Fish communities in the Poodří Protected Landscape Area (the Odra River basin)

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ABSTRACT: The Odra River, 55.2 km of its length, is winding through the Poodří Protected Landscape Area, which has total area of 81.5 km^2. More than 80% of its stream has retained the natural character of its riverbed and the hydrological regime with regular floods. Ichthyologic research was carried out in the period 1997–2001. It took place in 7 localities comprising 3 localities situated in main tributaries and 4 localities of former river arms. Gill nets and electrofishing were used for the research on limnetic biotopes. A total of 22 fish species in the streams (Odra, Lubina, Ondřejnice, and Bílovka Rivers) and 4 other species in stagnant water bodies were found. Out of all identified species, *Oncorhynchus mykiss, Pseudorasbora parva*, and *Carassius auratus* are not native species. Anglers identified further 7 species in their catches. The studied river sections are inhabited by the *Barbus – Chondrostoma* fish community. The highest biomass belongs to the most frequent species *Leuciscus cephalus*, *Rutilus rutilus*, and *Barbus barbus*. Total abundance in the individual localities ranged from 2 416 to 20 392 fishes/ha and total biomass was in the range from 174 to 788.8 kg/ha. The species diversity index *H'* of ichthyocenoses fluctuated between 2.238 to 3.108 in the area. There were 4–8 species in low numbers in 4 searched pools. The biomass was also low and the diversity index *H'* ranged from 1.390 to 1.737.

Keywords: fish communities; Odra River; Poodří PLA; floodplain

The Odra River basin spreads over the territories of four countries and belongs among the most important river systems in the drainage area of the Baltic Sea. Disastrous floods in 1997 initiated an interest in a better understanding of this river, Lojkásek *et al*. (2000).

A complex water quality examination was carried out in the Odra River basin in the period 1994–2002. It consisted of Project Odra I (1994–1998) and Project Odra II (1998–2002). The projects researched also the ichthyofauna of the river. The source of the Odra (131.4 km) is situated in the Czech Republic and its catchment has the area of 5 826 km^2. The current knowledge of ichthyofauna in the Czech Republic is limited. It is often vague and old. The study by Heinrich (1856) describes only the existence of the species in the Odra River without any specific locations. Data on the fish in the Odra River by Pax (1921) relate only to the former German part of Silesia. The most important knowledge of the fish in the Odra River, based on specific research and documentation, was acquired in the period 1950–1951 within research on the Silesian Region (organised by the Silesian Study Institute in the City of Opava). The first brief research results were published by Kempný (1950) and Oliva (1951). A complex review of the results was published by Oliva (1953). That research on the fish presence was conducted in the river stretch Mankovice and Suchdol n. O. (km 76–65). This section is situated

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in the southern part of the current protected area of the Odra River basin. Recently, partial data on the fish existence in the River Oder catchment were published by Lojkásek and Lusk (2001) and Lojkásek *et al*. (2000, 2002).

This study focuses on the fish presence in the system of the Odra River inside the Poodří Protected Landscape Area, on data that were collected in the period 1997–2001.

MATERIAL AND METHODS

Area and locality characteristics

The territory of the Poodří Protected Landscape Area (hereinafter "PLA"), which has the area of 81.5 km^2, is of an elongated shape oriented from southwest to northeast. The Odra River makes an axis of the territory stretching from river kilometre 21.95 to kilometre 77.15. Parts of the riverbed (14.5% of 55.2 km of the stream in PLA) were regulated in 4 sections (on river kilometres 21.9–25.1, 31.2–33.7, 47.0–47.5, and 72.5–74.2). The original natural slope of the stream is locally influenced by cross weirs, 13 of which are higher than 0.25 m. The river gradient reaches up to 8.4‰ in the upper part of the river and declines gradually down to 1.1‰ in the lower part of PLA. Despite of the regulations, the Odra River in PLA belongs among the best preserved lowland streams in the Czech Republic.

The lower parts of the Odra River tributaries, different types of drain and feeding channels that serve the operations of ponds and former mills, and small electric power stations are important hydrological segments in PLA. The presence of 57 ponds of the total area of 695 ha is important from the landscape and ichthyological aspects. Eighteen permanent pools and lay-by river arms make up important biotopes in the alluvium. The PLA became a registered part of the worldwide system of regions in accordance with the Ramsar Convention for its outstanding value for the natural science in 1993. It was proposed as one of the Special Areas for Conservation within the NATURA 2000 network (Directive 92/43/EEC), according to the European network of environmentally important and protected areas.

