanism of this “rotation” is probably built into the genetic code of relevant taxon.

So far, no consensus has been reached among experts on a national level on either shifting or strobila rotation in *F. beskydensis* n.sp. Nevertheless it can be regarded as abnormality ad hoc without taxonomic implication. The authors are planning to study the subject by its more thorough observation. 8.) Distribution and occurrence. *F. schikhobalovae* was described in *S. rusticola* in the island of Sakhalin.

Comparing the number, measurements and shape of the

hooks, *F. beskydensis* n.sp. is closely related to *F. scolopacina* (López-Neyra, 1944) (Fig. 3F-I). They differ in: a) measurements of strobilla 70.5 – 86 mm in contrast to 10 – 22 mm in *F. scolopacina*; b) width of bursa cirri 7 – 12 μ m in *F. beskydensis* n.sp. in comparison to 20 – 33 μ m in *F. scolopacina*; c) maximum cirrus width 6 – 11 μ m in contrast to 15 – 16 in *F. scolopacina*; d) distinct and compact knot of loops of *vas deferens* in contrast to loosely coupled loops in *F. scolopacina*; e) Reticulated uterus in comparison to sacciform uterus with septa in *F. scolopacina* sensu Spasskaya and Spassky (1978); or labyrinthine in *Ovosculpta scolopacis* (Joyeux and Baer, 1939) sensu Bona (1994a). Spasskaya and Spassky (l.c.) consider both forms (sub. e) to be synonyms of *F. scolopacina* (López-Neyra, 1944); f) alternating genital pores. In *F. scolopacina* they alternate irregularly by 1 – 2 segments. In one particular strobila in *F. scolopacina* we observed shifting of genital pores through 2 segments on a ventral side of strobila. The segments margins are neither deformed nor narrowed (Fig. 4).

Fig. 4. *Fuhrmanolepis scolopacina* (López-Neyra, 1944) strobila without scolex with incompletely developed eggs, app. 11 mm long shifting of genital pores. Osmoregulatory canals invisible.

F. beskydensis n.sp. differs from insufficiently described taxon *Taenia embryo* Krabbe, 1869, in: a) number of hooks 21 in contrast to 14 – 16 in *T. embryo*; b) shape of the hooks. In the new species, the hooks have relatively

longer handle and shorter blade than the hooks in *T. embryo* (Figs. 3 J, K); c) width of bursa cirri in the new species is 7 – 12 wide, in *Choanotaenia embryo* (Krabbe, 1869) 42 – 52; d) shorter cirrus. In *F. beskydensis* it is protruded at 26, in *Ch. embryo* (Krabbe, 1869) 42 and other features (sensu López-Neyra, 1944). Spasskaya and Spassky (1978) classified *Ch. embryo* (Krabbe, 1869) into the genus *Polycercus* Villot, 1883.

With long unilateral series between alternating of genital pores the new species is similar to *Ethiopotaenia trachyphnoides* Metrick, 1961. This taxon does not possess apical apparatus (Bona, 1994a), as the new species does.

Sandeman (1959) refers to strobilae with unilateral genital pores and those with alternating pores belonging to the only species of *Dilepis africana*. It is also possible to presume such similarity in *F. beskydensis* n.sp., as in the strobila section, 19.8 mm long, 54 segment with unilateral genital pores were observed. Therefore the new species was compared to the taxons with unilateral pores. *F. beskydensis* was similar only with *F. schiklobalovae*, classified into the genera with unilateral pores. Schmidt (1986) classifies this species into the genus *Valipora* Linton, 1927, and Bona (1994a) into the genus *Trichocephaloidis* Sinitzin, 1896. According to Krabbe (1882), unilateral pores are also visible in 50 mm long *Taenia bacilligera* Krabbe, 1869. *F. beskydensis* n.sp. differs from these species in a single crown of 21 hooks in contrast to double crown of 20 hooks 21 – 23, or 18 – 25 in *T. bacilligera*. Other taxonomically significant features are not known from the original descriptions of Krabbe (1869; 1882). Other dilepidid species with unilateral pores possess different combination of taxonomically significant features than those in *F. beskydensis* n.sp.

B) Nomenclature and taxonomy of the genus *Fuhrmanolepis* Spassky et Spasskaja, 1965

Problems concerning the identification of new species with regards to genera requires a brief commentary on the genesis of the genus *Fuhrmanolepis* and *Fuhrmannolepis* to clarify the opinion resulting in such interpretation of *F. beskydensis* n.sp.

