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SHORT COMMUNICATION

First record of brown bullhead, *Ameiurus nebulosus* (Lesueur), in the Łyna River drainage basin (northeast Poland)

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Abstract. This paper presents the first records of the occurrence of brown bullhead, *Ameiurus nebulosus* (Lesueur), in the Łyna River drainage basin. In February 2010, 77 brown bullhead were collected in Lake Czarne, and one in July 2010 was caught by angling method in Lake Długie in Olsztyn (northeast Poland). The specimens collected in Lake Czarne range from 72 to 154 mm total length (TL) and weighed from 3.9 to 36.8 g. Among measurable characters, the greatest variability was noted in head width, preanal distance, and snout length. The least variability in measurable characters was noted with regard to dorsal fin length, eye diameter, and preventral distance. Because of the adverse impact brown bullhead would have on the indigenous ichthyofauna of the Łyna drainage basin, its spreading occurrence in this region is an ecological and economic threat.

Keywords: Ictaluridae, catfish, invasive species, morphometry, lake

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The brown bullhead, *Ameiurus nebulosus* (Lesueur), is native to eastern and central North America from Nova Scotia and New Brunswick to the Great Lakes region and south to Alabama. It has also been introduced throughout the United States (Scott and Crossman 1973). *A. nebulosus* is found in lakes, ponds, oxbow lakes, reservoirs, canals, and low-gradient streams with shallow water, dense aquatic vegetation, and muddy bottoms. The brown bullhead is a typically benthic fish and can tolerate lower oxygen levels and higher water temperatures (Keast 1985). Whether introduced intentionally or accidentally, this species can now be found in many countries throughout Europe, Asia, South America (Chile), and New Zealand as well as the islands of Hawaii and the Caribbean (Puerto Rico) (Welcome 1988, Holčík 1991). It was first introduced in Europe in 1871 when it was imported to France (Vivier 1951 cited in Wheeler 1978). Currently, it inhabits inland waters from the rivers Kuban and Volga to Italy (Kottelat and Freyhof 2007). The brown bullhead has occurred in Poland since 1885 when it was introduced into ponds in the Pomeranian Lake District (Horoszewicz 1971). The rate at which this species has spread through Poland is not well documented (Grabowska et al. 2010). It currently inhabits a significant area of Poland with stable and self-sustaining populations. The brown bullhead has been recorded in the middle and lower courses of the Oder and Vistula rivers and in the Warta, Bug, and Wieprz tributaries, and in the lower course of the San