We investigated fish communities in 14 localities in the period 1997–2001. The localities included 7 Odra River sites, 3 localities situated in main tributaries, above their inlets to the Odra River, and 4 pools and lay-by river arms (Figure 1).

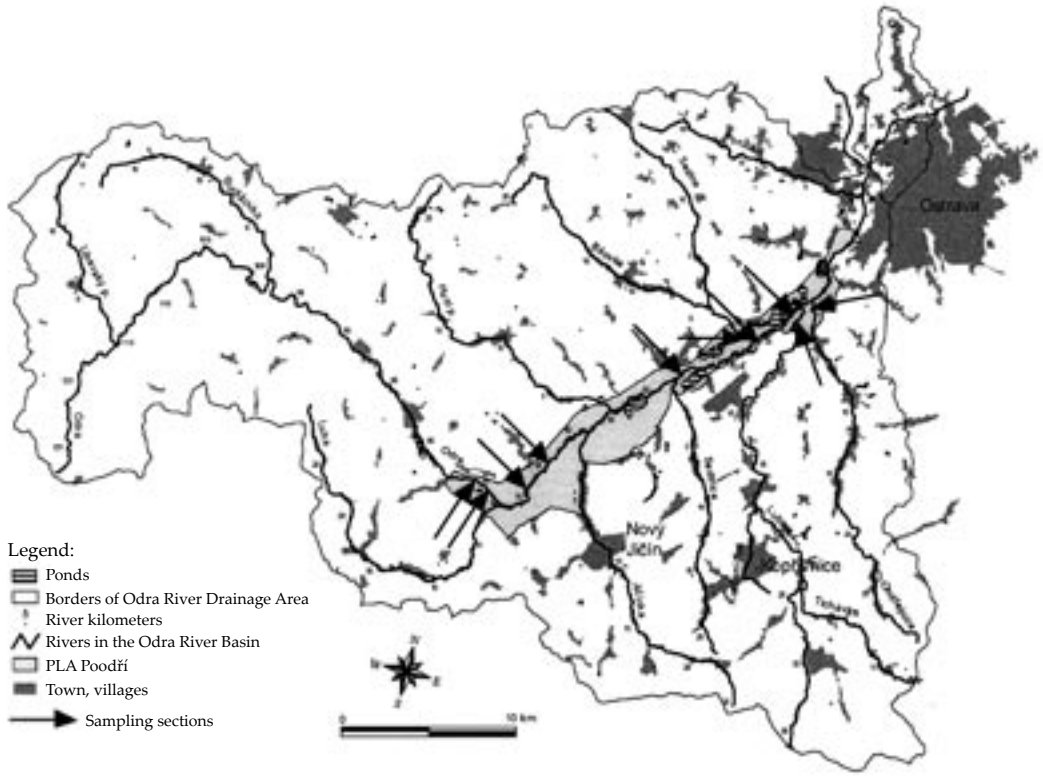

Figure 1. Territory of Protected Landscape Area of Poodří marked with researched river sites

(1) Odra River kilometre 75.6: (N = 49°37′56′′, E = 17°53′39′′). A 120 m long, 5.6 m wide and up to 0.6 m deep section with the stone/gravel bottom; the right bank was regulated with rubble armouring in the past. The stretch has its water flow reduced by water intake to pond raceways.

(2) Odra River kilometre 74.3: (N = 49°37′34″, E = 17°54′30′′). An 85 m long, 10.5 m wide, and up to 1.5 m deep stretch with the gravel/sand bottom. The section has its water flow reduced for the same reason as mentioned in the previous section. It is an unaltered meandering riverbed with pools and fords.

(3) Odra River kilometre 68.5: (N = 49°37′40′′, E = 17°56′28′′). A previously regulated stretch 105 m long, 10 m wide and in pools up to 1.3 m deep with the gravel/sand bottom and rubble armouring on the left bank.

(4) Odra River kilometre 64.7: (N = 49°38′41′′, E = 17°57′29′′). A 145 m long, 8.2 m deep and up to 2.0 m deep stretch. The bottom is sand or gravel and it is quite flat. Fords and pools are naturally positioned there.

