

The First Record of *Piscicola fasciata* Kollar, 1842 (Hirudinea: Piscicolidae) from Serbia, with Recommendations for Sampling

Thomas Oliver Mérő^{1,2,*} & Kristóf Málnás^{2,3}

¹ Nature Protection and Study Society – NATURA, Milana Rakića 20, 25000 Sombor, Serbia; E-mail: thomas.oliver.mero@gmail.com

² Department of Tisza Research, Danube Research Institute, Centre for Ecological Research, Hungarian Academy of Sciences, Bem tér 18/c, 4026 Debrecen, Hungary

³ BioAqua Pro KFT. Soó Rezső u. 21, 4032 Debrecen, Hungary; E-mail: malnask@gmail.com

Abstract: Between early December 2016 and late February 2017, we examined catfish (*Silurus glanis*) in Serbia to find the fish leech *Piscicola fasciata* Kollar, 1842. On December 26, 2016, we collected eight specimens from the head area of one catfish. As far as we know, this is the first published record of *P. fasciata* in Serbia and for the middle section of the Danube River. The finding of this fish leech species in Serbia resulted from a targeted search with the cooperation of a local angler. Since *P. fasciata* cannot be detected with traditional leech sampling methods, we provide recommendations on how this species may be successfully sampled and monitored in cooperation with recreational anglers.

Key words: elusive species, fish leech, *Piscicola fasciata*, catfish, *Silurus glanis*, Serbia

Introduction

The detection and monitoring of species and their populations, and the mapping of their distribution range are important elements in studying ecological and conservation requirements (e.g. CARO & O'DOHERTY 1999, MARTIN et al. 2007). However, some species (e.g. elusive species) are difficult to sample due to their morphological and behavioural characteristics, and (or) are difficult to locate (THOMPSON 2004); this may often be related to the lack of appropriate sampling methods. Consequently, in the case of these species, it is difficult to estimate their population sizes and their ecological requirements, which are crucial elements in establishing conservation practices (e.g. BRUSSARD 1991).

The fish leech species *Piscicola fasciata* Kollar, 1842 is a semi-constant parasite on the catfish, (*Silurus glanis* L., 1758) (BIELECKI et al. 2011); occasionally, single individuals have been found on the zope (*Abramis ballerus* L., 1758), the vimba (*Vimba*

vimba L., 1758), and the nase (*Chondrostoma nasus* L., 1758) (LUKIN 1976). *P. fasciata* detaches from the host only for the reproduction/egg-laying period (NESEMANN & NEUBERT 1999). This species of fish leech is distributed in Central and Eastern Europe in the tributaries of the Caspian Sea, Black Sea, Sea of Azov and Baltic Sea (SKET 1968, NESEMANN 1997, NESEMANN & NEUBERT 1999, BIELECKI 1997, BIELECKI et al. 2011). Despite its relatively wide distribution range, *P. fasciata* is considered to be rare because of sporadic records over a relatively long time span, ranging from the end of the 19th century (ÖRLEY 1886) up to this study (Table 1).

The southernmost finds of *P. fasciata* in Europe were recorded by SKET (1968) near Zagreb (Croatia) in the Sava River and by CRISTEA & MANOLELI (1977) in the Danube River delta (Romania, Fig. 1). The absence of *P. fasciata* was apparent on the new checklist of leech fauna in Serbia (GROSSER et al.

*Corresponding author: thomas.oliver.mero@gmail.com

Table 1. Detailed information about records of *Piscicola fasciata* Kollar, 1842 in Central and Eastern Europe gained from previously published studies. Records are listed chronologically.