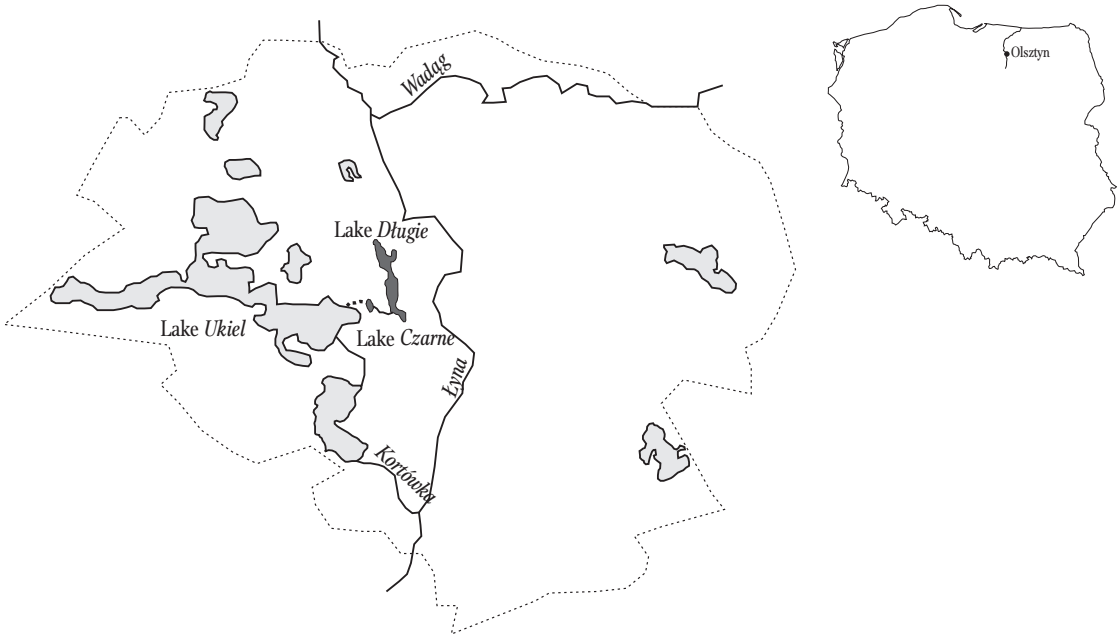

Figure 1. Schematic map of the study lakes located in the city of Olsztyn. Distribution of *Ameiurus nebulosus* in the Łyna drainage (shaded lakes). The dashed line refers the periodically functioning passage between lakes Czarne and Ukiel.

River. It also inhabits the lakes of the Łęczyńsko-Włodawski Lake District, Western Pomerania, and the Masurian Lake District (Grabowska et al. 2010). The aim of the current paper is to present the first report of *A. nebulosus* in lakes Czarne and Długie (Łyna River drainage basin, northeast Poland).

Based on information received from a Polish Angling Association, brown bullhead were collected from two lakes. Lake Czarne is located in the northwest part of Olsztyn between lakes Ukiel and Długie. The surface area of the lake is 1.48 ha, maximum depth is 7.1 m, and mean depth is 2.7 m (Lossow et al. 2005) (Fig. 1). The lake is eutrophic, and there is periodic flow through it. The greater share of the littoral is occupied by submerged and floating-leaved vegetation. Lake Długie is located in the northern part of Olsztyn in the drainage basin of the Łyna River, which is a tributary of the Pregoła River (Baltic Sea basin). The surface area of the lake is 26.8 ha, maximum depth is 17.5 m, and mean depth is 5.3 m. Untreated sewage was released into the lake for many years, and the lake has been under restoration since 1987 (Lossow et al. 2005). The current trophic status of the lake is moderately eutrophic. Lake Długie does not have natural surface inflow or outflow, and is connected to lakes Czarne and Ukiel by an artificial underground pipe. The fish from Lake Czarne were caught on February 19 and 26, 2010, and the specimen from Lake Długie on July 8, 2010. The fish from Lake Czarne were caught from beneath the ice using a baitfish net, while the specimen from Lake Długie was caught with a fishing rod. All the fish were identified and counted. Biometric analysis was performed at the Department of Ichthyology, Inland Fisheries Institute in Olsztyn. The analysis comprised thirteen measurable characters, and the brown bullhead specimens were measured (± 0.1 mm) and weighed (± 0.1 g). Biometric measurements were performed with an electronic caliper (± 0.01 mm). All of the biometric characters were expressed as absolute values and then subjected to standardization by expressing them in percentages of either body length or head length. Variability in the values of measurable characters was determined using standard deviation (SD).

In February 2010, 77 specimens of *A. nebulosus* with a total length (TL) ranging from 72 to 154 mm and body weight (BW) from 3.9 to 36.8 g were caught in Lake Czarne (Table 1). One specimen of this species was caught in Lake Długie in July 2010 (TL 214 mm,

Table 1
Mean, standard error (SE), minimum (min), maximum (max) and standard deviation (SD) for morphometric characters of brown bullhead collected from Lake Czarne (N = 103) and Lake Długie (N = 1)