(5) Odra River kilometre 46: (N = 49°41′25′′, E = 18°19′43′′). A meandering 80 m long, 10 m wide, and up to 1.2 m deep section with fords and pools. It has the gravel/sand bottom.

(6) Odra River kilometre 37: (N = 49°43′29′′, E = 18°07′49′′). An unaltered 120 m long section, which is on average 10.5 m wide and up to 1.3 m deep. The gravel bottom is almost flat.

(7) Odra River kilometre 32.3: (N = 49°44′46′′, E = 18°10′08′′). A section located 200 m below a weir with both banks regulated with heavy stonework. The bottom is of stone/gravel. The section is 80 m long, 10 m wide, and up to 1 m deep.

(8) The Ondřejnice kilometre 0.8: (N = 49°43′29′′, E = 18°07′49′′). The river flows into the Odra River on the right-hand side at river kilometre 30.48. The average flow in the inlet is 1.02 m^3/s (Vlček *et al.*, 1984). The flow was directionally regulated at the sampling site in the past and flood embankments were built there. The bank was armoured with rubbleworks. The bottom sediments are gravel/sand. There were only very few hiding places for bigger fish in this section.

(9) The Lubina kilometre 1.5: (N = 49°43′29′′, E = 18°07′49′′). The creek flows into the Odra River on the right-hand side at river kilometre 31.6; the average flow in the inlet is 2.36 m^3/s (Vlček *et al.*, 1984). This 105 m long, 4.9 m wide, and up to 1.5 m deep section was also regulated in the past. The bank provided for numerous hiding places for fish, thanks to the damaged rubbleworks. The bottom sediments consisted primarily of gravel.

(10) The Bílovka kilometre 0.4: (N = 49°43′29′′, E = 18°07′49′′). It is a left-bank tributary of the Odra River at its kilometre 36.3. The average flow in the inlet is 0.70 m^3/s (Vlček *et al.*, 1984). It is a straightened regulated section with a number of steps. The investigated section has the sand/gravel bottom with muddy sediments in pools. We investigated a 120 m long section, where the riverbed was 4 m wide and up to 0.8 m deep. Overhanging grass on both banks made up hiding places in this straightened section.

(11) Forest Lake is a meandering flow-through arm in the forest called Bažantula, which functioned as a parallel Odra River riverbed in the past. It is about 2.3 km long and 7–13 m wide. Its average depth reaches 1.7 m. When the flow is at its average, water slowly flows through the arm. The forest stand shades almost the entire water flow all the year round and this does not allow for the development of water macrophytes. Fishery management in the arm is sporadic.

(12) Small Gelnar Lake is a pool of the area of 0.7 ha and it is a remainder of the original old river arm. It is surrounded by alluvial meadows that are regularly flooded every year. The southern part is slightly shaded by a riparian stand of tall woody species on the bank. The average water depth reaches 1.5 m.

(13) The Old Odra River: it is a lay-by river arm that originated at the time when the river was regulated in the 1960s. The water surface of the area of 0.9 ha is connected with the main Odra River through both the inlet and outlet. The maximum depth of the pool reaches 1.6 m. Soil sediments are more apparent in the southern and northern parts. During the vegetation period the water surface of this arm is largely covered with broad-leaved water plants. A riparian stand of woody species partly shades the water surface there. Fishery management in the arm is intensive.

(14) Polanka Pool is a river arm of the area of 0.8 ha that separated from the main stream thanks to natural fluvial activities of the Odra River in the 1940s. The arm is within reach of yearly floods. Parts of the pool, on the north-eastern and south-eastern sides, are rapidly filled in with soil sediments and growing woody species. The permanent water surface is maintained mostly in the western part of this lay-by arm. Fishery management in the arm is sporadic.

