

The history of the Atlantic sturgeon, *Acipenser oxyrinchus* Mitchill, 1815, in the Warta River of Central and Western Poland in the nineteenth century based on Polish sources

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Abstract. An analysis of Polish historical sources indicates that there are no references to sturgeon in the Warta River basin before 1810. It is hypothesized that there was no autochthonic sturgeon population in this river in historic times. The occasional occurrence of fish in the Warta River stemmed from their straying from the Oder River, especially during high waters. The situation changed in the second half of the nineteenth century because increasing pollution in the Oder River meant increasing numbers of fish entered the Warta River. Peak catches by fishers in Poznań were in the 1880s and early 1890s, after which the population collapsed and never recovered. Overfishing in this period stemmed primarily from the effects of regulating the Warta River for navigation. The data presented herein might have implications for the current sturgeon reintroduction program being conducted in the Warta River basin.

Keywords: Sturgeon, Warta River, overfishing, river pollution, environmental history

Introduction

The history of the Atlantic sturgeon in the Warta River basin in Poland before 1900 has been of limited interest to researchers. German ichthyologists from the late

nineteenth and early twentieth centuries beginning with Borne (1882) noted the occurrence and high catches of sturgeon in the second half of the nineteenth century, especially in 1880s and early 1890s, but no attempt was made to interpret the data from a historical perspective, because there was no knowledge of the situation in previous periods. Przybył (1976) concluded from readily available German and Polish ichthyological accounts that sturgeon had always been present in the Warta River, that it reproduced in the Warta, Drawa, and Gwda rivers, and significant catches were being landed as late as in the early 1890s. He attributed the disappearance of the sturgeon to the following: overfishing late in the nineteenth century; channelization that destroyed spawning grounds, deep pools, etc.; steamships that destroyed spawn; pollution. These conclusions are commonly uncritically accepted because of the lack of in-depth historical studies, and they are the basis for current attempts to reintroduce this fish into the Warta River basin (Arndt et al. 2006, Kolman et al. 2011a, 2011b).

The purpose of the article is to present new information on sturgeon catches in the Warta River basin in the nineteenth century based on Polish sources, primarily newspapers. Different conclusions can be drawn from the data, especially regarding the issue of

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historic sturgeon occurrence in the Warta River and the reasons for its disappearance.

Material and Methods

The study is based on contemporaneous evidence. All available written sources were checked for references to sturgeon in the Warta River basin, especially the following newspapers appearing in two cities: Poznań – *Gazeta Południowo-Pruska* (GPP) (1794–1806); *Gazeta Poznańska* (GaP) (1806–1814); *Gazeta Wielkiego Xięstwa Poznańskiego* (GWXP) (1815–1863), *Dziennik Domowy* (DD) (1840–1847); *Goniec Polski* (GoP) (1850–1851); *Dziennik Poznański* (DP) (1859–1900); *Kurier Poznański* (KP) (1872–1900); *Orędownik* (OR) (1873–1900); *Goniec Wielkopolski* (GW) (1877–1900); *Wielkopolanin* (WP) (1883–1900); and Kalisz – *Kaliszanin* (KS) (1870–1892). Poznań, which was the capital of the Wielkopolska region and the Grand Duchy, is located by the Warta River. Kalisz, a city in Wielkopolska, is on the Prosna River. Some references were also found in newspapers from other regions including in *Dziennik Kujawski* (DK), *Gazeta Rządowa Królestwa Polskiego* (GRKP), and *Kurjer Warszawski* (KW).

There are two types of records concerning sturgeon. The first is brief information on catches, and almost all of these records are in columns on local news. The second type is announcements by fishers of the sale of freshly caught sturgeon, which are found in advertising sections. All the records are presented in Table 1 in the Annex. When at least two newspapers published the same information, then only the oldest or most complete source is included.

