

***Actitis hypoleucos* (L., 1758) – new Polish host of the trematodes: *Plagiorchis nanus* (Rudolphi, 1802) and *Leucochloridium perturbatum* Pojmańska, 1969**

Izabella Rząd¹, Ewa Dzika², Robert Krupa³

¹ Department of Ecology and Environment Protection, Faculty of Natural Sciences, University of Szczecin, 13 Wąska Street, 71-415 Szczecin

² Department of Medical Biology, Faculty of Medical Science, University of Warmia and Mazury in Olsztyn, 14 c Żołnierska Street, 10-561 Olsztyn

³ Department of Zoology, Faculty of Biology, University of Warmia and Mazury in Olsztyn, 5 Oczapowskiego Street, 10-718 Olsztyn; Poland

Corresponding author: Izabella Rząd; E-mail: izabela.rzad@univ.szczecin.pl

ABSTRACT. In July–August of 2005–2008, 47 digenean trematodes were examined from 7 specimens of the common sandpiper, *Actitis hypoleucos* (L., 1758). The digeneans were collected during a study on the food composition of the common sandpiper. The research was conducted near Lisewo Malborskie (near Tczew, Żuławy Wiślane, Gdańsk sea-coast), at a resting site on the birds' migration route. The foods ingested were extracted from live birds by draining their alimentary tracts with a nasogastric tube. Two digenean species were identified: *Plagiorchis nanus* Rudolphi, 1802 (Plagiorchiidae) and *Leucochloridium perturbatum* Pojmańska, 1969 (Leucochloridiidae). *Actitis hypoleucos* is the host for these new records in Poland. The *P. nanus* individuals isolated from *A. hypoleucos* differed in terms of the visible uterus and the extent of the vitellaria in the posterior part of the body.

Key words: trematodes, Digenea, birds, Charadriiformes, Poland

Introduction

The breeding area of common sandpiper, *Actitis hypoleucos* (L., 1758) [3,4] extends from the northern Palaearctic to a strip of the moderate zone of Eurasia from the British Isles and the Iberian Peninsula to the Kamchatka Peninsula, Sakhalin and Japan [5–7]. The preferred breeding grounds of the common sandpiper are sandy or gritty river islands and riversides with irregular shorelines and with vegetation [7,8]. The common sandpiper is a sparsely breeding species in Poland. Bird pairs range from 1500–2000 in number [9,10]. The birds migrate twice a year: in spring (from the first of March to the end of April) and in autumn (from the end of June to the half of September) and they cover about 500–13000km [9]. In Poland, only a few previous studies have investigated the common sandpiper for helminths. Birds from the Masurian

Lakeland revealed *Plagiorchis* sp. [11]. In addition, parasitological research on common sandpipers from Mazuria (North Mamry Lake and Świącayty) and from Mazovian Lowland (round about Warsaw) revealed two cestode species [12], whereas in Lower Silesia only a single nematode species *Eufilara lari* Yamaguti, 1935 was recorded for the first time [13].

Plagiorchis nanus (Rudolphi, 1802) is a Palaearctic digenean occurring in over 50 species of shorebird (Charadriiformes). Specific records were made from twenty species of birds: Gaviiformes, Anseriformes, Galliformes, Strigiformes, Passeriformes and in a single mammal species *Mustela erminea* [14,15].

Four specimens of adult trematode *Leucochloridium perturbatum* (mean as *L. insigne*) was found in *Actitis hypoleucos* for the first time by Wittenberg [16]. Presently we know, that

L. perturbatum Pojmańska, 1969 is a common digenean species, in perching birds (Passeriformes) and shorebirds (Charadriiformes) [17,18].

Material and methods

In July–August of 2005–2008, Maćko [1] and Rorot [2] led research on the common sandpiper's food composition [3,4]. The research was conducted near Lisewo Malborskie (near Tczew, Żuławy Wiślane, Gdańsk sea-coast) [19], at a resting site on the birds' migration route. The food items ingested were extracted from live birds by draining their alimentary tracts with a nasogastric tube. One hundred birds were investigated. Insects from four orders: Diptera (the majority Chironomidae), Coleoptera, Trichoptera and Hymenoptera, predominated. A total of 47 digenean trematodes were recovered from seven specimens of the common sandpiper, *Actitis hypoleucos* (L., 1758). Trematodes were preserved in 75% ethanol and mounted; the mounts were stained with carmine alum and embedded in Canada balsam.

Results and discussion

A total of two digenean trematode (Digenea) species were identified: *Plagiorchis nanus* (Plagiorchiidae Lühe, 1901) [20] and *Leucochloridium perturbatum* (Leucochloridiidae Poche, 1907) [21].