The investigations in the pools were carried out with gill net sets made of a monofilament nylon material with the mesh size (from knot to knot) of 17 mm, 22 mm, 33 mm, 40 mm, 50 mm, and 60 mm. Electrofishing was also used (the direct pulse current 0.6–1.8 A, 160–230 V). In the case of the gill net use, the catch was calculated as catch per unit effort expressed as fish number ($CPUE_n$) and in grams per square metre of gill net in one hour ($CPUE_w$). The electrofishing was used in streams and the sections were fished twice 1.5 hours apart. The abundance and the biomass of fish communities were estimated on the basis of two catches, according to the Seber and Le Cren method (1967). The ichthyocenoses were assessed by the diversity index (*H'*) ($\log_2$) according to Shannon and Weawer (1963) and the equitability (*E*) was assessed in accordance with Sheldon (1969). The migration penetration index M was also calculated as the ratio of the length of the assessed stream route to the number of migration barriers (steps) for the Odra River in the protected area. The zoogeographic integrity coefficient *ZIC* (Bianco, 1990) indicates the percentage proportion of biogeographically original fish species in the relevant ichthyocenosis. The catch data by sport anglers in the fishing grounds within PLA were provided by the Committee of the Regional Association of Northern Moravia and Silesia in Ostrava.

RESULTS

Odra River

We found 22 fish species in total (Table 1) in the Odra River in PLA. The fish communities could be classified as the *Barbus – Chondrostoma* community, which is typical of the so-called barbel zone in streams draining into the Baltic Sea and Black Sea. There were also species characteristic of the trout and grayling zone – *Salmo trutta, Thymallus thymallus, Phoxinus phoxinus* and *Cottus gobio* in the upper part of the investigated part of the river. Among the non-native species, only *Oncorhynchus mykiss*, *Pseudorasbora parva* and *Carassius auratus* were found. This corresponds with the favourable value of *ZIC* = 90.9. The presence of other non-typical species *Esox lucius*, *Stizostedion lucioperca*, *Perca fluviatilis*, *Scardinius erythrophthalmus*, and *Cyprinus carpio* originates in ponds existing in the catchment. The frequent presence of *Alburnus alburnus* and *Rutilus rutilus* in most localities proves the widespread environmental valence of these species that are usually characteristic of lower river parts. In spite of the fact that the floodplain, especially in its lower part, is regularly flooded, the absence of the species (*Abramis brama*, *A. bjoerkna*) typical of this ecosystem is surprising.

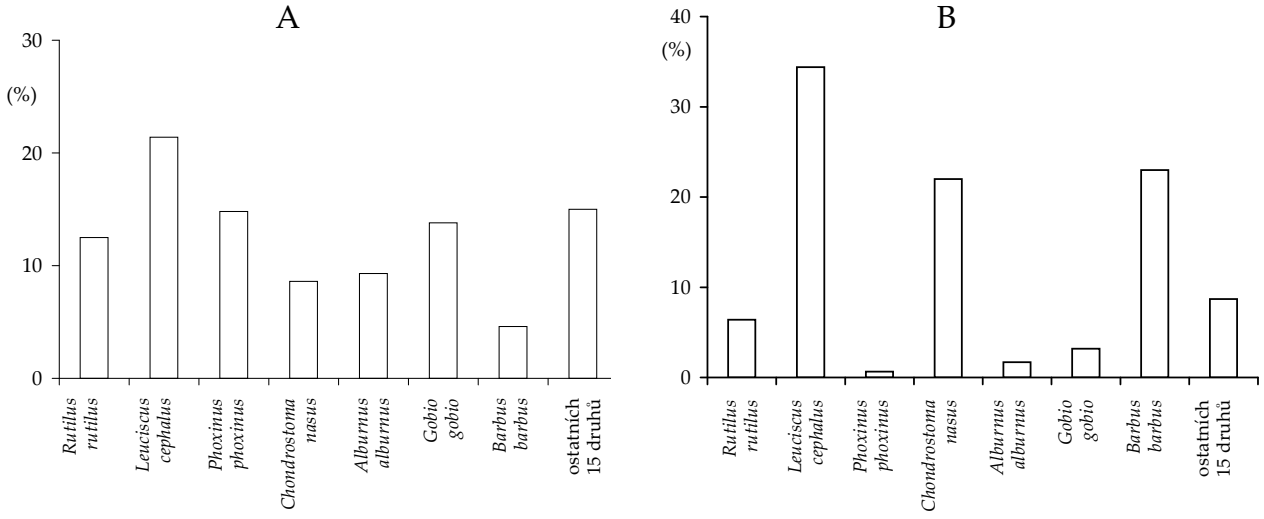

Figure 2. Species composition of the total fish catch (A – abundance, B – biomass) in researched sites on the Odra River