Interpreting information reported in newspapers presents some challenges since imprecise adjectives are often used like “some,” “several,” or “many” fish, while location information, dates of fish catches, and even fish sizes are frequently lacking. Although the archives of some newspapers are incomplete, and in

a few cases whole years are missing, fortunately other newspapers often fill in the gaps, which means they can be considered representative of basic trends. This is due to consistency of various sources and the fact that large fish, like sturgeon, attracted the attention of the media and the public. Additionally, catches of sturgeon in the Warta River were monitored by fishers in Poznań. Their guild, dating back to the thirteenth century, is the oldest of its kind known in Poland (Karwowski 1912). It had a monopoly on fishing on a 150 km long stretch of the river from Nowe Miasto to Wronki, but later in the nineteenth century this stretch was shortened. The fishers probably took most of the sturgeon to Poznań, which was a key market for these fish.

Results

Altogether 82 newspaper records containing original information were identified, of which 75 concern catches and consumption, while seven are advertisements placed by Mikołaj and Józef Palczewski, the master fishers from Poznań. The records span 40 years. In the 1800–1850 period, there are only three records, while the remaining ones are from 1851–1898. In some years there is just one record, while for others there are several, such as seven in 1885 and eight in 1889. The peak catches were from 1885 until the early 1890s. In general, years with abundant sturgeon catches produced more records.

Most of the records (74) pertain to the Warta River along a long stretch from Golina (near Konin) to Santok (near Gorzów Wielkopolski); however, most of the fish were caught in Poznań close to Chwaliszewski Bridge, where there was a deep pool where sturgeon occurred and was convenient for fishing. Fishers, including the Palczewski family, had their landing-place there. There are five records from the Prosna River, two from the Gwda River, and one from the Noteć River.

It is impossible to assess the total number of fish caught. Nevertheless, the number of fish recorded

in the newspapers was approximately 300. The largest numbers were in 1889 (>60), 1886 (ca. 50–60), 1887 (>30), and 1876 (25), but many reports are of single fish. However, two sources report that in some years as many as 300 sturgeon were caught in Poznań alone (WP 1892, 234, 12 X; DP 1904, 145, 26 VI). This is probably an inflated figure, because it was used by the fishers of Poznań as evidence of high incomes in their fight with the authorities planning to terminate the guild's privileges by paying low compensation fees.

Most of the records are from June and July, while some are from May and August. This indicates that sturgeon was present in the Warta River from May. However, one source (DP 1889, 180, 8 VIII) reports that in 1889 the upstream migration started late and the fish appeared in the river at the end of June because of the prolonged winter and high waters, while the fish usually appeared at the end of May (but note that the earliest record is from May 2). Single records are from October and December, an unusual period, since the fish migrate back to the sea soon after spawning.

Discussion

The data indicates that until the middle of the nineteenth century sturgeon was a rare fish in the Warta River basin. Several facts confirm this. First, the reference from 1810 reporting that crowds paid to see the unusual fish, is strong evidence in support of this. Similar information from Poznań in 1870 could indicate the catch was poor in this year, too, and reports from the cities of Piła in 1858 and Kalisz in 1871 also prove this point. Similar instances reported in Poland refer to the Narew River (only a few fish are on record in the nineteenth century) in which a large sturgeon was caught in 1866 and was then put on display in the city of Łomża (Kurp 1870), the Niemen (Nemunas) River from which a fish measuring 2.75 m was caught and then displayed in the city of Grodno (Anonymous 1927), and the Vistula River in Płock (Anonymous 1934) when sturgeon was rare in

this period. The fact that in 1810 a sturgeon was bought by a prefect and other accounts from 1842 and 1851 indicate the special role of sturgeon in Poznań at that time because of its rarity. In contrast, in Warsaw the local populace consumed sturgeon widely in the nineteenth century because it was one of the cheapest fish in May and June.

