

THREATS TO EXISTENCE OF LAKE MINNOW *Eupallasella percnurus* (PALLAS) SITES IN POLAND¹

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Summary. In Poland, endangered with extinction lake minnow (Cyprinidae) inhabit tiny water bodies. Among 163 of its sites known presently, 126 (77.3% of all) are regarded as threatened at high or medium level. The most common threat is permanent shallowing of water body basin, which can result in its overgrowing with vascular plants and drying off. Most of the threat factors have an influence on lake minnow habitats rather than directly on the fish populations.

Key words: lake minnow, *Eupallasella percnurus*, occurrence, Poland, threats

INTRODUCTION

Lake minnow, *Eupallasella percnurus* (Pallas), for a long time has been considered as one of the rarest and most endangered with extinction native freshwater fish species [Witkowski 1992, Kuszniarz 2001, Wolnicki 2004]. In Poland it became law protected already in 1975 [Rolik and Rembiszewski 1987]. This fish has been included in all recent editions of the Polish red books and red lists of ichthyofauna or animals in general [Wieser 1992, Witkowski *et al.* 1992, 2009, Kuszniarz 2001, Głowaciński 2002]. It belongs also to the species of priority in the European Ecological Natura 2000 Network.

Until recently the knowledge of the state of *E. percnurus* occurrence in Poland was outdated and incomplete. However, at the beginning of the present century, large-scale field survey for the unknown sites of this species was begun. It brought many new finds, thanks to which the number of sites existing currently increased first to 157 [Wolnicki and Radtke 2009] and then to 163 [Wolnicki *et al.* unpubl. data]. Simultaneously with the inventory studies, works con-

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cerning the identification of the most important threats to the existence of each *E. percnnurus* site were commenced [Radtke *et al.* 2004, 2006, Wolnicki *et al.* 2006, 2008, Wolnicki and Kolejko 2008]. The aim of this paper was to present updated information on this subject, as being useful to assess the chance of both the survival and protection of the particular sites.

MATERIAL AND METHODS

The studies comprised *E. percnnurus* sites, found or confirmed from 2002 to the end of May 2010, within the boundaries of the historical range of occurrence of the Polish populations of this species [Gąsowska and Rembiszewski 1967, Kuszniarz 1996]. The range is made up of five voivodeships (provinces): Pomorskie, Kujawsko-Pomorskie, Wielkopolskie, Mazowieckie and Lubelskie [Wolnicki and Sikorska 2009]. From among 163 existing sites, 126 were distinguished, all of high or medium level of threat to their existence in accordance with the 3-step scale proposed by Wolnicki and Radtke [2009]. The first category consists of sites being subject to noticeable, advanced and inevitable processes of degradation of their habitat or extinction of *E. percnnurus* population or both, or when the occurrence of these processes in the nearest future seems already decided. In the second category there are sites being liable to evident threats, but when their existence seems possible for a long time. From the analysis 37 sites of low level of threat to their existence were excluded, i.e. those large and deep or of remote location, visibly not threatened by any real natural or anthropogenic factor.

As concerns all selected sites, an attempt was undertaken to determine the most important factors that can be a real threat to their existence. Seven such factors were distinguished, all being a threat to fish habitats or their populations or both (Tab. 1).

RESULTS

Most of *E. percnnurus* sites turned out to suffer from permanent shallowing of the basin of the water bodies inhabited by populations of this fish (Tab. 1). This problem afflicted from 53% sites in the Pomorskie Voivodeship to 93–100% in the remaining voivodeships. In the former, 33% of the sites were threatened by intensive agriculture in the close neighbourhood of the water bodies, an important role (8%) was also played by intentional draining. In the remaining voivodeships of higher significance were other threats, such as exploitation of mineral deposits, especially peat (Lubelskie Voivodeship) or intentional filling in with rubbish or other materials (Mazowieckie and Lubelskie Voivodeships). The factors influencing directly *E. percnnurus* populations, such as stocking water bodies with fish species of high attractiveness for humans or with invasive species, played the most important role (25%) in the Lubelskie Voivodeship.