Table 1. Species composition, abundance (*n*/ha) and biomass (kg/ha) of the fish found in the researched sites of the Odra River

Species	r. km 75.6	r. km 74.3	r. km 68.5	r. km 64.7	r. km 46	r. km 37	r. km 32.3
	(*n* per ha/kg per ha)						
Salmo trutta	0	22/1.12	38/4.43	0	17/3.33	0	0
Oncorhynchus mykiss	0	34/3.14	0	0	0	0	0
Thymallus thymallus	45/2.08	0	19/1.90	0	0	0	0
Esox lucius	0	34/29.13	29/7.9	34/7.4	0	8/2.54	56/22.5
Rutilus rutilus	413/14.58	1 041/39.78	280/10.57	82/4.34	2 651/25.21	1 487/45.49	710/31.25
Leuciscus leuciscus	0	50/3.15	170/9.7	90/7.03	0	95/4.86	0
Leuciscus cephalus	5 787/129.9	581/180.4	1 424/132.8	781/71.7	1 008/308.2	857/75.6	716/120.87
Phoxinus phoxinus	7 700/17.12	34/0.11	0	0	0	0	0
Chondrostoma nasus	1 370/20.38	788/158.44	696/106.56	129/12.43	238/31.3	160/21	1 104/301.1
Alburnus alburnus	0	541/2.7	307/4.59	204/1.01	1 473/17.78	286/5.49	2 007/20.25
Alburnoides bipunctatus	0	0	610/5.51	404/3.08	272/3.33	0	0
Carassius auratus	0	0	10/0.95	0	300/15	0	0
Gobio gobio	2 804/43.8	688/12.63	774/8.3	299/3.19	1 141/10	508/8.34	992/8.4
Scardinius erythrophthalmus	0	0	0	0	0	0	67/2.81
Pseudorasbora parva	450/0.6	134/0.11	114/0.19	0	0	0	0
Barbus barbus	15/0.89	11/6.27	43/5.83	276/60.56	759/353.46	382/47.27	919/213.6
Cyprinus carpio	0	22/14.01	0	8/2.02	0	0	0
Barbatula barbatula	1 609/7.75	359/2.24	152/0.86	101/0.34	288/2.38	203/1.32	0
Anguilla anguilla	15/1.79	0	0	0	0	384/4.83	50/8
Stizostedion lucioperca	0	34/1.34	0	0	0	0	0
Perca fluviatilis	124/2.68	143/13.46	0	8/1.01	535/16.37	0	551/60
Cottus gobio	60/0.15	34/0.11	0	0	0	0	0
Number of species	12	17	14	12	11	10	10
∑ *n*/ha	20 392	4 550	4 666	2 416	8 682	4 370	7 173
∑ kg/ha	241.74	468.15	300.1	174.1	786.63	216.73	788.8
Diversity index *H´*	2.3300	3.1081	2.9283	2.8922	2.9045	2.7412	2.8185
Equitability *E*	0.6499	0.7604	0.7691	0.8068	0.8396	0.8252	0.8485
ZIC	90.9%						

The typical species in the fish community of *Barbus – Chondrostoma*, i.e. *Barbus barbus*, *Chondrostoma nasus*, *Leuciscus cephalus*, *Gobio gobio*, and *Barbatula barbatula*, were present almost in all investigated localities. They accounted for 53.52% of the total number of caught fish and 82.93% of the total biomass of the caught fish (Figure 2). The low presence of *Leuciscus leuciscus* and *Alburnoides bipunctatus* among other typical species in the barbel zone was also surprising. The species *Vimba vimba*, the presence of which is critical in the Odra River catchment, was completely absent (Table 1).