Second, there are no advertisements for fresh fish in Poznań before 1862. All advertisements placed by local tradespeople until the early 1860s are for processed fish. Table 2 (Annex) presents the oldest advertisements, but many similar ones also appeared later. They indicate that processed sturgeon was for sale from late fall until early spring. Some advertisements state that these fish were imported from the city of Elbląg near the mouth of the Vistula River. At that time there was no sturgeon processing in Poznań, and it did not begin until the 1880s when caviar was produced from fish caught locally.

Third, no valuable information was found in other Polish sources. Notably, the naturalist Jonston (1657), who lived for many years in Wielkopolska, especially in Leszno, mentions the occurrence of sturgeon, but only in the Vistula River. Plater (1841), who also lived for a long time in Wielkopolska, including in Poznań, also mentions this. Books on the geography of the Grand Duchy of Poznań (e.g., Sempński 1853) mention sturgeon, but the eastern border of Wielkopolska region ran along the Vistula River, in which the fish was abundant. Przybył (1976) states that Rzączyński (1721) mentions sturgeon in the Warta River, but there is no such reference (only its occurrence in the Vistula River – see also Fedorowicz 1966). The ichthyologist and naturalist Wałęcki (1864) makes a general statement that sturgeon in the Warta River might reach the city of Koło. However, in his earlier work (Wałęcki 1863) he states that there is no information about the occurrence of sturgeon in this river. Therefore, even well-educated naturalists had no knowledge about the occurrence of sturgeon in the Warta River.

Fourth, sturgeon was not included among the fishes that had to be given to landlords. This is in sharp contrast to this practice regarding sturgeon

from the Vistula River, which was widespread before 1800 (Cios 2007).

Fifth, no German paper on fisheries published prior to 1880 known to this author mentions the occurrence of the sturgeon in the Warta River (records refer only to the Oder River, as discussed below). Jaśkowski (1951) states that, according to the fishery chronicles of the Wielkopolska region, sturgeon was noted commonly in the 1830s, but he does not provide the source (this is probably a printing error, and the date should be the 1880s).

Sixth, the rarity of sturgeon in the Warta River is confirmed by a brief note in a newspaper from Warsaw: "...sturgeon are caught each year in the Vistula River, but only sometimes in the Warta River. [...] In the Vistula River they only occur in summer, while in other rivers they do so in winter" (KW 1847, 181, 10 VII; author's translation). This is probably secondary information based on some unknown source, perhaps a German one. The rare occurrence of sturgeon in late fall and winter in the Warta River, however, is in line with similar occasional market reports from Warsaw concerning the Vistula River. "Other rivers" probably refers to those in Russia and Ukraine, where winter fishing for Acipenserids was common.

Seventh, fishery documents from the sixteenth to the eighteenth centuries for Gorzów Wielkopolski that Gaziński (2003) reviewed concerned only eel, and there are no references to sturgeon.

Eighth, a price list of fish from June 12, 1780, in Poznań, includes 15 fish species but sturgeon is not one of them (Karwowski 1912). The exclusion of the most valuable fish, taking into account the fact that in the nineteenth century the largest number of sturgeon records was in June, is a clear indication that it was not caught nor did it occur in the Warta River.

Ninth, there is a strikingly small number of sturgeon in archaeo-ichthyological remains from Poznań and surrounding areas. Makowiecki (2016) found the remains of only six fish in material dating from the tenth to the early nineteenth centuries. His conclusions concur with this author's preliminary findings that this was because of the rare occurrence of sturgeon in the Warta River.

There is also a small number of references to sturgeon in the Noteć, Gwda, and Prosna rivers, in which only single specimens are reported. Old sources on the fisheries in these rivers (Anonymous 1898, 1899) confirm this. The fish was unknown in the Obra River (Krasicki 1898). There are also no reports of this species from the Drawa River. One description of this river (Anonymous 1825) includes information on the former abundance of eel, trout, and stone loach (or barbel; in Polish *śliz* was used for both species), but no mention is made of sturgeon.