	Lake Czarne (N = 77)					
Morphometrics	mean	SE	min	max	SD	Lake Długie (N = 1)
Total length (mm)	122.7	2.15	72	154	18.87	214
Standard length (mm)	99.3	1.78	57	125	15.61	182
Body weight (g)	20.16	0.90	3.9	36.8	7.87	124
in % of SL						
Head length	22.12	0.40	18.22	47.86	3.47	22.72
Predorsal distance	36.77	0.29	27.84	42.03	3.54	33.05
Dorsal fin length	7.38	0.17	3.31	15.62	1.52	8.82
Prepectoral distance	25.27	0.39	20.42	49.22	3.42	22.52
Pectoral fin length	18.74	0.41	9.93	43.09	3.57	19.84
Preventral distance	49.21	0.27	43.69	57.60	2.41	48.25
Preanal distance	63.30	0.61	36.81	74.64	5.32	60.85
Anal fin length	22.68	0.39	14.81	44.01	3.40	22.36
in % of HL						
Head width	106.09	0.94	74.69	125.32	8.21	103.36
Head depth	50.44	0.48	34.22	63.87	4.19	47.80
Eye diameter	13.22	0.25	9.65	18.10	2.22	9.79
Snout length	45.09	0.57	32.09	60.15	5.05	38.15

BW 124.0 g). Among the measurable characters examined, the greatest variability was noted for head width, preanal distance, and snout length (Table 1). The least variability among the measurable characters was noted for dorsal fin length, eye diameter, and preventral distance. In its native environment, the brown bullhead grows to much greater sizes than in areas to which it was introduced. In the waters of Florida it reaches lengths exceeding 50 cm and weights of up to 3 kg (Scott and Crossman 1973), while in Central Europe the average size of this species is 20-25 cm at weights of 250 g, but sporadically there are individuals measuring 30 cm and weighing 500 g.

Knowledge regarding the occurrence of the brown bullhead in northern Poland is poor. The first report of this species in the Masurian Lake District was made by Bryliński and Chybowski (2000), but the precise location was not given. This report probably refers to Lake Zdróżno (Masurian Lake District), which was mentioned by Kornijów (2001). Previous review articles lack information on the occurrence of the brown bullhead in this region (Rembiszewski and Rolik 1975, Brylińska 1986, 1991). The origin of the brown bullhead caught in both lakes remains unknown. According to local anglers, approximately 40 brown bullhead were imported about year 2000 from the vicinity of Pisz (Masurian Lake District) and deliberately released into Lake Czarne. The brown bullhead could have reached Lake Długie through the underground pipe, or anglers could have moved it deliberately into this lake from nearby Lake Czarne. Both of the lakes are fished frequently by anglers, and their connections to flow-through lakes and the Łyna River nearby threaten the further distribution of this species into a large segment of the drainage basin. In 2001-2002, this species was not noted in the Łyna River (Terlecki et al. 2005), nor was it noted during monitoring catches conducted in 2010 (K. Kozłowski, personal communication).

Until recently, the inland waters of Poland were thought to be inhabited only by *A. nebulosus*. However, recent reports indicate that, in addition to this

species, *Ameiurus melas* (Rafinesque) also occurs (Nowak et al. 2010a). Identification difficulties were likely the reason that in early stages the material imported to Europe belonged to the species *A. nebulosus*. Significantly later, it became apparent that two morphologically very similar species from the genus *Ameiurus* had been introduced simultaneously (Wheeler 1978). The currently location of *A. melas* has been described in central Poland (Nowak et al. 2010b). It is likely that when known areas of occurrence of *A. nebulosus* are verified, this will lead to the description of new locations of the occurrence of *A. melas* in Poland.

Brown bullhead ecological attributes that support its invasive potential include ecological plasticity, high fecundity, parental care, broad feeding habits, water quality flexibility, and tolerance to pollution (Kornijów 2001). Because of its adverse impact on indigenous ichthyofauna (competition for food, predation), brown bullhead distribution throughout the Łyna River drainage basin poses serious ecological and economic threats. Polish legislation prohibits the further distribution and release into waters of any specimens of brown bullhead that are caught.

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References

Brylińska M. 1986 – The freshwater fishes of Poland – PWN, Warszawa, 429 p. (in Polish).

Brylińska M. 1991 – The freshwater fishes of Poland. Second edition – PWN, Warszawa, 428 p. (in Polish).

Bryliński E., Chybowski Ł. 2000 – The brown bullhead, *Ictalurus nebulosus* – In: The freshwater fishes of Poland. Third edition (Ed.) M. Brylińska, PWN, Warszawa; 354-355. (in Polish).

