Arch. Ryb. Pol.	Archives of Polish Fisheries	Vol. 5	Fasc. 2	201 - 207	1997

PRELIMINARY RESULTS ON RESTORATION OF ATLANTIC SALMON (*Salmo salar* L.) IN POLAND

Ryszard Bartel

The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn

A B S T R A C T. Salmon was present in many Polish rivers. Deterioration of environmental conditions and damming of rivers caused extinction of salmon populations in Polish rivers and it became a protected inland water species. 50 000 and 30 000 salmon eyed eggs were imported respectively in 1985 and 1987 from Daugava spawners, and 10 000 Neva salmon eyed eggs were obtained in 1985 from Finland. Daugava spawners were reared in net cages in the Gulf of Gdańsk. 0,8–1 million eggs were obtained yearly. In 1995 these spawners were moved to the Fish Farm „Aquamar" and reared in fresh water. In 1994 another 50 000 Daugava salmon eyed eggs were imported from Latvia. 349-750 one and two–year–old salmons were released into the Drawa River, the Drwęca River and into 3 Pomeranian rivers in 1994-1996. Tagging experiments were carried out and 24 856 tagged smolts released into 5 rivers. From these tagged fish, 16 younger fish and 11 older ones were obtained. Older salmon were caught in the southern Baltic and in the Gulf of Finland and the Gulf of Bothnia. They reached 47 cm after the first year in the sea, after the second 83 cm and 5.9 kg.

STATUS OF SALMON IN POLAND

Salmon was present in many Polish rivers (Fig. 1). The biggest salmon (*Salmon salar* L.) populations were in the Vistula River and the Drawa River (Bartel 1993a). Deterioration of environmental conditions in many rivers and their damming caused a decrease in salmon population numbers. This tendency was even more pronounced after the II World War. The last salmon was reported to be caught in the Skawa River (a tributary of the upper Vistula River) in 1952 (Bieniarz and Łysak 1975), but in the lower Vistula River salmon were still caught at that time. At the end of the 60-ies, attempts to catch salmon spawners in the Vistula estuary were unsuccessful (Bartel 1993b). A similar tendency was observed in the Drawa salmon population. The last salmon spawners were observed on the Drawa spawning grounds in 1985 (Chełkowski 1986), and 2 years later attempts to catch Drawa spawners were unsuccessful (Chełkowski 1988). This resulted in the fact that salmon became a protected inland waters species.