Plagiorchis nanus (Rudolphi, 1802)

Number of infected *Actitis hypoleucos*: 7

Mean intensity of infection and range: 5 (from 1 to 7)

Material: 35 specimens

Morphology and measurements (Table 1, Fig. 1):

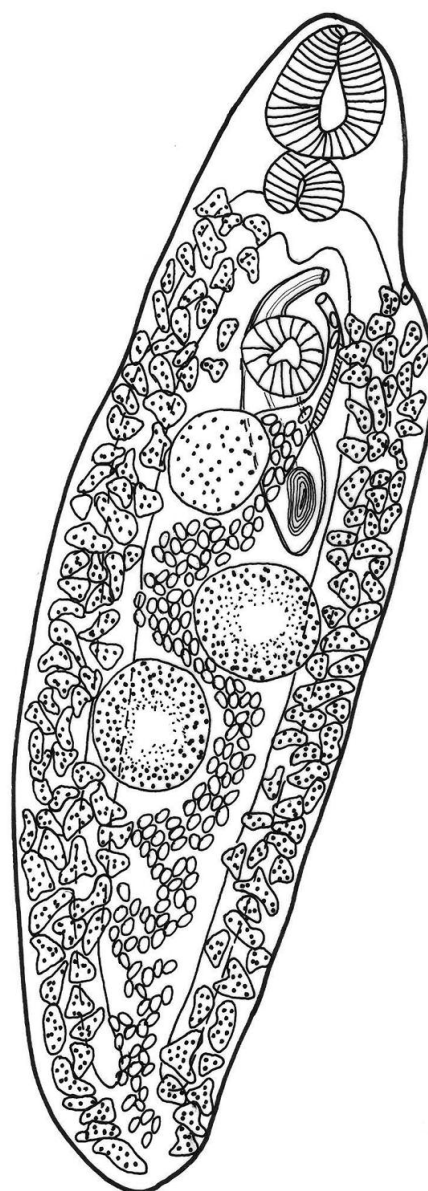


Fig. 1. *Plagiorchis nanus* (Rudolphi, 1802) from *Actitis hypoleucos* L. Scale bar: 100 μ m

Table 1. Biometric data (μ m) of *Plagiorchis nanus* (Rudolphi, 1802) isolated from *Actitis hypoleucos* L.

Feature [length×width]	Mean \pm Standard Deviation	Minimum	Maximum
Body	1425.87 \pm 241.34 \times 362.12 \pm 66.23	839.34 \times 200.31	1807.27 \times 536.92
Oral sucker	177.29 \pm 22.69 \times 156.31 \pm 21.69	128.04 \times 110.11	223.00 \times 192.62
Pharynx	86.13 \pm 15.80 \times 92.71 \pm 19.68	59.96 \times 59.47	106.21 \times 131.37
Ventral sucker	110.17 \pm 8.77 \times 97.88 \pm 7.08	98.03 \times 85.38	128.83 \times 110.64
Cirrus-sac (n=5)	363.93 \pm 56.29 \times 61.83 \pm 9.43	280.59 \times 47.12	407.27 \times 74.24
Ovary	126.86 \pm 17.37 \times 116.81 \pm 18.44	90.76 \times 73.11	151.98 \times 141.01
Anterior testis	161.04 \pm 18.62 \times 155.14 \pm 28.27	104.79 \times 86.23	185.58 \times 198.54
Posterior testis	174.99 \pm 29.70 \times 158.83 \pm 26.91	79.57 \times 91.96	231.44 \times 208.88
Eggs	30.48 \pm 1.97 \times 18.83 \pm 2.51	24.67 \times 14.47	36.79 \times 27.64

Morphology of *P. nanus* is consistent with the description of Krasnobolova [22]. Krasnobolova [22] described individual variability among *P. nanus* in the definitive host. The specimens of *P. nanus* from *A. hypoleucos* differ with respect to the visible coverage of the uterus in the posterior part of body and the extent of the vitellaria. In general, the majority of digeneans possess a uterus in the middle of the posterior part of body between the vitelline fields. In the four specimens of *P. nanus* described here, the uterus with eggs is visible to the border of testes and finishes between the testes, but vitellaria fill the posterior part of the body. Krasnobolova [22] stated that such differences reflect a range of individual variability within *P. nanus* and this variability is related to the parasite's age. Important changes are observed in the morphology of internal organs, mainly in the vitellaria. In the body of young specimens of *P. nanus*, the uterus extends to the end of the body and the final part of body is filled by vitelline follicles that increase with digenean age [22]. Sonin [23] discusses this variability. The specimens of *P. nanus* from *Erolia minuta* (*Calidris minuta*) with a short uterus was demonstrated by Bychowskaja-Pawłowskaja [24]. It has called attention on possible differences in site and number of testes.

