

Lake minnow, *Eupallasella percunurus* (Pall.), in Kujawsko-Pomorskie Voivodeship in Poland – past and present occurrence and protection

Received – 11 May 2011/Accepted – 05 September 2011. Published online: 30 September 2011; ©Inland Fisheries Institute in Olsztyn, Poland

Jacek Wolnicki, Rafał Kamiński, Justyna Sikorska, Jan Kuszniierz, Grzegorz Radtke

Abstract. Knowledge of the historical occurrence of the endangered cyprinid fish species, *Eupallasella percunurus* (Pall.), in today's Kujawsko-Pomorskie Voivodeship in Poland is sparse. However, a total of nine sites inhabited by this species had been identified by the end of the twentieth century, but only one of these had survived into the early 2000s. The largest field inventory to date of this area was undertaken from 2005 to 2011 and nine new sites were recorded. Most of the newly discovered sites inhabited by *E. percunurus* are located in the Dobrzyńskie Lake District mesoregion, which is where this species has occurred in the past. Four of these sites have been designated as vulnerable and two as critically threatened. Immediate active protection measures are necessary to preserve *E. percunurus* at the two existing sites in the Special Protected Area PLH040013 "Cyprianka".

Keywords: lake minnow, distribution, threats, conservation, Kujawsko-Pomorskie Voivodeship (Poland)

Introduction

The lake minnow, *Eupallasella percunurus* (Pall.), a member of the family Cyprinidae, is among the most threatened native freshwater fish species in Poland (Wieser 1992, Witkowski 1992, Kuszniierz 1995, 1996, 2001, Witkowski et al. 1999, 2009, Wolnicki 2004). It has an exceptionally high ecological status among Polish ichthyofauna, as a species under strict legal protection and one of the priority vertebrates in the European Ecological Natura 2000 Network (Wolnicki and Radtke 2009).

Historically, today's Kujawsko-Pomorskie Voivodeship probably was an important sanctuary for Polish *E. percunurus* populations thanks to its diversified terrain, the occurrence of numerous small and large water bodies, and the popular local custom of excavating peat for household use. However, this area of Poland has never been the subject of systematic field inventories. Consequently, prior to the end of the nineteenth century, only nine sites of *E. percunurus* occurrence had been identified, of which only one survived until last decade (Wolnicki and Sikorska 2009).

In the present century attempts have been made to locate as yet undiscovered *E. percunurus* sites in this region. Although these investigations focused on a relatively small area, nine sites were discovered (Wolnicki et al. 2007a, 2007b and unpubl. data).

J. Wolnicki [✉], R. Kamiński, J. Sikorska
Pond Fishery Department in Żabieniec
Inland Fisheries Institute in Olsztyn
Główna 48, Żabieniec, 05-500 Piaseczno, Poland
Tel. +48 22 756 74 86; e-mail: jawol@infish.com.pl

J. Kuszniierz
Zoological Institute, Wrocław University, Poland

G. Radtke
Department of Migratory Fishes Gdańsk
Inland Fisheries Institute in Olsztyn, Poland

The aim of the present work is to summarize and update all available data on *E. percnnurus* occurrence in Kujawsko-Pomorskie Voivodeship both historically and presently, and includes assessments of threats to habitats, populations, and sites as well as recommendations for measures that must be implemented promptly to protect this species in the voivodeship.

Study area

The field survey conducted in 2005-2011 comprised a study area with 80 water bodies located in regions of Kujawsko-Pomorskie Voivodeship where *E. percnnurus* populations occurred in the twentieth century. These included areas near Bydgoszcz and Świecie (Świecka High Plain mesoregion) and Toruń and Włocławek (Dobrzyńskie Lake District mesoregion) (Kondracki 2009). Selected small water bodies located in the Chełmińskie Lake District between Grudziądz and Toruń were also investigated. Many of these were recommended as potential *E. percnnurus* sites by local anglers who had responded to articles published in specialized periodicals (Wolnicki 2005, 2007). Some other water bodies were chosen for investigation based on topographic maps (scale of 1:25,000) showing where peat had previously been excavated.

Material and methods

The fish were caught with baited specialized folding traps with two openings (25 x 25 x 40 cm; mesh 5 mm; opening diameter 60 mm) (Wolnicki et al. 2007b) or sometimes fishing rods were used. The fish were caught mostly between June and August. Two to four traps were deployed for 0.5-1 h depending on the size of the water body, and if no fish were caught initially, more attempts were made. The number of *E. percnnurus* individuals caught in single sample events in water bodies inhabited by this species ranged from approximately 10 to 50. The fish were

released alive immediately after they had been caught.