The data suggest the following history of the sturgeon in the Warta River. Sturgeon was not an autochthonic fish in this river in historic times. Occasionally, single specimens strayed from the Oder River during upstream migration in spring, especially during high waters. The situation was also the same in some tributaries of the Vistula River, like the San River (Cios 2017). From the 1850s, the number of fish entering the Warta River increased slowly, while in the late 1870s and 1880s it was quite remarkable. These were no longer just straying fish; some ecological factor must have prompted this change in migratory behaviour.

The reason probably lies in the increasing pollution of the Oder River. As early as 1753 there are recorded complaints in Ruppertsdorf in the Nysa Łużycka River (Neiße) basin that fish cannot live in the water polluted by developing industry (Pfeifer 2002). In 1828 many dead catfish were seen on the surface of the Oder River near Stettin, and in Radow commune over 600 fish were buried (Anonymous 1828). In the second half of the nineteenth century the progressing industrialization of Silesia led to increasing pollution in the Oder River. This resulted in the disappearance of salmon in the upper reaches of the river basin (Pax 1925), and this also became an ecological barrier for the sturgeon, which then turned to the Warta River.

It seems that the sturgeon population in the Oder River was never large as or at least not comparable to that in the Vistula River. This conclusion can be drawn from several old German works. The first reference to sturgeon (*rumbus*) is in a dictionary of Silesian fish from 1340 (Witkowski and Żereplik 2001).

Schwenckfeld (1603) mentions that fishers sighted sturgeon in the Oder River near Bytom (Beuten). Börner (1781) reports that in Silesia sturgeon occurred in spring as soon as the ice cover on the Oder River melted. Bloch (1786) reports that one fish was caught near Wrocław (Breslau). Kaluza (1815) writes that sturgeon were in the river in winter and summer but mainly in May. Gloger (1833) reports that sturgeon occurred in the river and its larger tributaries throughout the year but most often in May. Heinrich (1856) states that sometimes sturgeon were caught in Oderberg (Bohumin) close to the mouth of the Olza River. Wittmack (1875) reports that sturgeon migrates upstream to Gubin (Guben) and even as far as Ścinawa (Steinau). Most of these authors noted that the occurrence of sturgeon coincided with high waters. In Polish sources, Kumelski and Górski (1837) were the first to note the occurrence of sturgeon in the Oder River, but this is probably a secondary source.

The only paper on sturgeon fishing in the Oder River is by Kundmann (1737) in which he states that sturgeon sometimes occurred in large numbers and swam far upstream. In 1713, 26 sturgeon were caught in Wrocław, the largest of which was six elbows long. Approximately 70 years earlier a much larger fish was caught in Racibórz (Ratibor). In Silesia most fish were caught near Bytom and Ścinawa, but in 1718 only seven sturgeon were caught there. For comparison, large numbers of sturgeon were caught in the Vistula River. According to Rzączyński (1742, 202), 1,200 fish were caught near Warsaw in one spring. Tanner (2002, 255) states that 370 fish were caught near Janowiec in 1678. In the first half of the nineteenth century up to a 1,000 fish were caught in a short period (Anonymous 1853), while on one Friday, 300 fish were for sale at the Warsaw market (Anonymous 1875).

These data indicate that there was a sudden increase in sturgeon catches in the 1880s and that after a few years the sturgeon population collapsed, likely because of overfishing. But what happened in the 1880s that fishers suddenly started to catch large numbers of sturgeon? Since there is no indication that fishing gears or techniques improved, the only sound explanation is an ecological one. In the 1880s,

long stretches of the Warta River were channelized with a view to developing river navigation. The river was straightened and cleared of all trees in the water, and the banks were regulated. Under these conditions, fishers could easily net all the fish since the numbers of deep runs and pools and places affording protection were greatly reduced. This seems to be the most likely reason for overfishing and the collapse of the sturgeon population in the late 1890s from which it never recovered. This is in line with one report from the city of Kraków, in which attention was drawn to the presence of fallen trees in the Vistula River that were a natural refuge and prevented fishers from catching the sturgeon (Anonymous 1915).