Table 2. Ichthyocenosis of the lower parts of the Ondřejnice, Lubina and Bílovka Rivers in the territory of Poodří PLA

Species – locality	Ondřejnice	Lubina	Bílovka
	n per ha/kg per ha		
Salmo trutta	1 309/74.7	107/10.67	0
Oncorhynchus mykiss	81/16.50	0	0
Thymallus thymallus	91/9.09	0	0
Rutilus rutilus	743/54.55	4 743/84.9	4 329/136.1
Leuciscus leuciscus	940/90.3	163/8.2	127/7.44
Leuciscus cephalus	1 125/103.31	2 224/174	1 884/409.5
Phoxinus phoxinus	108/0,54		
Chondrostoma nasus	0	160/20.6	171/40.9
Alburnus alburnus	0	403/8	424/12.36
Gobio gobio	3 880/121.93	1 576/18.8	781/18.6
Pseudorasbora parva	168/0.4	167/0.6	143/0.24
Barbus barbus	0	1 613/160.6	48/5.95
Cyprinus carpio	0	0	24/20.24
Barbatula barbatula	2 510/12.12	661/4.5	0
Perca fluviatilis	0	480/12	1 434/34.33
Number of species	10	11	10
∑ *n*/ha	10 956	12 298	9 365
∑ kg/ha	483.44	502.9	685.7
Diversity index *H´*	2.5559	2.6195	2.2382
Equitability *E*	0.7694	0.7572	0.6738
ZIC		92.3%	

The high number in locality No. 1, at river kilometre 75.6 (20.392 specimens/ha), was mostly influenced by the presence of *Phoxinus phoxinus* (7 700 specimens/ha). Total abundance in other sections was in the range from 2 416 to 8 682 specimens/ha. Total biomass ranged from 174 to 789 kg per ha and it was mostly influenced by the presence of *L. cephalus*, *Ch. nasus*, and *B. barbus* (Table 1).

There were 13 weirs of the height of 0.25 m on the route of the Odra River inside PLA. When we assessed the functionality of all steps and weirs, we realised that 8 steps situated at river kilometres 31.3, 32.4, 47.1, 50.7, 68.8, 73.4, 75.3, and 75.6 were significant barriers preventing the fish migration against the stream. The migration coefficient that indicates the theoretical length of the Odra River segments on the followed up route of 55.2 km was 6.9 km.

Tributaries

The investigated localities were close to the inlets of Ondřejnice, Lubina, and Bílovka. There were no migration barriers between the inlets and the investigated sections of the streams. This was probably the reason why the fish communities in the investigated sections were mostly similar to the species found in the Odra River. From the aspect of species number (10–11), total abundance (9.3–12.3 thousand specimens/ha) and total biomass (483–681 kg/ha), the investigated localities were very similar (Table 2). From the aspect of abundance, the following species prevailed in the investigated localities: *R. rutilus* – 30.09% on average, *Gobio gobio* – 19.12%, and *L. cephalus* – 16.04%. A substantial part of the biomass mainly consisted of *L. cephalus* – 41.08%, *R. rutilus* – 16.48%, and

Table 3. Fish community in river pools and arms in the Odra River alluvium in the territory of Poodří PLA established from the catches with gill nets. Total fish catch

Species – locality	Lesní jezero		Gelnarovo jezírko		Stará Odra		Polánecká tůň	
	A	B	A	B	A	B	A	B
Esox lucius	2	0.88	0	0	2	0.63	2	2.28
Rutilus rutilus	19	0.82	7	0.41	11	0.32	31	1.30
Scardinius erythrophthalmus	0	0	4	0.20	2	0.19	3	0.10
Tinca tinca	1	0.32	0	0	1	0.24	0	0
Alburnus alburnus	6	0.16	0	0	0	0	0	0
Abramis brama	5	1.44	0	0	4	0.77	5	0.75
Carassius gibelio	1	0.20	0	0	0	0	0	0
Carassius carassius	0	0	1	0.80	0	0	0	0
Cyprinus carpio	1	0.44	0	0	2	1.61	3	3.18
Perca fluviatilis	1	0.05	2	0.10	4	0.25	3	0.20
Number of species	8		4		7		6	
∑ A/B (kg)	36/4.3		14/1.51		26/4.01		47/7.81	
Diversity index *H´*	1.731		1.688		2.390		1.737	
Equitability *E*	0.577		0.845		0.851		0.672	
ZIC	90%							

A = abundance, B = biomass

G. gobio – 9.53%. The high presence of *S. trutta*, *T. thymallus*, and *P. phoxinus* accompanying the barbel community in the Ondřejnice is the result of the trout character of higher situated parts of this stream. Only *O. mykiss* and *P. parva* were present as representatives of non-native species (*ZIC* = 92.3).