The geographical situation of all water bodies inhabited by *E. percnnurus* and those regarded as suitable for translocations were determined with a handheld GPS receiver (GPSMap 60C, Garmin; 4-7 m accuracy). Information from local communities was used to determine the origin of the water bodies. At each of the *E. percnnurus* sites identified attempts were made to identify the crucial factors for the preservation of both habitats and fish populations, and the degree to which the sites are threatened was evaluated using the classification by Wolnicki and Radtke (2009, 2010).

Results

In total, nine previously unknown *E. percnnurus* sites were identified in the 2006-2011 period. Six of these are either in or near the Włocławek-Toruń-Lipno triangle (Fig. 1). Only two sites, Grabowiec and Sęk, are likely of natural origin, while the rest formed following peat excavation (Table 1). Four of these sites were single water bodies. All of the water bodies inhabited by *E. percnnurus* populations were shallow and most were densely overgrown with submerged and emerged macrophytes. Two sites have been designated as threatened to high degree and four as threatened to low degree.

Discussion

Historical occurrence

The occurrence of *E. percnnurus* in Kujawy was noted relatively late. Chronologically, the oldest recorded information on the presence of this species in Buszkowo near Koronowo (Fig. 1) dates to 1931 (Urbanowa, unpubl. data), as cited in Gašowska and Rembiszewski (1967). Kaj (1953) reported the occurrence of *E. percnnurus* in Serock Pomorski near Świecie in 1937-1939. Subsequent reports were

Table 1

List and general characteristics of *Eupallasella percunurus* sites in Kujawsko-Pomorskie Voivodeship in June 2011 (alphabetical order)

No.	Site/year of discovery	Geographical coordinates	Origin ¹	Number of water bodies	Protection status ²	Threats identified ³	Level of threat ⁴
1	Cyprianka/2007	N52°44'30"; E19°05'20"	MM	c	N20 ⁵	SHA, OVE	H
2	Czerskie Rumunki/2006	N52°46'22"; E19°13'29"	MM	c	NOP	SHA, OVE	M
3	Grabowiec/2009	N53°26'30"; E18°33'10"	NA	1	NOP	SHA, INT	L
4	Komorowo/2008	N52°49'29"; E19°06'57"	MM	3	NOP	SHA, OVE	M
5	Leszyce/2006	N52°58'57"; E18°08'58"	MM	1	NOP	SHA, OVE	M
6	Lipno/2006	N52°51'03"; E19°10'06"	MM	2	NOP	SHA, OVE	H
7	Łochocin/2011	N52°45'15"; E19°04'09"	MM	c	N20 ⁵	INT	L
8	Sartowice/2009	N53°26'18"; E18°33'34"	MM	1	NOP	SHA	L
9	Sęk/2007	N53°03'30"; E18°52'21"	NA	1	NOP	SHA, OVE	L

c – large complex of water bodies, exact number not determined

¹MM – man-made; NA – natural

²N20 – protected within the Natura 2000 Network; NOP – non-protected

³SHA – permanent shallowing of water body basin; OVE – overgrowing with water plants; INT – fish introductions

⁴L – low; M – medium; H – high

⁵PLH040013 “Cyprianka”