Based on the information presented, it is necessary to raise the question of natural sturgeon reproduction in the Warta River basin. Historical data on this is scarce and uncertain because there was no self-sustaining, autochthonic sturgeon population prior to the mid nineteenth century, and in-depth studies were not conducted later. Although some places have been indicated as spawning sites (Przybył 1976, Arndt et al. 2006), there is no evidence that spawning was successful and that the sturgeon that occurred in the Warta River basin were of local origin (one cannot exclude the possibility of migrating sturgeon reproducing in the Oder River). The smallest reported fish was 30 lbs. In the Vistula River basin the only certain historical spawning sites were in the main channel and particularly downstream of the confluence with the San River. Small fish (10–17 cm long) were still noted in the early twentieth century (Anonymous 1926). Therefore, the issue of successful spawning in small rivers, both in the Vistula and Oder basins, needs reassessment. There is a good analogy with salmon. Some reintroduction programs in recent years are based on the assumption that salmon was native in the San River, but a detailed analysis of historical data indicates that this is not the case. The occurrence of salmon in the San River from the end of the nineteenth century was thanks to stocking not natural reproduction (Cios 2017).

An important source of data, which may shed additional light on the occurrence of sturgeon in the Warta River basin, are German newspapers, not only

from Poznań but also from Wrocław, Szczecin, and some other cities in the Oder River basin. They certainly contain references to sturgeon, because some Polish newspapers mention them (like in the *Posener Zeitung*), but this is a task for a researcher fluent in German.