Water	Geographic location	No of leech per catfish	Date of records	Source
Tisza	Csongrád (Hungary)	3/1	NA	ÖRLEY (1886)
Thaya	NA (Czech Republic)	several/more than one	Spring, year NA	LUCKÝ & DYK (1964)
Nida	Pińczów and Stary Korczyn (Poland)	57/2	September, 1968	PAWŁOWSKI & JAŹDŹEWSKA (1970)
Mierzawa	Pińczów (Poland)	43/2	September, 1969	PAWŁOWSKI & JAŹDŹEWSKA (1970)
Danube	Delta (Romania)	13/1	15.07.1974	CRISTEA & MANOLELI (1977)
Duna Dolna	Kotliny Kłodzkiej (Poland)	1/1	25.05.1976	BIELECKI (1977)
Biebrza	Osowiec (Poland)	3/1	24.05.1977	BIELECKI (1978)
Bug	Podlasie (Poland)	43/NA	09.01, 15.09, 01.12.1982; 20.11.1983	DANILKIEWICZ (1981)
Krzna	NA (Poland)		15.02.1984	BIELECKI (1997)
Biebrza	Osowiec (Poland)	40/1	27.02.1985	BIELECKI (1997)
Thaya	Hohenau (Austria)	1/1	08.03.1991	NESEMANN (1994)
Thaya	Bernhardtshal-Hohenau (Austria)	many/1	Summer 1991	NESEMANN (1994)
Thaya	Hohenau (Austria)	5/1	10.10.1993	NESEMANN (1994)
Danube	Haid (Austria)	1/1	28.09-01.10.1993	NESEMANN (1994)
Danube	Osterhofen (Germany)	1/1	28.09-01.10.1993	NESEMANN (1994)
Danube	Pleinting (Germany)	1/1	28.09-01.10.1993	NESEMANN (1994)
Latorica	Brehov (Slovakia)	34/1	04.07.2003	KOŠEL & KOŠČO (2006)
Schweriner See	Paulsdamm (Germany)	1/1	March, 2005	JUEG (2013)
Don	Staraya Kalitva (Russia)	3/1	22.11.2011	PODBEREZNY et al. (2015)
Volga	Teplichny (Russia)	29/1	17.01.2015	PODBEREZNY et al. (2015)
Danube	Bogojevo (Serbia)	9/1	26.12.2016	Present study

2014). Previous studies suggested that the distribution of this leech species is related to the distribution of catfish (KOŠEL & KOŠČO 2004). Therefore, our aim was to conduct a purposeful search of *P. fasciata* in Serbia in cooperation with a local angler. Furthermore, based on available literature, we present details of previous findings on the distribution range of this species, and we offer recommendations for sampling.

Materials and Methods

In the period between December 1, 2016, and February 28, 2017, we had the opportunity to examine catfish for *P. fasciata*. In these three months, the angler caught 33 catfish near Bogojevo (NW Serbia), where the water depth of the Danube varied between approximately 8 and 13 m. The sizes of the catfish ranged from 67 cm (2.4 kg) to 198 cm (41.0 kg). In this study, we examined catfish exclusively. The specimens of *P. fasciata* were preserved in 70% alcohol. The identification was carried out according to NESEMANN (1997) and NESEMANN & NEUBERT

(1999). From previously published studies, the records of *P. fasciata* with available detailed information were presented in Table 1 and Fig. 1, while those with no available details were excluded from Table 1 but were listed in the text and marked in Fig. 1.

Results

On December 26, 2016, eight adult specimens of *Piscicola fasciata* were collected from the head area of a catfish (length 107 cm; weight 9.5 kg). This catfish was caught north of Bogojevo, at a section of the Danube called Staklara (N 45°33'30.96"; E 19°0'50.76", Fig. 1). The leech individuals had body length (distance between the bases of the suckers) 18–27 mm, body width 1.5–3 mm and diameter of the posterior sucker 4–8 mm.

Discussion

Besides the fact that this is the first observation of *P. fasciata* in Serbia, this record is particularly interesting because it is also the first data for the mid-



Fig. 1. Distribution range of the catfish specialist fish leech *Piscicola fasciata* Kollar, 1842 in Central and Eastern Europe based on previously published reference material and the present study. Circles with grey fill indicate findings from previous studies and the black-filled square shows the record in the present study. The name of the water body followed by the name of the locality (in parentheses) are given.

dle section of the Danube (ranging from the Devín Gate, Austrian–Slovakian border, to the Iron Gate, Serbian–Romanian border, see TUBIĆ et al. 2013). Most of previous records of *P. fasciata* are from rivers in Poland and Russia, and in the upper section of the Danube in Austria and Germany (Table 1, Fig. 1). With no details available, *P. fasciata* has been reported from the rivers Soła and Vistula in Poland (ZAĆWILILCHOWSKA 1965, MIKULSKI & TARWID 1951), Dysna and Pripjaty in Belarus (LSKIEWICZ 1925, 1934, PAWŁOWSKI 1947), Don and Volga in Russia (BLANCHARD 1893, PLOTNIKOV 1909, JOHANSSON 1935, ZENKEVIČ 1968, DONCOV 1969, LUKIN 1976), Danube in Austria (NESEMANN 1997), Sava in Croatia (SKET 1968), Emajõgi in Estonia (HERTER 1968), Ural in Kazakhstan (JOHANSSON 1935, LUKIN 1976), Dnieper in Ukraine (ŠPET 1928) and Mtkvari in Georgia (BLANCHARD 1893) (Fig. 1). Finally, one record originates from Lake Druzno in Poland (KARASSOWSKA & MIKULSKI 1960). The supposed sporadic distribution of this fish leech species may be a consequence of data deficiency that arises from the inadequacy of the leech sampling methods usually applied. When *P. fasciata* has been found, it has been detected with unusual leech sampling methods, e.g. from catfish caught (sold) by fishermen or sold at markets (Soós 1964a, SKET 1968, NESEMANN 1994).