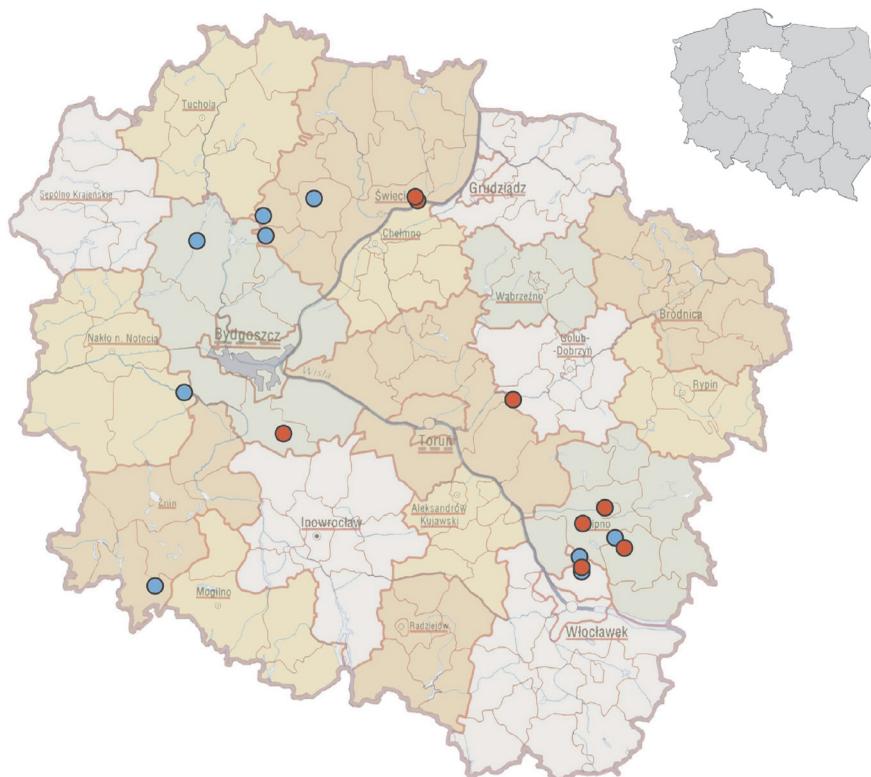


Figure 1. Past (blue circles) and present (red circles) distribution of lake minnow *Eupallasella percunurus* sites in Kujawsko-Pomorskie Voivodeship in Poland.

made by Kulamowicz and Jażdżewski (1960), who discovered a site in Ryszewo south of Żnin, while in 1964–1965, Gąsowska and Rembiszewski (1967) located five more sites in Bukowiec near Świecie, Małe Łąkie near Koronowo, Suszewo and Łochocin near Lipno, and Rynarzewo near Bydgoszcz. No subsequent attempts were made to locate *E. percnnurus* sites until the mid-1990s, when Kuszniierz (unpubl. data) found it to occur in a peat excavation site in Cyprianka, a village about one kilometer south of Łochocin. Of the nine sites referred to above, eight had become extinct by the end of the 1990s (Wolnicki and Sikorska 2009).

Present state of occurrence

Although the historical site of *E. percnnurus* in Cyprianka survived into the 2000s, it dried up completely in August 2008 (Wolnicki and Sikorska, unpubl. data); however, another small water body in the vicinity of Cyprianka was found that summer to be inhabited by an *E. percnnurus* population (Kuszniierz and Wolnicki, unpubl. data). In 2011, this species was discovered to inhabit a large complex of man-made water bodies near Łochocin.

Most of the *E. percnnurus* sites discovered in the present century in Kujawsko-Pomorskie Voivodeship, including those mentioned above, are located in the Dobrzyńskie Lake District, which corresponds to the locations in which Gąsowska and Rembiszewski (1967) and Kuszniierz (unpubl. data) reported having found of *E. percnnurus* populations. Attempts to locate sites where *E. percnnurus* occurred in the mesoregions of the Krajeńskie Lake District and Świecka High Plain, where there were sites of historical occurrence (Kaj 1953, Gąsowska and Rembiszewski 1967) failed. Therefore, the two newest sites discovered in Grabowiec and Sartowice, which are very close to Świecie in an area where no *E. percnnurus* were noted previously, are exceedingly important (Fig. 1, Table 1).

Knowledge of the present state of occurrence of *E. percnnurus* populations in Kujawsko-Pomorskie Voivodeship is modest in comparison to the data available from Polish regions such as Pomorze

(Radtke et al. 2011) or Mazowsze (Wolnicki et al. 2011). Nevertheless, new discoveries of as yet unknown *E. percnnurus* sites are possible.

Threats and protection

Although the territory of today's Kujawsko-Pomorskie Voivodeship might historically have been abundant in *E. percnnurus* sites, over the last two centuries large segments of this region have been subjected to extensive, consistent drying, damming, and deforestation to serve the needs of intensive agriculture and human settlement (Kasprzak 1984). Decreasing ground water levels and surface water resources resulted in the disappearance of many swamps and both smaller and larger water bodies, including those inhabited by *E. percnnurus* (Kuszniierz 1996). Land reclamation projects completed fifty years ago in the vicinity of Bydgoszcz could have had a similar impact on sites inhabited by *E. percnnurus* (Paczuski and Paczuska 1996).