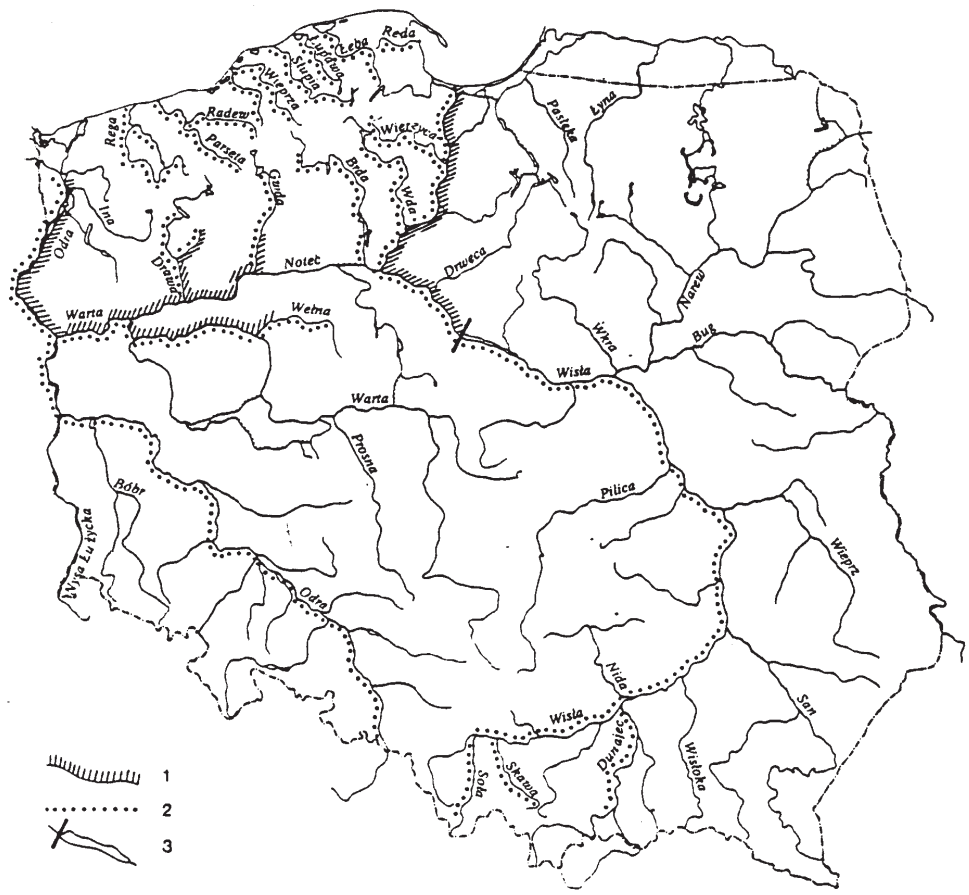

Fig. 1. Salmon rivers in Poland. 1 - after the II World War, 2 - in former times, 3 - the dam built in 1968

PROGRAMME OF SALMON RESTORATION IN POLAND

The described situation was the main reason for taking certain measures leading to regeneration of salmon stock in Polish waters. It was decided that salmon from a river with natural salmon populations, which is geographically closest to Polish rivers, should be used for the restoration of salmon in Poland. For this purpose the Daugava salmon populations was used.

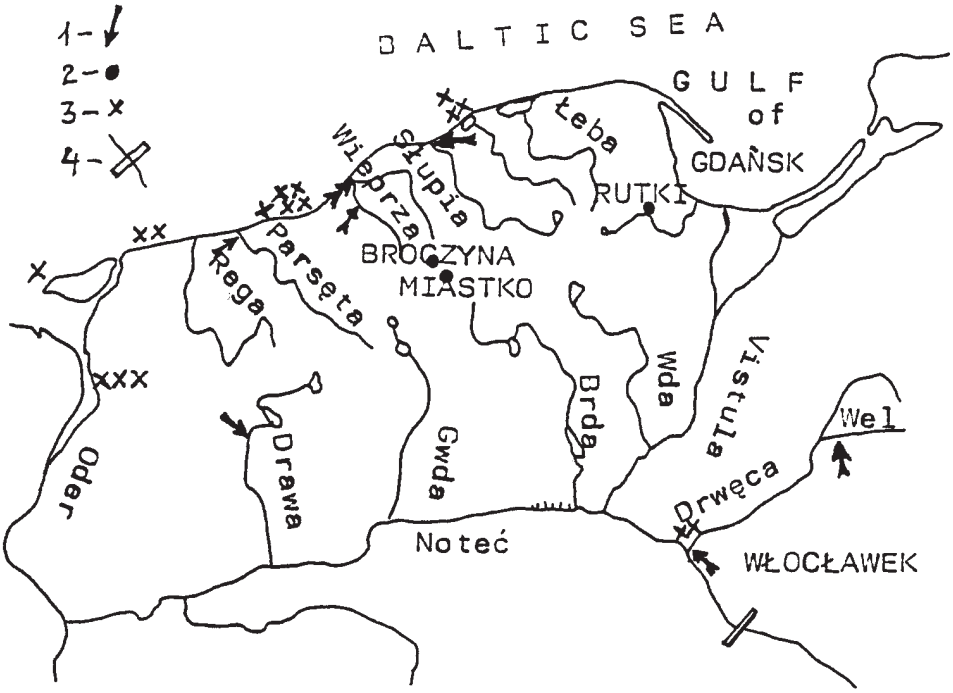

Fig. 2. Sites of smolt release - 1, hatcheries in which salmon are reared - 2, site where one specimen was caught - 3, the dam built in 1968 - 4

REARING OF SALMON SPAWNERS

In 1985 and 1987 the Sea Fisheries Institute imported 50 000 and 30 000 Daugava salmon eyed eggs respectively (Wiktor 1989, Grudniewska, Grudniewski 1990). Smolts were reared in the Salmonid Research Laboratory of the Inland Fisheries Institute at Rutki. These smolts were used for rearing spawners in net cages in the Gulf of Gdańsk. About 0.8–1 million salmon eggs were collected yearly from these spawners. In autumn 1995, after artificial spawning, salmon spawners aged 6+, 4+ and 3+ were moved to the Fish Farm „Aquamar" in Miastko which reared salmon spawners in fresh water.

In 1994 another 50 000 salmon eyed eggs, obtained from the Daugava spawners, were imported. Smolts were reared in the Fish Farm „Aquamar" and 1500 selected 2–year–old smolts were reared as breeders.

In 1985 the Inland Fisheries Institute obtained 10 000 Neva eyed salmon eggs from Finland.

STOCKING

During the last few years, salmon alevins were stocked into the Słupia River and the Wieprza River. Numbers of released fish have not exceeded 50 000 alevins yearly. The results of these stockings were very low. Better results were obtained when one summer old salmon were released into small streams (Domagała and Bartel 1995).