The occurrence of *P. nanus* in the following hosts from Poland include: *Calidris alpina* in the Mazurian Lake District [11,25], *Philomachus pugnax* in the Baltic sea coast [11,26] and the Mazurian Lake District [11,25], and *Tringa glareola*, *T. ochropus* and *T. totanus* in the Mazurian Lake District [11,25]. A total of 226 digeneans were recovered from a single *Philomachus pugnax*. A single *A. hypoleucos* from Lake North Mamry in the Mazurian Lake District, yielded 600 specimens of *Plagiorchis* sp. [11].

***Leucochloridium perturbatum* Pojmańska, 1969**

Number of infected *Actitis hypoleucos*: 1

Material: 12 specimens

Morphology of the trematode is consistent with the description of Pojmańska [17]. *L. perturbatum* takes a stand generally, probably, in whole Poland in birds such as: Passeriformes (*Corvus cornix*, *C. monedula*, *Lanius collurio*, *Pica pica*, *Turdus iliacus*, *T. merula*, *T. philomelos*, *T. viscivorus*) Gruiformes (*Fulica atra*), Charadriiformes (*Gallinago gallinago*, *Limosa limosa*, *Philomachus pugnax*) [27].

Single birds of Charadriiformes were infected with the number of *L. perturbatum* specimens ranging from 2 to 14 [28]. *L. perturbatum* was described as *L. cyanocittae* McIntosh, 1932 by Sulgostowska: in *Fulica atra*, *Lanius collurio* and *Philomachus pugnax* [11,25]; and as *L. actitis* in *Philomachus pugnax* [26]. However, results of experimental development cycles have allowed displacement of this species for *L. perturbatum* synonyms [17]. *Actitis hypoleucos* is a new host of this trematode in Poland.

The state of knowledge concerning trematodes of shorebirds is incomplete in Poland. From a total of 95 species of birds, parasitological research has been carried out on 21 species so far and 36 species of digenean trematodes have been described [27]. The most common family is that of the Laridae [28]. Seven species of birds were subjected to parasitological research on the Scolopacidae family, which was represented by single specimens only including *A. hypoleucos*. Four species and three genera: *Plagiorchis nanus*, *Leucochloridium perturbatum*, *Cyclocoelum mutabile*, *Echinostoma stantschinskii* and *Echinostoma* sp., *Plagiorchis* sp. and *Tanaisia* sp were described.

Plagiorchis nanus (Rudolphi, 1802) and *Leucochloridium actitis* McIntosh, 1932 were described from *Actitis hypoleucos* in the Ukraine [29]. Occurrence in other areas of the former ZSRR include *P. nanus* (Rudolphi, 1802) and *L. actitis* McIntosh, 1932, among 19 species of digeneans [24]. Four species of Digenea were described from the Czech Republic including *A. hypoleucos* with *P. nanus* in it [30]. Results of research have contributed to a wider knowledge of digeneans including *Plagiorchis nanus* Rudolphi, 1802 (Plagiorchiidae) and *Leucochloridium perturbatum* Pojmańska, 1969 (Leucochloridiidae). *Actitis hypoleucos* is new species of host for these digeneans in Poland.

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***Actitis hypoleucos* (L., 1758) – nowy w Polsce żywiciel przywr *Plagiorchis nanus* (Rudolphi, 1802) i *Leucochloridium perturbatum* Pojmańska, 1969**

I. Rząd, E. Dzika, R. Krupa

W latach 2005–2008 w lipcu i sierpniu Maćko [1] i Rorot [2] prowadziły badania składu pokarmu brodzca piskliwego *Actitis hypoleucos* (Linnaeus, 1758). Ptaki badane były w miejscu przystankowym na trasie migracji w okolicy Lisewa Malborskiego k/Tczewa. Pokarm po-

bierano od ptaków poprzez sondowanie, wypłukując treść przewodu pokarmowego. Przy okazji tych badań wypłukano z przewodów pokarmowych siedmiu broźców piskliwych 47 egzemplarzy przywr (Digenea). Zidentyfikowano przywry: *Plagiorchis nanus* Rudolphi, 1802 (Plagiorchiidae) i *Leucochloridium perturbatum* Pojmańska, 1969 (Leucochloridiidae), dla których

Actitis hypoleucos jest w Polsce nowym gatunkiem żywiciela. Egzemplarze *P. nanus* z *A. hypoleucos*, różnią się między sobą zasięgiem widocznej macicy w tylnej części ciała i wypełnieniem tej części przez żółtniki.

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