Ondřejnice: 10 species were caught (Table 2). The species *G. gobio* (34.41%) and *B. barbatula* (22.91%) significantly prevailed there. The leading position with its biomass was taken by *G. gobio* (25.22%), *L. cephalus* (21.34%), and *L. leuciscus* (18.68%). The presence of *S. trutta*, *T. thymallus*, *O. mykiss*, and *P. phoxinus* (Table 2) proves the trout character of the Ondřejnice stream.

Lubina: The highest proportions out of the 11 found species (Table 2) belonged to *R. rutilus* (38.57%), *L. cephalus* (18.08%), *B. barbus* (13.12%), and *G. gobio* (12.82%). *L. cephalus* (34.6%) and *B. barbus* (31.39%) accounted for the substantial part of total biomass. For more details see Table 2.

Bílovka*: R. rutilus* prevailed in number in the investigated section with 46.22%. *L. cephalus* (20.12%) and *P. fluvialitis* (14.24%) followed. The substantial part of the biomass consisted of *L. cephalus* (59.27%) and *R. rutilus* (19.85%). For more details see Table 2.

Pools and backwaters

Four river pools – originally river meanders – were investigated in the lower part of the protected area, in the left-bank alluvium of the Odra River between river kilometre 30 and 40. An overview of the fish species caught with gill nets in the individual localities is presented in Table 3. The investigated biotopes presented very poor fish communities (4–8 species), a low number of fish and low biomass. Only *R. rutilus* and *P. fluviatilis* were present in all investigated biotopes.

Forest Lake: We found 8 fish species in gill net catches. For more details see Table 3. The $CPUE_n$ values of individual nets were 0.10 or less. The value 0.43 was found out only in the case of the net with the mesh size of 17 mm. The $CPUE_w$ values of individual nets did not get over 50 g. The Forest Lake has a small step built in front of its lower inlet into the Odra River. It increases the water level in the

lower part of the arm. By electrofishing we caught under this step *E. lucius* (1 specimen – 1 000 g), *R. rutilus* (40 specimens – 670 g), *S. erythrophthalmus* (1 specimen – 70 g), *L. cephalus* (8 specimens – 2 250 g), *T. tinca* (2 specimens – 640 g), *P. parva* (31 specimens – 65 g), *G. gobio* (3 specimens – 90 g), *C. auratus* (12 specimens – 1 450 g), *C. carpio* (1 specimen – 155 g) and *P. fluviatilis* (28 specimens – 460 g).

Small Gelnar Lake: By electrofishing, we caught in the part close to the bank *E. lucius* (6 specimens – 625 g and 7 specimens of fingerlings), *R. rutilus* (5 specimens – 245 g), *T. tinca* (5 specimens – 160 g), *Carassius carassius* (2 specimens – 105 g), and *P. fluviatilis* (9 specimens – 100 g). The gill net catches (the gill nets 17, 22, and 33 mm with the mesh of 40 m presented no catch at all) presented 4 species (Table 3). The $CPUE_n$ value was very low – 0.03 to 0.19 – similarly like the $CPUE_w$ value (2.8 to 26.4 g). We consider catching *C. carassius*, including the fingerlings, very valuable.

The Old Odra: We proved with gill nets the presence of 7 fish species (Table 3). The $CPUE_n$ values of individual nets were in the range from 0.11 to 0.46 and the $CPUE_w$ values from 15.64 to 89.07 g.

Polanka Pool: With gill nets we found 6 fish species in total in this arm (Table 3). The $CPUE_n$ values were higher when compared with the previous three biotopes ($CPUE_n$ was in the range from 0.11 to 0.82 and the $CPUE_w$ varied from 16.00 to 97.07 g).