Table 1. Major threats to lake minnow sites in Poland (as % of sites considered)

Threat	Voivodeship				
	POM	KUP	WLK	MAZ	LUB
SHA	53	100	100	93	95
AGR	33				
EXT	1				10
DRA	8				
FIL	1			7	5
ALT	13				
INT	8			7	25
Number of sites considered/total number of sites	86/95	5/8	1/1	14/16	20/43

Voivodeships: POM – Pomorskie, KUP – Kujawsko-Pomorskie, WLK – Wielkopolskie, MAZ – Mazowieckie, LUB – Lubelskie. Threats: SHA – permanent shallowing of water body basin, overgrowing, AGR – intensive agriculture in the neighbourhood, EXT – industrial extraction of peat or other materials in the neighbourhood, DRA – intentional draining, FIL – intentional filling in, ALT – transformation of the water body into recreational reservoir, INT – fish introductions or presence of invasive fish species.

DISCUSSION

At present the most common habitat of the Polish *E. percnurus* populations are artificial water bodies, usually being a result of former peat extraction [Wolnicki and Radtke 2009]. Most of them are small (0.1–0.5 ha) and very shallow (maximum depth below 1 m), which is a limit for their life span. Moreover, many sites are situated in the lowland areas of Central Poland. There, due to considerable decline of the ground water level, only from the 19th century drying off and extinction of many small water bodies have been recorded [Kasprzak 1984, Kuszniierz 1996, Paczuski and Paczuska 1996]. It is not then surprising that permanent shallowing of the water bodies inhabited by *E. percnurus* and all consequences of this fact (drying off and accelerated overgrowing with vascular plants) are a common threat affecting most of the sites.

The largest variety of threats was found in the Pomorskie Voivodeship with the highest number of *E. percnurus* sites in Poland. Many sites there proved to suffer from several threats acting simultaneously. This voivodeship is a specific region, because only here sites of natural origin dominate over those made by man [Wolnicki and Radtke 2009]. Specific for this region are also some threats, as especially intentional draining of small water bodies. This factor equally affects *E. percnurus* habitats and populations. More and more common threat has become the transformation of the water bodies into recreational reservoirs, often favoured by their situation on a private land at a close distance from people's residences. This kind of activity always causes destruction of the bottom and banks of the water bodies, and thus of *E. percnurus*.

spawning grounds. Frequently the transformed water bodies are subject to introduction of other fish species.

The Lubelskie Voivodeship, the second largest *E. percnurus* sanctuary in the country, is of quite different specificity as compared to the aforementioned one. It is characterised by a total lack of sites of natural origin [Wolnicki and Radtke 2009] and by rather a modest share of sites of high and medium level of threat to their existence. This noteworthy fact is a consequence of domination of large complexes of water bodies of differentiated size and depth, often situated in remote areas. Frequent and specific for this region threats are – noticeable in the recent years – renaissance of machine extraction of peat deposits and introduction of other fish species, including the invasive, dangerous to native ichthyofauna, *Ictalurus nebulosus* [Wolnicki and Kolejko 2008].

CONCLUSION

As a result of the inventory field survey it was found that among 163 currently known *E. percnurus* sites in Poland, 126 (77.3%) are exposed to distinct threats, most often directed against habitats of this species. The most common threat is permanent shallowing of the water bodies.