The diagnosis of the genus *Fuhrmanolepis* was formulated by Spassky and Poznakomkin (1966) on the basis of material from *Calidris alpina* from Anadyrja (the former U.S.S.R.). Spasskaya and Spassky (1978) omitted numbers of hooks in diagnosis and included 10 species into this genus, resulting in *F. slesvicensis* comprising two taxons: *F. slesvicensis* sensu Clerc, 1903 and *F. slesvicensis* (Krabbe, 1882). Schmidt (l.c.) synonymized the genus *Fuhrmanolepis* Spassky et Jurpalova, 1967 with the genus *Dilepis* Weinland, 1858. Bona (1994a) has not only amended the name *Fuhrmanolepis* for *Fuhrmannolepis* Spassky et Spasskaja, 1965 but also essentially modified the diagnosis of this genus. He was under the impression that Spassky and Poznakomkin (1966) probably described a species different from *decacantha* Fuhrmann, 1913. Diagnosis of *Fuhrmannolepis* Spassky et Spasskaja, 1965 sensu Bona (1994a) refers to Fuhrmann's type material.

According to Bona (1994a), several other species from the original genus *Fuhrmanolepis* as conceived by Spassky and Spasskaya (1965) contain species belonging to the other genera, including *Sacciuterina*. These are *Ovosculpta* Bona, 1994; *Trichocephaloidis* Sinitzin, 1896 (syn. *Diagonaliporus*, Krotov, 1951); and perhaps other genera, which are not listed there. Unless synonymia of the genus *Fuhrmanolepis* Spassky et Spasskaya, 1965 with other genus is provided or unless another nomenclature act carried out, the taxonomical status of the genus *Fuhrmanolepis* (l.c.) remains unclear.

According to Articles 32.sub; 32.2; 32.5 and 56.sub 56.2 of the International Code of Zoological Nomenclature (ICZN-1999) and examination of rules concerning the 'justified and unjustified' emendation, cf. 33.2.2 and 33.2.3. the studied dilepidids comprises following genera:

1.) *Fuhrmanolepis*¹ Spassky et Spasskaya, 1965 *sensu* Spassky and Poznakomkin (1966), resp. Spasskaya and Spassky (1978). Besides other features, it is characterised as having pinhead-like apical disc (without two lobes) armed with a single crown of wrench-shaped hooks (10-30) Genital ducts between osmoregulatory canals. Embryophore in typical species spiny or granular. (type-species: *Fuhrmanolepis decacantha* Fuhrmann, 1913). The original description of *Choanotaenia decacantha* offers following comments on rostellum "Das Rostellum ist offenbar sehr lang mit knopfförmiger Anschwellung am Ende und trägt nur 10 Haken von 0.0198-0.0216 mm Länge" (Fuhrmann, 1913). Concerning the name Fuhrmann, the emendation of the *Fuhrmanolepis* to *Fuhrmannolepis* seems to be justified. As it follows from particular paragraph of the Article 32.5.1, this is not the case of "... an inadvertent error - such as lapsus calami or copyist's or printer's error..." This is well documented in the papers published in Russian language, with *Fuhrmanolepis* written not once only with a single 'n', while in brackets Fuhrmann is listed with double 'nn' (Skryabin & Mathevossian, 1945; Spassky, 1951, 1968; Spassky & Poznakomkin, 1966; Spasskaya & Spassky 1978; Schmidt 1986) and others.

Besides the name *Fuhrmanolepis*, various published sources also cite the genus *Fuhrmanacanthus* Spassky, 1966 with a single 'n' (Schmidt, 1986; Czaplinsky & Vaucher, 1986; 1994; Mas-Coma & Galan-Pachades, 1991 and others). Though it is necessary to point out that the name Fuhrman with a single 'n' is often stated in the various literature sources, including the Internet.

2.) Emended *Fuhrmannolepis* Spassky et Spasskaya, 1965 *sensu* Bona (1994a) syn. *Taeniarhynchaena* Burt, 1983. We are convinced that this taxon emended by Bona (l.c.) can be considered to be a separate genus. Characterised -

besides other- by wide, slightly bilobbed apical disc, a single crown of wrench shaped hooks (10), five on each rostellar lobe, genital ducts between osmoregulatory canals. (In syn. *Taeniarhynchaena* Burt, 1983 [Burt l.c.] refers to genital ducts being dorsal to longitudinal excretory vessels). Vagina with pre-atrial sphincter. Uterus coarse-meshed reticulum. Embryophore smooth. Type species: *F. decacantha* (Fuhrmann, 1913) *sensu* Bona (1994a).

Aforementioned *Choanotaenia decacantha* Fuhrmann, 1913 was described by Fuhrmann (1913) according to a single tapeworm specimen. Wirt, *Tringa alpina*; Fundort: Takern 5/9 09 (No. 145). It seems that No. 145 is actually a number of a test tube (cf. Fuhrmann, 1908a, 1908b, 1909). Other work, while describing new species, omit even this No. Fuhrmann et Baer (1943).