Grabowska J., Kotusz J., Witkowski A. 2010 – Alien invasive fish species in Polish waters: an overview – Folia Zool. 59: 73-85.

Holčik J. 1991 – Fish introductions in Europe with particular reference to its Central and Eastern part – Can. J. Fish Aquat. Sci. 48: 13-23.

Horoszewicz L. 1971 – Catfish – PWRiL, Warszawa, 191 p. (in Polish).

Keast A. 1985 – Implications of chemosensory feeding in catfishes: An analysis of the diets of *Ictalurus nebulosus* and *L natalis* – Can. J. Zool. 63: 590-602.

Kornijów R. 2001 – Reasons for successful colonisation of Polish fresh waters by brown bullhead, *Ictalurus nebulosus* Le Sueur, 1819 – Prz. Zool. 45: 113-119 (in Polish).

Kottelat M., Freyhof J. 2007 – Handbook of European freshwater fishes – Kottelat, Cornol, Switzerland and Freyhof, Berlin, Germany, 646 p.

Lossow K., Gawrońska H., Mientki C., Wiśniewski G. 2005 – Trophic status of and threats to Olsztyn lakes – Wyd. SPW Edycja, Olsztyn, 164 p. (in Polish).

Nowak M., Koščo J., Szczerbik P., Mierzwa D., Popek W. 2010a – When did the black bullhead, *Ameiurus melas* (Teleostei: Ictaluridae), arrive in Poland? – Arch. Pol. Fish. 18: 183-186.

Nowak M., Koščo J., Popek W., Epler P. 2010b – First record of the black bullhead *Ameiurus melas* (Teleostei: Ictaluridae) in Poland – J. Fish. Biol. 76: 1529-1532.

Rembiszewski J.M., Rolik H. 1975 – Catalogue of Polish fauna. Part XXXVIII. Agnathans and fishes *Cyclostomata* et *Pisces* – PWN, Warszawa, 252 p. (in Polish).

Scott W.B., Crossman E.J. 1973 – Freshwater fishes of Canada. Bulletin 184 – Fisheries Research Board of Canada, Ottawa, 966 p.

Terlecki J., Kozłowski J., Dostatni D., Hliwa P., Józsa V., Martyniak A., Przybylski M., Wziątek B. 2005 – Fish fauna of the Łyna, Guber, Dajna, and Sajna rivers – Rocz. Nauk. PZW 17: 35-53 (in Polish).

Welcome R. L. 1988 – International introductions of inland aquatic species – FAO, Fish. Tech. Paper 294: 1-318.

Wheeler A. 1978 – *Ictalurus melas* (Rafinesque, 1820) and *I. nebulosus* (Lesuer, 1819): the North American catfishes in Europe – J. Fish Biol. 12: 435-440.

Streszczenie

Pierwsze stwierdzenie sumika karłowatego, *Ameiurus nebulosus* (Lesueur) w dorzeczu Łyny (północna-wschodnia Polska)

W pracy przedstawiono pierwsze doniesienie występowania sumika karłowatego *Ameiurus nebulosus* (Lesueur) w dorzeczu Łyny. W Olsztynie w jeziorze Czarne w lutym 2010 roku złowiono 77 osobników *A. nebulosus* o długości całkowitej (TL) od 72 do 154 mm i masie ciała (BW) od 3,9 do 36,8 g, a w jeziorze Długiem w lipcu 2010 roku jednego osobnika (TL – 214 mm, BW – 124,0 g). Spośród cech mierzalnych największą zmiennością charakteryzowały się: szerokość głowy, długość przedanalna i przestrzeń przedoczna. Najmniejszą zmiennością cech mierzalnych charakteryzowały się: długość nasady płetwy grzbietowej, średnica oka i przestrzeń prewentralna. Ze względu na niekorzystny wpływ na rodzimą ichtiofaunę rozprzestrzenianie się sumika karłowatego w dorzeczu Łyny byłoby wielkim zagrożeniem ekologicznym i gospodarczym.