References

- Anonymous (1825). "Statistics of the Prussian Kingdom," *Rozmaitości Warszawskie*, 35, 275–278 (31 VIII) (in Polish).
- Anonymous (1828). [Near Szczecin in Pomerania...], *Kurjer Warszawski*, 243, 1024 (10 IX) (in Polish).j
- Anonymous (1853). [It is known that in spring...], *Kurjer Warszawski*, 100, 498 (16 IV) (in Polish).
- Anonymous (1875). [Strongly developed sturgeon fishing...], *Kurjer Codzienny*, 104, 2 (15 V) (in Polish).
- Anonymous (1898). "The River Noteć area and the state of its fisheries," *Ziemianin*, 50, 210–211 (in Polish).
- Anonymous (1899). "The River Prosna area and the state of its fisheries," *Ziemianin*, 41, 183 (in Polish).
- Anonymous (1915). "Sturgeon in the Vistula," *Głos Narodu* (wyd. por.), 323, 2 (29 VI) (in Polish).
- Anonymous (1926). "Sturgeon in the Vistula," *Kresy Zachodnie*, 213, 3 (16 IX) (in Polish).
- Anonymous (1927). "An unusual sturgeon specimen," *Gazeta Bydgoska*, 163, 4 (20 VII) (in Polish).
- Anonymous (1934). "A huge sturgeon exhibited at a charge," *Głos Mazowiecki*, 131, 3 (11 VI) (in Polish).
- Arndt, G.–M., Gessner, J., Bartel, R. (2006). Characteristics and availability of spawning habitat for Baltic sturgeon in the Odra River and its tributaries. *J. Appl. Ichthyol.*, 22(Suppl. 1), 89–99.
- Bloch, M.E. (1786). *Ichtyologie, ou, Histoire naturelle, générale et particulière des poissons*. Vol. 3. Chez l'auteur, & chez François de la Garde libraire, Berlin.
- Borne, M. (1882). *Die Fischerei-Verhältnisse des Deutschen Reiches, Oesterreich-Ungarns, der Schweiz und Luxemburgs*. Moeser, Berlin.
- Börner, J. (1781). *Prodromus der Schlesischen Zoologie*. Amphibia. *Neue Ökonomische Nachrichten der patriotischen Gesellschaft in Schlesien*, 2, 131–143.
- Cios, S. (2007). Fish in the life of Poles from the tenth to nineteenth centuries. *Wyd. IRS, Olsztyn* (in Polish).
- Cios, S. (2017). Historical information on the main fish species in the River San drainage area. *Rocz. Nauk. PZW*, 30, 137–155 (in Polish with an English summary).
- Fedorowicz, Z. (1966). The fauna of Poland in the works of Friar Gabriel Rzączyński T.J. (1664–1737). *Zakład Narodowy imienia Ossolińskich, Wrocław* (in Polish).
- Gaziński, R. (2003). From the history of fishing in Gorzów and its surroundings in the sixteenth to eighteenth centuries. *Nadwarciański Rocznik Historyczno-Archivalny*, 10, 31–40 (in Polish).
- Gloger, C.L. (1833). *Schlesiens Wirbelthier-Fauna*. Verl. von Grafts, Barth und Comp, Breslau.
- Heinrich, A. (1856). *Mährens und k.k. Schlesiens Fische, Reptilien und Vögel*. Nitsch und Grosse, Brünn.
- Jaśkowski, M. (1951). "Are sturgeon returning to the Warta River?" *Głos Wielkopolski*, 144 (27 V) (suppl. Nowy Świat, 12:[1]). (in Polish)
- Jonston, J. (1657). *Historiae naturalis de piscibus et cetis libri 5*. Apud Ioannem Iacobi fil. Schipper, Amstelodami.
- Kaluza, A. (1815). *Systematische Beschreibung der schlesischen Amphibien und Fische*. Gedruckt mit Kreuzer-Scholzachen Schriften, Breslau.
- Karwowski, S. (1912). "The fishers guild in Poznań," *Roczniki Towarzystwa Przyjaciół Nauk w Poznaniu*, 38, 144–175 (in Polish).
- Kolman, R., Kapusta, A., Duda, A. (2011a). Re-establishing the Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus* Mitchill) in Poland. In: *Biology and conservation of the European sturgeon Acipenser sturio L. 1758* (Eds.) P. Williot, E. Rochard, N. Desse-Berset, F. Kirschbaum, J. Gessner, Springer-Verlag, Berlin, 573–581.
- Kolman, R., Kapusta, A., Duda, A., Wiszniewski, G. (2011b). Review of the current status of the Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus* Mitchill 1815, in Poland: principles, previous experience, and results. *J. Appl. Ichthyol.*, 27, 186–191.
- Krasicki, J. (1898). "Marshes by the River Obra and the state of fisheries in them," *Ziemianin*, 30, 123–124 (in Polish).
- Kumelski, N.A., Górski, S.B. (1837). *Zoology, or the natural history of animals*. Vol. 3. J. Zawadzki, Wilno (in Polish).
- Kundmann, J.C. (1737). Von einem Rom gefangenen Stöhr, und dessen Aestimation daselbst; wie auch von dem Stöhr-Fang in der Oder, insonderheit bey Breslau. In: *Rariora naturae et artis item in re medica*, M. Herbert, Bresslau und Leipzig, 481–484.
- Kurp (1870). [Letter from the River Narew]. *Gazeta Polska*, 216, 1–2 (1 X) (in Polish).
- Makowiecki, D. (2016). The animals of the Poznań and surroundings in the Middle Ages and Post-Medieval period: Archaeozoological foundations. *Bogucki Wydawnictwo Naukowe, Poznań* (in Polish).
- Pax, F. (1925). *Wirbeltierfauna von Schlesien: faunistische und tiergeographische Untersuchungen im Odergebiet*. Verlag von Gebrüder Borntraeger, Berlin.
- Pfeifer, M. (2002). Die historische Ichthyofauna im Flussgebiet der oberen Neiße in der Oberlausitz und ihre Veränderungen seit dem 16. Jahrhundert. *Ber. Naturforsch. Ges. Oberlausitz*, 10, 37–50.
- Plater, S. (1841). *The Small Polish Encyclopedia*. Vol. 1. Nakł. i druk. Ernesta Günthera, Leszno and Gniezno (in Polish).