Restoration programme of salmon in Poland is based on smolt release. Smolts are reared in 3 hatcheries (Fig. 2).

Smolts were released into the Drwęca River (tributary of the Vistula River), the Drawa River (tributary of the Oder River) and into 3 Pomeranian rivers: Słupia, Wieprza and Parsęta (Fig. 2). 349 750 were released into these rivers, among them there were 216 945 and 132 805 one and two year old smolts respectively. Majority of these fish were released into the Wieprza River (Tab. 1, Fig. 2).

TABLE 1

Number of released smolts into Polish rivers in 1986-1996

Year	River	Number of fish
1986	Słupia	840
1994	Wieprza	22647
1995	Wieprza	46687
	Drwęca	25019
	Drawa	22843
	Słupia	68678
	Parsęta	46254
Total		209481
1996	Wieprza	20422
	Grabow	15500
	Drwęca	13675
	Wel	6953
	Drawa	11403
	Słupia	24402
	Parsęta	24427
Total		116782
Grand total		349750

TAGGING EXPERIMENTS

In 1994-1996 24 856 tagged smolts were released into the Drwęca River and the Drawa River (tributaries of the Vistula River and the Oder River respectively) and into 3 Pomeranian rivers (Fig. 2).

Smolts were tagged with Carlin tags. Only 27 recoveries were obtained 16 from younger fish and 11 from older ones (Tab. 2). The released smolts migrated downstream to the sea and were caught in the coastal waters. Smolts released into the Drawa were caught after 13 days in Lake Dąbie, about 300 km from the site of release. These smolts migrated with an average speed of 23 km per day. They were slower than the

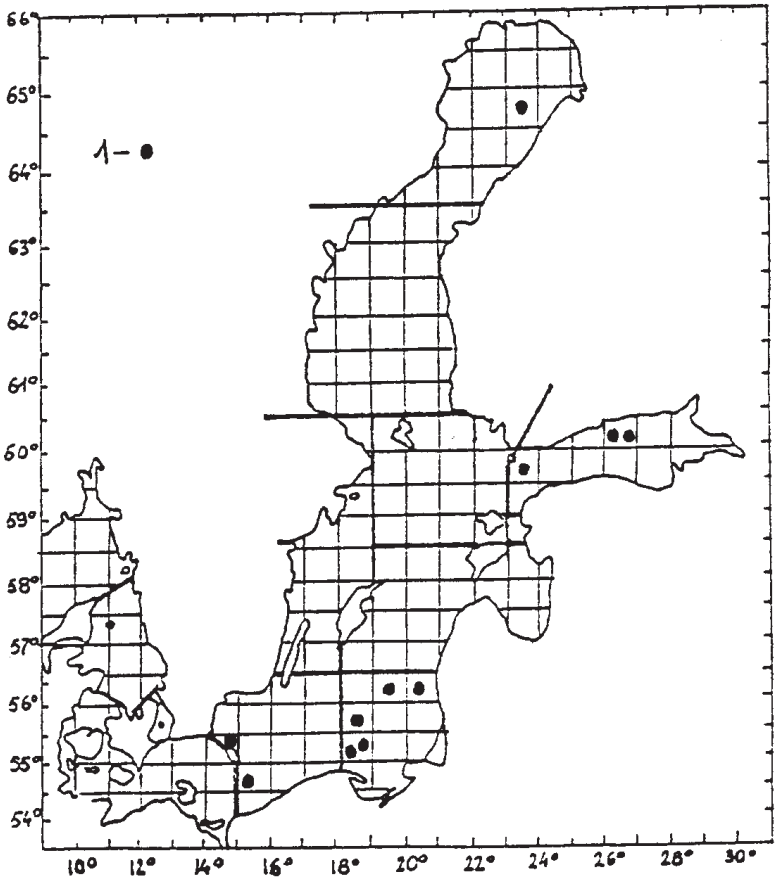

Fig. 3. Sites of catches of tagged „older" Daugava salmon, 1- site where one specimen was caught

TABLE 2

Tagging experiments of salmon smolts released into Polish rivers

Year	River	Number of smolts	Age	Recoveris	
				younger fish[1/]	older fish[2/]
1994	Wieprza	1080	2	-	9
1995	Wieprza	2999	2	4	
	Wieprza	996	1		
	Drwęca	1997	2	1	
	Drawa	1999	2	-	1
	Słupia	1999	2	2	
	Parsęta	2000	2	2	1
	Parsęta	975	1		
	Gulf of Puck	990	1		
Total 1995		13955		9	2
1996	Wieprza	3000	2		
	Drwęca	3000	2	1	
	Drawa	990	2	3	
	Słupia	1900	2	1	
	Parsęta	931	2	2	
Total 1996		9821		7	
Grand total		24856	16	11	

1 - fish caught before the end of June of the first year after the release

2 - fish caught after June of the first year after the release

Drawa smolts released into the same place in the 70-ies, when smolts migrated with the speed of 70 km per day (Bartel 1987). The older tagged salmon were caught in the southern Baltic, the Gulf of Finlandia, and the Gulf of Bothnia (Fig. 3).