In Poland most significant threats to the continued existence of water bodies inhabited by *E. percnnurus* populations are persistent shallowing of water body basins and low ground water levels, and this applies also to the *E. percnnurus* sites located in the Kujawsko-Pomorskie Voivodeship (Wolnicki and Radtke 2009, 2010). It is noteworthy that at least two of the sites (Cyprianka and Lipno; Table 1) are probably currently on the brink of extinction. The former is protected within the Natura 2000 Network (PLH040013 "Cyprianka") as one of only two sites in the voivodeship. Although as recently as in 2006, the site was considered to be a relatively safe *E. percnnurus* refuge (Wolnicki et al. 2007a), the long periods of hot, dry weather over the course of the subsequent two years resulted in considerable drying and shallowing of this water body. It is especially important to note that during this two-year period, most of the small water bodies in this region dried up completely.

In view of the preceding, a prerequisite for guaranteeing a permanent *E. percnnurus* presence in the protected area of PLH040013 "Cyprianka" is to

implement immediate active protection measures. However, deepening of some of the most prospective water bodies is insufficient; stocking them with cultivated *E. percunurus* juveniles is essential, as has been done successfully in Mazowieckie Voivodeship (Wolnicki et al. 2011). Translocations of local wild *E. percunurus* individuals could also prove to be indispensable to preserve the occurrence of this species in this area.

References

- Gąsowska M., Rembiszewski J.M. 1967 – The revision of the subspecies of the swamp-minnow *Phoxinus percunurus* (Pallas) in Poland – Ann. Zool. 24: 305-341.
- Kaj J. 1953 – Distribution and breed variability of fish from the species *Phoxinus percunurus* Pall. in Poland – Pol. Arch. Hydrobiol. 1: 49-78.
- Kasprzak K. 1984 – The disappearance of surface waters in the Wielkopolsko-Kujawska Lowland – Wszechświat 10: 321-324 (in Polish).
- Kondracki J. 2009 – Regional geography of Poland – Wyd. Nauk. PWN, Warszawa, 441 p. (in Polish).
- Kulamowicz A., Jażdżewski K. 1960 – Contributions to knowledge of the taxonomy and distribution of the lake minnow – *Phoxinus percunurus* (Pall.) (Cyprinidae) in Poland – Zesz. Nauk. Uniw. Łódz. II, 7: 141-152 (in Polish).
- Kusznierz J. 1995 – Preliminary estimates of the present state of Polish populations of the swamp minnow *Moroco* (= *Phoxinus percunurus* (Pallas, 1811), Cyprinidae, Osteichthyes) – Acta Univ. Wratislav., 1744, Prace Zool. 29: 59-69 (in Polish).
- Kusznierz J. 1996 – Present state of Polish populations of swamp-minnow *Moroco* (= *Phoxinus percunurus* (Pallas) and perspectives for its protection – Zool. Pol. (suppl.): 143-146 (in Polish).
- Kusznierz J. 2001 – *Eupallasella percunurus* (Pallas, 1811). Lake (swamp) minnow – In: Polish Red Data Book of Animals. Vertebrates (Ed.) Głowaciński Z., PWRiL, Warszawa: 301-303 (in Polish).
- Paczuski R., Paczuska B. 1996 – Vanishing mid-forest ponds and swamps in the environs of Bydgoszcz – Chrońmy Przyr. Ojcz. 52: 49-54 (in Polish).
- Radtke G., Wolnicki J., Kamiński R. 2011 – Occurrence, threats and protection of the endangered lake minnow *Eupallasella percunurus* (Pall.), in Pomorskie Voivodeship in Poland – Arch. Pol. Fish. 19: 183-193.
- Sikorska J., Wolnicki J. 2011 – Occurrence, threats, and the need for active protection of the lake minnow, *Eupallasella percunurus* (Pall.), in the Wielkopolskie Voivodeship in Poland – Arch. Pol. Fish. 19: 223-226.
- Wieser T. 1992 – *Moroco* (= *Phoxinus percunurus* (Pallas, 1811). Lake minnow – In: Polish Red Book of Animals (Ed.) Głowaciński Z., PWRiL, Warszawa: 250-252 (in Polish).
- Witkowski A. 1992 – Threats and protection of freshwater fishes in Poland – Neth. J. Zool. 2-3: 243-259.
- Witkowski A., Błachuta J., Kotusz J., Heese T. 1999 – The Red List of freshwater ichthyofauna in Poland – Chrońmy Przyr. Ojcz. 55: 5-19 (in Polish).
- Witkowski A., Kotusz J., Przybylski M. 2009 – The degree of threats to the freshwater ichthyofauna of Poland: Red list of fishes and lampreys – the situation in 2009 – Chrońmy Przyr. Ojcz. 65: 33-52 (in Polish).
- Wolnicki J. 2004 – The lake minnow *Eupallasella perenurus* (Pallas, 1814) – In: Animals species (excluding birds). Guide to habitats and species protection. Natura 2000 (Eds) P. Adamski, R. Bartel, A. Bereszyński, A. Kapel, Z. Witkowski, Warszawa, T. 6: 229-233 (in Polish).
- Wolnicki J. 2005 – The lake minnow – a little known fish – Wędkarski Świat 1: 84-85 (in Polish).
- Wolnicki J. 2007 – On rescuing the lake minnow – Wędkarski Świat 2: 81 (in Polish).
- Wolnicki J., Radtke G. 2009 – Assessment of the present state of occurrence, threats and protection of lake minnow *Eupallasella percunurus* (Pallas, 1814) in Poland – Chrońmy Przyr. Ojcz. 5: 329-340 (in Polish).
- Wolnicki J., Sikorska J. 2009 – Occurrence of lake minnow *Eupallasella percunurus* (Pallas) in Poland by the end of the 20th century – Komun. Ryb. 2: 10-13 (in Polish).
- Wolnicki J., Radtke G. 2010 – Threats to existence of lake minnow *Eupallasella percunurus* (Pallas) sites in Poland – Teka Kom. Ochr. Kształt. Środ. Przyr. – OL PAN 7: 473-477.
- Wolnicki J., Kamiński R., Kusznierz J. 2007a – Occurrence of lake minnow *Eupallasella percunurus* (Pallas) in the Wielkopolskie and Kujawsko-Pomorskie Voivodeships – Komun. Ryb. 6: 24-26 (in Polish).
- Wolnicki J., Sikorska J., Kolejko M., Kamiński R., Radtke G. 2007b – Newest discoveries of lake minnow *Eupallasella percunurus* (Pallas, 1814) sites in Poland – Teka Kom. Ochr. Kszt. Środ. Przyr. 4: 314-321.
- Wolnicki J., Kamiński R., Sikorska J. 2011 – Occurrence, threats and active protection of the lake minnow, *Eupallasella percunurus* (Pall.), in Mazowieckie Voivodeship in Poland – Arch. Pol. Fish. 19: 209-216.