Previously, Soós (1964b) has suggested that sampling *P. fasciata* might be more successful if conducted on catfish caught by fishermen. Based on this previous suggestion and our experience (this study), we aim to make recommendations for a sampling method that can be easily and inexpensively applied in most countries where *P. fasciata* occurs. Since industrial fishing by fishermen is not allowed in some Central European countries (e.g. Hungary), we prefer that leech experts should cooperate with recreational anglers. Cooperation with anglers has many advantages. The presence of recreational anglers is relatively high in the community, and they are organized into societies with their magazines, online forums and websites. With these features, leech experts can easily establish and maintain contact with anglers. E.g., we contacted a major anglers' society in Hungary in February 2017 and, after a few days, we received a positive response with confirmation that anglers often observe leeches attached to the head region of catfish caught in the Tisza River in winter. Establishing contact with anglers at a national level may bring unexpected results in recording *P. fasciata* that could increase our knowledge of the distribution and ecological requirements of this fish leech species. By applying this method in the countries where *P. fasciata* is assumed to be distributed, a detailed, large-scale monitoring scheme could be developed. If this un-

sual leech sampling method brings more finds of *P. fasciata*, experts will have a more stable basis when the species is assigned conservation status or conservation practices are eventually needed.

In conclusion, we suggest that *P. fasciata* might occur more frequently than previously assumed. We presume that data deficiency arises because of non-appropriate sampling methods. Therefore, we suggest that cooperation between leech experts and recreational anglers that may increase recorded finds could improve our knowledge of the distribution range and ecological needs of *P. fasciata*.