REFERENCES

- Gąsowska M., Rembiszewski J.M., 1967. The revision of the subspecies of the swamp-minnow *Phoxinus percnurus* (Pallas) in Poland. Ann. Zool., 24, 305–341.
- Głowaciński Z., 2002. *Vertebrata* Vertebrates (in Polish), in: Z. Głowaciński, M. Makomaska-Juchiewicz, G. Połczyńska-Konior (eds) Red list of threatened animals in Poland. Ofic. Wyd. TEXT, Kraków, 13–22.
- Kasprzak K., 1984. Disappearance of surface water in the Wielkopolska-Kujawy Lowland (in Polish). Wszechświat, 10, 321–324.
- Kusznierz J., 1996. Present state of the Polish populations of swamp-minnow *Moroco* (= *Phoxinus percnurus* (Pallas) and perspectives of its protection (in Polish). Zool. Pol., suppl., 143–146.
- Kusznierz J., 2001. *Eupallasella percnurus* (Pallas, 1811). Lake (swamp) minnow (in Polish), in: Z. Głowaciński (ed.) Polish Red Data Book of Animals. Vertebrates (in Polish). PWRiL, Warszawa, 301–303.
- Paczuski R., Paczuska B., 1996. Vanishing of mid-forest ponds and swamps in the environs of Bydgoszcz (in Polish). Chrońmy Przyrodę Ojczyzną, 52, 49–54.
- Radtke G., Wolnicki J., Kamiński R., 2004. Present state of the Pomeranian populations of lake minnow *Eupallasella percnurus* (Pallas) (in Polish). Komun. Ryb. 6, 20–22.
- Radtke G., Wolnicki J., Kamiński R., 2006. Occurrence and major threats to the habitats of lake minnow *Eupallasella percnurus* (Pallas) in Pomerania (in Polish). Komun. Ryb. 6, 31–33.
- Rolik H., Rembiszewski J.M., 1987. Fish and cyclostomata (*Pisces et Cyclostomata*) (in Polish). PWN, Warszawa, 166–168.
- Wieser T., 1992. *Moroco* (= *Phoxinus percnurus* (Pallas, 1811). Lake minnow (in Polish), in: Z. Głowaciński (ed.) Polish Red Data Book of Animals (in Polish). PWRiL, Warszawa, 250–252.

- Witkowski A., 1992. Threats and protection of freshwater fishes in Poland. *Neth. J. Zool.* 2–3, 243–259.
- Witkowski A., Kotusz J., Przybylski M., 2009. The degree of threat to the freshwater ichthyofauna of Poland: Red list of fishes and lampreys – situation in 2009 (in Polish). *Chrońmy Przyrodę Ojczystą* 65, 33–52.
- Wolnicki J., 2004. The lake minnow *Eupallasella percnurus* (Pallas, 1814) (in Polish), in: P. Adamski, R. Bartel, A. Bereszyński, A. Kepel, Z. Witkowski (eds) *Animals species (except for birds). Guide of habitats and species protection. Natura 2000* (in Polish). Warszawa, T. 6, 229–233.
- Wolnicki J., Kolejko M., 2008. Situation of lake minnow populations in water ecosystems of the Polesie Lubelskie and the bases of programme of their protection in this region of the country (in Polish). *Wyd. Liber Duo s.c., Lublin*, 88 pp.
- Wolnicki J., Radtke G., 2009. Assessment of the present state of the occurrence, threats and protection of lake minnow *Eupallasella percnurus* (Pallas, 1814) in Poland (in Polish). *Chrońmy Przyrodę Ojczystą* 5, 329–340.
- Wolnicki J., Sikorska J., 2009. Occurrence of lake minnow *Eupallasella percnurus* (Pallas) in Poland by the end of the 20th century (in Polish). *Komun. Ryb.*, 2, 10–13.
- Wolnicki J., Sikorska J., Kamiński R., 2008. Occurrence and conservation of the endangered cyprinid fish species, lake minnow *Eupallasella percnurus* (Pallas, 1814), in the Mazowieckie Voivodeship in Poland. *Teka Kom. Ochr. Kształt. Środ. Przyr.* – OL PAN, 5, 190–198.

ZAGROŻENIA DLA ISTNIENIA STANOWISK STRZEBLI BŁOTNEJ
Eupallasella percnurus (PALLAS) W POLSCE

Streszczenie. W Polsce zagrożona wyginieciem strzebla błotna (Cyprinidae) zamieszkuje drobne zbiorniki wodne. Spośród 163 stanowisk znanych obecnie, 126 (tj. 77,3% wszystkich) uznaje się za zagrożone w stopniu wysokim lub średnim. Najczęstszym zagrożeniem jest trwałe wypłylenie misy zbiorników wodnych, które skutkuje ich szybkim zarastaniem przez roślinność naczyniową oraz wysychaniem. Większość czynników zagrożenia oddziałuje raczej na siedlisko strzebli błotnej niż bezpośrednio na jej populację.

Słowa kluczowe: strzebla błotna, *Eupallasella percnurus*, występowanie, Polska, zagrożenia