According to our data, Fuhrmann's material of *Ch. decacantha* comprises specimens and segments of several strobila and therefore it is unclear whether the type material in that particular test tube is indeed morphologically homogenous or comprising tapeworms with scolex and apical disc not being divided. To prevent any dubiousness, it is necessary - besides the type species illustration (lectotype ?) of *F. decacantha* (*sensu* Bona 1994a:518) to redescribe the whole Fuhrmann's material of *Ch. decacantha* and to publish the numbers of type specimens, conforming to the rules of the ICZN (Articles 73-75). In such questionable matter, when it seems that *F. decacantha* had been wrongly identified (Article 70a.) of the ICZN- 1959), the case should be submitted to the Commission of ICZN, which is to decide on such matter (Article 79). The fourth Edition of the ICZN (1999-2000) requires the same procedure (cfr. Article 70.2), moreover when in this case the diagnosis of the genus has also been changed.

3.) Aforementioned creation of the genus *Fuhrmannolepis* *sensu* Bona (1994a) has also called for description of the genus *Ovosculpta* Bona, 1994. Its diagnosis include, besides other, a single crown of numerous (18-22), wrench-shaped hooks. Proglottis sides often deformed. Genital ducts between osmoregulatory canals. Vagina in front of entering atrium with pre-atrial sphincter. Uterus labyrinthine. Embryophore sculptured. Type species: *O. scolopacis* (Joyeux et Baer, 1939) Bona, 1994.

Diagnosis of the *Ovosculpta* is so similar to that of the genus *Fuhrmanolepis* *sensu* Spasskaya et Spassky (1978) that Bona's genus could be considered as its part, as evidenced by its type species *O. scolopacis*, believed to be a synonym of *F. scolopacina* (López-Neyra, 1944) Spasskaja et Schumilo, 1971 (ex Spasskaya et Spassky l.c.). However, it is unclear, where to include according to Bona (1994a) e.g. dilepidids *Fuhrmanolepis* with 10 wrench-shaped hooks in a single circle at compact rostellar apical disc (without two lobes). *Sacciuterina* Mathevossian, 1963 would probably not be the case here, as it has according to Bona (l.c.) porosoid hooks.

In order to better evaluate mentioned data and opinions, a register of all the species comprising the genera of the Bona's system would be very useful. These registers are

¹Only the generic names are taken into the consideration in this particular case. Names of the authors that are nomenclatorial part of the taxons' scientific name are listed here exactly as presented by the Russian authors. Their references in the text are based solely upon assessment of a translator.

offering valuable information on views of revising author(s) on volume and boundaries of the genera (Mayer, 1964, 1969), on validity and synonymy of the species and other data which are also important when selecting a system. Unfortunately, the 'Keys to Cestode Parasites of vertebrates' (Eds. Khalil *et al.*, 1994) misses these data that have considerably complicated identification of dilepidid species according to the aforementioned system. The problems occur in particular when describing new species and their differentiation from close taxons published often with a short description of few traditional characters (cfr. Bona, 1994b:206).

Other authors has also encountered similar problems while placing species into the genus *Fuhrmannolepis*, e.g. in Fauna Europea² (April 10, 2007; last update 2005), the examined genus comprises species published without the authors of their scientific name of and the year of the first publication. Probably it concerns following species: *F. arctica* (Baylis, 1919); *F. averini* Spassky et Jurpalova, 1967; *F. birostrata* sensu Belogurov et Zueva, 1968 (nec ? sp. *birostrata* Clerc, 1906), *F. decacantha* (Fuhrmann, 1913) - it is dubious whether it is the case of sp. *Fuhrmannolepis decacantha* (Fuhrmann, 1913) sensu Spassky et Poznakomin (1906), or sp. *Fuhrmannolepis decacantha* (Fuhrmann, 1913) sensu Bona (1994); *F. rotunda* (Clerc, 1913), *F. scolopacina* (López-Neyra, 1944), *F. slesvicensis* (Krabbe, 1882). These taxons have from 10 up to 30 hooks in a single crown with compact disc-shaped apex or slightly bilobed apical disc with five hooks at each rostellar lobe. They also include the species with unilateral or alternating genital pores; with sacciform, reticulate or labyrinthine uterus; with smooth or sculptured embryophore. The genus with such a vast species spectrum should have had a wider diagnosis of *Fuhrmannolepis* than that formulated by Bona (1994a).

In this paper we have decided to accept ad hoc the system of Spasskaya and Spassky (1978) owing to the fact, that it meets the above-mentioned criterions. However, the new findings and observations have resulted in necessity to complete several data on dilepidid species of Charadriiformes and to bring into accord the classification with the ICZN and some other taxonomic categories of dilepidids. Such task exceeds the scope of this paper, which is only a part of a faunistic survey of Slovakia as papers by Dudiňák & Špakulová (2005) and Hanzelová *et al.* (2007).

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²The species list of the genus *Fuhrmannolepis* in the Fauna Europea has been created based on the data on taxons of aforementioned genus in Europe provided by various authors. (Špakulová, personal communication).

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