- Przybył, A. (1976). The occurrence of Atlantic sturgeon, *Acipenser sturio*, in the Warta River basin. *Chrońmy Przyrodę Ojczyzną*, 32(5), 5–12 (in Polish).
- Rzączyński, G. (1721). *Historia naturalis curiosa Regni Poloniae, Magni Ducatus Lithuaniae annexarumque provinciarum*. Typis Coll. S.J., Sandomierz.
- Rzączyński, G. (1742). *Auctuarium historiae naturalis curiosae Regni Poloniae, Magni Ducatus Lithuaniae annexarumque provinciarum*. Gedani.
- Schwenckfeld, C. (1603). *Theriotropheum Silesiae, in quo Animalium, hoc est, quadrupedum, reptilium, avium, piscium, insectorum natura, vis & usus sex libris perstringuntur*. Impensis Davidis Alberti bibliopolae Vratisl., Legnica.
- Sempiński, F.X. (1853). Historical and geographical description of the Grand Duchy of Poznań. J.K. Żupański, Poznań (in Polish).
- Tanner, B. (2002). Successful Polish-Lithuanian legation to Moscow in 1678. Ed. by A. Strojny, transl. M. Rzepliela and A. Strojny. *Towarzystwo Wydawnicze Historia Iagellonica*, Kraków (in Polish).
- Wałęcki, A. (1863). Material on the ichthyological fauna of Poland. *Biblioteka Warszawska*, 4(11), 325–364 (in Polish).
- Wałęcki, A. (1864). Material on the ichthyological fauna of Poland. II. Druk *Gazety Polskiej*, Warszawa (in Polish).
- Witkowski, A., Żerecik, R. (2001). List of Silesian fishes from the mid fourteenth century. In: *Studia i materiały z dziejów Śląska i Małopolski* (Ed.) R. Żerecik, Arboretum, Wrocław, 167–178 (in Polish).
- Wittmack, L. (1875). *Beiträge zur Fischerei-Statistik des Deutschen Reichs: sowie eines Theiles von Oesterreich-Ungarn und der Schweiz in Auftrage des Deutschen Fischerei-Vereins*. Druckerei von W. Moeser, Berlin.

Annex

Table 1

List of records of catches and sales of fresh/live sturgeon (all data pertains to the Warta River, unless otherwise stated)