DISCUSSION

Fish communities in the investigated biotopes in the area of PLA consisted primarily of original native species. For this reason, the *ZIC* values (the zoogeographic integrity coefficient) did not get below 90%. Occasional differences in the ichthyofauna species spectrum in PLA, compared with streams draining into the Black Sea, result from the lower species diversity of the ichthyofauna in streams draining into the Baltic Sea in the Czech Republic (Lusk *et al*., 2002). The low presence or the absence of some species typical of the biotopes of floodplains (bream, rudd, pike, bitterling, catfish, and lance) probably has several reasons. The number, diversity and the area of floodplain biotopes (pools, lakes, and river arms) in the PLA seem to be low. A significant part of suitable grounds was taken for the building of ponds in the Middle Ages (Hurt, 1960). Another negative effect may also be that floods in PLA take place in early spring (March and April), when the temperatures are unsuitable for the reproduction of phytophile fish species. The fact that the Odra River itself is inhabited by the *Barbus – Chondrostoma* community excludes any feedback, i.e. a possible support or renewal of the fish community of alluvial biotopes in flood periods, as we know it for example in areas of the lower part of the Dyje River (Lusk *at al*., 2001).

We can also consider the ichthyocenoses in the investigated localities in the Odra River and in its tributaries, in the alluvial area of the Odra River, very unbalanced with respect to the community (*Barbus – Chondrostoma*). This relates mostly to the very low presence (the number and the biomass) of key rheophile species of *Ch. nasus* and *B. barbus*, despite the natural conditions of these localities suit these species. Locally weak populations of the latter species probably result from serious disturbances of the river continuum with across the flow built structures, especially the steps and weirs. The long-term existence of migration barriers undoubtedly led to a serious decline in the formerly plentiful populations of barb, nase, carp and vimba (which was not found during our investigations). The strong devastation of the key species populations of the so-called barbel zone (*Ch. nasus*, *B. barbus*, and *V. vimba*) and also some unidentified causes are basically valid for the entire hydrological network in the Czech Republic (Lusk, 1996; Lusk *et al*., 1997). In spite of the fact that the Odra River in PLA is mostly unregulated, the biomass there is significantly lower (174–789 kg/ha) when compared with a similar stream of the Ostravice River (800–1 890 kg/ha) (Lojkásek *et al*., 2001). This fact is quite surprising if we consider that the Ostravice River was heavily regulated in both longitudinal and diagonal profiles, when compared with the Odra River, which is almost natural in the investigated part.

Apart from the 25 fish species we found, the following species listed in anglers' statistics of the fishing grounds in the area were also caught: *Aspius aspius*, *Ctenopharyngodon idella*, *Silurus glanis*, and *Vimba vimba*. These four species occur in limited numbers and their presence results from fishery management.

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ABSTRAKT

Rybí společenstva v CHKO Poodří (povodí řeky Odry)

Územím CHKO Poodří o rozloze 81,5 km^2 protéká řeka Odra v délce 55,2 km. Více než 80 % délky toku má zachováno přirozené vinutí koryta a hydrologický režim s pravidelnými záplavami. V období 1997 až 2001 byl proveden ichtyologický výzkum v sedmi lokalitách Odry, ve třech lokalitách hlavních přítoků a ve čtyřech bývalých říčních ramenech. Výzkum byl proveden pomocí tenatních sítí (limnické biotopy) a elektrolovem. Ve vodních tocích (Odra, Lubina, Ondřejnice, Bílovka) bylo zjištěno 22 druhů ryb a ve stojatých vodách další čtyři druhy. V přehledech o úlovcích Českého rybářského svazu z daného území je vykazováno dalších sedm druhů ryb. Ze zjištěných druhů ryb patří *Oncorhynchus mykiss, Pseudorasbora parva, Carassius auratus* mezi nepůvodní druhy pro Českou republiku.

Zkoumané říční úseky jsou osídleny společenstvem typu *Barbus – Chondrostoma.* Nejvyšší početnosti i biomasy dosahují *Leuciscus cephalus, Rutilus rutilus a Barbus barbus.* Odhadované hodnoty celkové abundance a biomasy v jednotlivých lokalitách kolísaly od 2 416 do 20 392 ks/ha a od 174 do 788,8 kg/ha. Index druhové diverzity H' ichtyocenóz v daném území se pohyboval v rozmezí hodnot 2,238 až 3,108, hodnoty ekvitability E byly v rozmezí 0,6499 až 0,8485. Ve čtyřech zkoumaných tůních se vyskytovalo čtyři až osm druhů ryb s nízkou abundancí i biomasou. Index diverzity H' dosahoval hodnot 1,390 až 1,737, přičemž ekvitabilita E se pohybovala v rozmezí 0,577 až 0,851.

Klíčová slova: rybí společenstva; řeka Odra; CHKO Poodří; záplava

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