Streszczenie

Strzebla błotna, *Eupallasella percunurus* (Pall.), w województwie kujawsko-pomorskim w Polsce – występowanie w przeszłości i obecnie oraz ochrona

Celem pracy było podsumowanie opublikowanych i niepublikowanych informacji na temat dawnego i obecnego występowania oraz potrzeb ochrony zagrożonego wyginieciem gatunku ryby karpiowej, strzebli błotnej *Eupallasella percunurus* (Pall.), w województwie kujawsko-pomorskim. Do końca ubiegłego wieku w opublikowanych i niepublikowanych źródłach naukowych wzmiankowano o 9 kujawskich stanowiskach tej ryby, z których do początków tego stulecia przetrwało tylko jedno. Szersze, niż w przeszłości poszukiwania jej stanowisk w województwie, przeprowadzone w bieżącej dekadzie, przyniosły nowe odkrycia. W ich efekcie dzisiaj znamy 9 stanowisk. Sześć z nich znajduje się w okolicy Włocławka i Lipna w mezoregionie Pojezierze Dobrzyńskie, a dwa w

okolicach Świecia nad Wisłą (Wysoczyzna Świecka). Tylko cztery stanowiska mają status zagrożonych w stopniu niskim. W wypadku stanowiska Cyprianka, jednego z dwóch najbardziej zagrożonych w województwie i jednocześnie jednego z tylko dwóch w województwie, chronionych w ramach Europejskiej Sieci Ekologicznej Natura 2000 (PLH040013 „Cyprianka”), warunkiem utrzymania obecności strzebli błotnej będzie pogłębienie skrajnie wypłyconego zbiornika wodnego. Działania takie byłyby pożądane również w odniesieniu do kilku innych silnie wypłyconych zbiorników wodnych na tym obszarze. Pogłębione zbiorniki powinny być miejscem translokacji hodowlanego lub dzikiego materiału zarybieniowego, wywodzącego się z jednej z lokalnych populacji.