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References

- BIELECKA A. 1978. New stand of leech *Cystobranchnus fasciatus* (Kollar, 1862) (Hirudinea, Piscicolidae). *Przegląd Zoologiczny* 22 (3): 249-251. (In Polish).
- BIELECKA A. 1997. Fish leeches of Poland in relation to the Palaearctic piscicolines (Hirudinea: Piscicolidae: Piscicolinae). *Genus* 8 (2): 223-375.
- BIELECKI A., ŚWIĄTEK P., CICHOCKA J., ROPELEWSKA E., JELEŃ I. & ADAMIAK-BRUD Ź. 2011. Pijawki (Hirudinida) wód powierzchniowych Olsztyna. *Forum Faunistyczne* 1: 12-34.
- BLANCHARD R. 1893. Révision de Hirudinées du Musée de Turin. *Bollettino dei Musei di Zoologia e Anatomia Comparata della R. Università di Torino* 8: 145.
- BRUSSARD P. F. 1991. The role of ecology in biological conservation. *Ecological Applications* 1 (1): 6-12.
- CARO T. M. & O'DOHERTY G. 1999. On the use of surrogate species in conservation biology. *Conservation Biology* 13 (4): 805-814.
- CRISTEA V. & MANOLELI D. 1977. Conspectus des sangsues (Hirudinea) de Roumanie avec une clef de détermination. *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"* 18: 23-56.
- DANILKIEWICZ Z. 1981. *Cystobranchnus fasciatus* (KOLLAR) w Bugu na Podlasiu. *Wiadomości Parazytologiczne* 27: 773-774.
- DONCOV S. 1969. [Materials on leeches on fishes in Volgograd Reservoir.] XXIII Nauchnaya Konferentsiya Volgograd, pp. 110-112. (in Russian).
- GROSSER C., PEŠIĆ V. & LAZAREVIĆ P. 2014. A check of the leeches (Annelida: Hirudinida) of Serbia, with new records. *Fauna Balkana* 3: 71-86.
- HERTER K. 1968. Der medizinische Blutegel und seine Verwandten. Die neue Brehm-Bücherei. Wittenberg – Lutherstadt.
- JOHANSSON L. 1935. *Opredelitel' pijavok*. Laningrad: NKZ, Centralnoe upravlenie edinoj gidro-meteorologičeskoj služby. (In Russian).
- JUEG U., GROSSER C. & BIELECKI A. 2004. Zur Kenntnis der Fischegelfauna (Hirudinea: Piscicolidae) in Deutschland. *Lauterbornia* 52: 39-73.
- JUEG U. 2013. Rote liste der Egel und Krebsegel. Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz, Mecklenburg-Vorpommern.
- KARASSOWSKA K. & MIKULSKI J. S. 1960. *Studia nad zbiorowiskami zwierzecymi rolności zanurzonej i pływającej jeziora Drużno*. *Ekologia Polska* 8: 16. (in Polish).
- KOŠEL V. & KOŠČO J. 2004. The first record of *Piscicola fasciata* (Hirudinea, Piscicolidae) in Slovakia. *Biologia* 62 (2): 138.
- LISKIEWICZ S. 1925. Die Hirudinen des nord-östlichen Polens. *Archiv für Naturgeschichte* 16: 12.
- LISKIEWICZ S. 1934. Pijawki północno-wschodniej Polski. *Towarzystwo Przyjaciół Nauk w Wilnie* 8. (In Polish).
- LUKIN E. J. 1976. Pijawki presnych i solenovatych vodojemov. *Fauna SSSR, Pijavki*. Leningrad: Nauka. (In Russian).
- LUCKÝ Z. & DYK V. 1964. Fish parasites in rivers and ponds in Oder and Thaya River catchment area. *Sbornik Vysoké školy zemědělské v Brně* 12: 49-73.
- MARTIN J., KITCHENS W. M. & HINES J. E. 2007. Importance of well-designed monitoring programs for the conservation of endangered species: case study of the snail kite. *Conservation Biology* 21 (2): 472-481.
- MIKULSKI J. & TARWID K. 1951. Prawdopodobny wpływ regulacji Wisły na niektóre żerowiska ryb, związane z bentosem. *Roczniki Nauk Rolniczych* 57.
- NESEMANN H. 1994. The fish leeches of the genus *Cystobranchnus* Diesing 1859 (Hirudinea, Piscicolidae) in the Danube River basin. *Lauterbornia* 15: 1-15.
- NESEMANN H. 1997. Egel und Krebsegel (Clitellata: Hirudinea, Branchiobdellida) Österreichs. *Sonderheft der Ersten Vorarlberger Malakologischen Gesellschaft, Rankweil*.
- NESEMANN H. & NEUBERT E. 1999. Annelida, Clitellata: Branchiobdellida, Acanthobdellea, Hirudinea. *Süßwasserfauna von Mitteleuropa* 6/2. Heidelberg: Spektrum Akademischer Verlag.
- ÖRLEY L. 1886. A magyarországi piócák faunája. *Math Term-tud Közl* 22: 63-115.
- PAWŁOWSKI L. K. 1947. Sue la biologie du *Cystobranchnus fasciatus* (Kollar). *Pr Wydz Mat-Przyr Łódź* 2: 16.
- PAWŁOWSKI L. K. & JAŻDŻEWSKA T. 1970. [The occurrence of the leech *Cystobranchnus fasciatus* (Kollar) in Poland.] *Pr. Wydz Mat-Przyr Łódź* 2 (40): 19-29. (In Polish).
- PLOTNIKOV V. 1909. [Leeches from vicinity of the city of Saratov.] *Rab Volž Biol* 3: 1-17. (In Russian).
- PODBEREZNY V. V., KHITSOVA L. N. & MOLOKANOVA L. V. 2015. Parasitic and free living leeches of the Upper-Don and its tributaries. *Vestnik VSU, Series Chemistry, Biology, Pharmacy*, No. 3.
- SKET B. 1968. Zur Kenntnis der Egel-Fauna (Hirudinea) Jugoslawiens. *Academia Scientiarum et Artium Slovenica Classis IV: Historia Naturalis et Medicina* 9: 127-178. (In Slovenian).
- SOÓS Á. 1964a. A revision of the Hungarian fauna of Rhynchobdellid leeches (Hirudinea). *Opuscula Zoologica* 5: 107-112.
- SOÓS Á. 1964b. [Leech species to be shown in the fauna of Hungary.] *Állattani Közlemények* 51: 125-133. (In Hungarian).
- ŠPET G. 1928. *Materijal z fauny Hirudinea porožystoi častiny r. Dnipro ta jogo nižnoi tečii*. *Trudy Fiz-mat Vidd* 10: 3. (In Russian).
- THOMPSON W. L. 2004. *Sampling rare or elusive species: Concepts, designs and techniques for estimating population parameters*. Washington DC, USA: Island.
- TUBIĆ B. P., SIMIĆ V. M., ZORIĆ K. S., GAČIĆ Z. M., ATANACKOVIĆ A. D., CSÁNYI B. J., PAUNOVIĆ M. M. 2013. Stream section types of the Danube River in Serbia according to the distribution of macroinvertebrates. *Biologia* 68 (2): 294-302.
- ZACWILILCHOWSKA K. 1965. *Bentos obrzeza Zbiornika Goczałkowickiego w latach 1958-1959*. *Acta Hydrobiologica* 7: 83-97.
- ZENKEVIČ L. A. 1968. *Žizn' životnych. Bezpozvonočnye*, Moskva (in Russian).

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