Daugava salmon released into Polish rivers reached length of 47 cm after the first year in the sea, after the second 83 cm and 5.9 kg, but at the same time a fish was caught 51 cm long and weighing 1100 g.

ACKNOWLEDGEMENTS

This work was supported by the State Committee for Scientific Research (KBN), Project number 5 5678 94 C/1992.

REFERENCES

Bartel R. 1987 – Distribution, migrations and growth of Drawa salmon (*Salmo salar* L.) – J. Appl. Ichthyol. 3: 33–38.

Bartel R. 1993a – Anadromous fishes in Poland – Bull. Sea Fish. Inst. 1 (128): 3–15.

Bartel R. 1993b – Present status of salmo and sea trout in Poland – In: Report from the Uppsala workshop on reproduction disturbances in fish (Ed.) L. Norrgren, 20-22 Oct. 1993, Swedish Environmental Profection Agency, Report 4346.

Bieniarz K., Łysak A. 1975 – Oddziaływanie człowieka na środowisko wodne i ichtiofaunę w Polsce południowej – Gosp. Ryb. 27, 1: 6–9.

Chełkowski Z. 1986 – Łosoś w Drawie XX – Gosp. Ryb. 38, 10: 18–20.

Chełkowski Z. 1988 – Łosoś w Drawie XXII – Gosp. Ryb. 40, 6: 17–18.

Domagała J., Bartel R. 1995 – Survival of salmon (*Salmo salar* L.) fry stocked into small brooks – ICES An. Cat. Fish. Comm. C.M. 1995/M: 36.

Grudniewska J., Grudniewski T. 1990 – Próby odbudowy stada rodzimego łososia bałtyckiego – Gosp. Ryb. 42, 1–3: 3–4.

Wiktor J. 1989 – Zarybianie Bałtyku łososiem w świetle polskich doświadczeń hodowli reproduktorów tych ryb w sadzach – Tech. Gosp. Mor. 7 (152): 317–319.

STRESZCZENIE

WSTĘPNE WYNIKI RESTYTUCJI W POLSCE POGŁOWIA ŁOSOSIA ATLANTYCKIEGO (Salmo salar L.)

Swego czasu łosoś występował w wielu polskich rzekach. Pogorszenie warunków środowiska oraz przegradzanie rzek tamami spowodowało zanik łososia, tak że obecnie stał się on gatunkiem ściśle chronionym. W latach 1985 i 1987 sprowadzono do Polski odpowiednio 50 000 i 30 000 ziaren zaoczkowanej ikry pobranej od tarlaków Daugava, a w 1985 r. zaimportowano 10 000 ziaren zaoczkowanej ikry pobranej od fińskich tarlaków Neva. Tarlaki Daugava hodowano w sadzach sieciowych umieszczonych w Zatoce Gdańskiej. Otrzymano 0,8–1 miliona ziaren ikry rocznie. W 1995 r. tarlaki te przeniesiono do gospodarstwa rybackiego „Aquamar", gdzie są one przetrzymywane w wodzie słodkiej. W 1994 r. sprowadzono z Łotwy następną porcję 50 000 szt. zaoczkowanej ikry łososia Daugava. W latach 1994-1996 wypuszczono 349-750 jedno– i dwurocznych smoltów łososia do Drawy, Drwęcy oraz trzech rzek pomorskich. Doświadczenia nad znakowaniem łososia przeprowadzono na 24 856 smoltach wypuszczonych do 5 rzek. Z tej liczby uzyskano 16 zwrotów znaczków od ryb młodszych oraz 11 starszych. Starsze łososie odłowiono w Bałtyku, Zatoce Fińskiej i Zatoce Botnickiej. Łososie osiągały 47 cm długości po pierwszym roku życia w morzu, 83 cm i 5,9 kg po drugim roku.

ADRES AUTORA:

Prof. dr hab. Ryszard Bartel
Instytut Rybactwa ródlądowego
Zakład Rybactwa Rzecznego
80-761 Gdańsk
Reduta Żbik 5