Year	Information about sturgeon	Source
1810	One sturgeon, 54 kg, was caught in Rogalin. It was taken live to Poznań, where crowds of people, paying a small fee, gathered to see the curious fish. It was bought by the prefect and kept in a pond by the Royal Castle.	GaP 1810, 83 (17 X)
1842	On June 25, when in Poznań, King Frederick William IV of Prussia received a gift of an 8-foot-long sturgeon recently caught in the Warta River.	GRKP 1842, 143 (4 VII)
1846	One live sturgeon, 21 kg, was for sale in Poznań	GWXP 1846, 179 (4 VIII)
1851	One sturgeon, 112 kg, was the first prize at an annual rifle shooting competition in Poznań.	GoP 1851, 137 (17 VI)
1856	A few live sturgeon were for sale in Poznań.	GWXP 1856, 134 (11 VI)
1857	One large sturgeon was for sale in Poznań.	GWXP 1857, 150 (1 VII)
1858	One sturgeon, 12 feet long, was caught in the River Noteć near Ujście. A large crowd of people gathered in the city of Piła to see the fish. A few weeks earlier the fishers had seen a sturgeon in the river.	GWXP 1858, 153 (4 VII)
1860	A few days ago a few sturgeon were caught in Poznań. One was six feet one inch long and 130 lbs. During high waters, like this year, some sturgeon enter the Warta River.	DP 1860, 125 (2 VI)
1860	Several sturgeon, the largest of which was 54 kg, were sometimes caught in the river.	GWXP 1860, 136 (13 VI)
1861	A few sturgeon, not so large, were caught recently.	DP 1861, 129 (7 VI)
1862	Advertisement: A few large sturgeon will be for sale in Poznań.	DP 1862, 134 (13 VI)
1862	A few sturgeon, the largest of which was 125 kg, were caught in Poznań.	DP 1862, 140 (21 VI)
1864	Advertisement: Sturgeon will be for sale in Poznań.	DP 1864, 131 (10 VI)
1865	Recently, several sturgeon were caught.	DP 1865, 133 (13 VI)
1866	Three days ago, two sturgeon were caught in Poznań.	DP 1866, 108 (14 V)
1866	One sturgeon, a few feet long, jumped into a boat in Poznań.	DP 1866, 126 (7 VI)
1867	Six sturgeon, the longest was seven and a half feet long, were caught in Poznań.	DP 1867, 147 (29 VI)
1867	Advertisement: Sturgeon will be for sale in Poznań.	DP 1867, 148 (3 VII)
1869	One large sturgeon, nine feet long and 250 lbs., was caught near Czerwonak. People were invited to see it.	DP 1869, 217 (23 IX)
1869		DP 1869, 219 (25 IX)
1870	Advertisement: A sturgeon 200–250 lbs. Paid viewings near Chwaliszewski Bridge in Poznań.	DP 1870, 133 (12 VI)
1871	A few sturgeon were caught, the largest was five feet long.	DP 1871, 123 (1 VI)
1871	Two sturgeon, each over 240 lbs., were caught in the Prosna River near Chocz and brought to Kalisz. These fish are rare in the region.	KS 1871, 53 (4 VII)
1872	The first sturgeon was caught on May 6 in Poznań.	KP 1872, 106 (10 V)
1872	Advertisement: A few sturgeon will be for sale in Poznań.	KP 1872, 114 (22 V)
1873	One sturgeon, ca. 170 kg, was caught.	KP 1873, 160 (16 VII)
1874	Advertisement: A few sturgeon will be for sale in Poznań.	DP 1874, 136 (18 VI)
1874	One sturgeon, 280 lbs., caught near Czerwonak.	KP 1874, 177 (6 VIII)
1875	Three sturgeon, the largest at 280 lbs. and nine feet long and another at 190 lbs., were caught.	DP 1875, 132 (13 VI)
1875	Advertisement: sturgeon will be for sale in Poznań.	DP 1875, 162 (20 VII)
1876	Five sturgeon, in the range 80–150 lbs., arrived in Kalisz. This year the number of sturgeon caught in the Warta and Prosna rivers was exceptionally large because of the high waters.	KS 1876, 46 (16 VI)
1876	A large number of sturgeon was caught this year, on one day as many as 25 fish, the largest of which was 125 kg.	KP 1876, 144 (27 VI)
1877	A large number of sturgeon, up to 200 lbs., were caught.	KP 1877, 164 (20 VII)
1877	A few large sturgeon were caught in Pogorzelica and brought to Środa. The longest was seven feet, and five others were four and five feet.	DP 1877, 165 (22 VII)
1877	One sturgeon, 2.5 m long and ca. 200 lbs., was caught in Śrem.	KP 1877, 196 (28 VIII)
1878	One fish caught in Oborniki, 2.78 m and 280 lbs. According to the fishers, there were more fish in the river.	KP 1878, 158 (13 VII)
1879	Yesterday a fisher caught the second sturgeon this week in Poznań.	GW 1879, 134 (14 VI)
1881	One sturgeon, 102 kg, was caught in the Gwda River near Ujście.	DP 1881, 128 (5 VI)
1881	Two sturgeon were caught near Santok: one ca. 100 lbs., another over 60 lbs..	DP 1881, 158 (14 VII)

Year	Information about sturgeon	Source
1881	One sturgeon, seven feet long, was caught near Obrzyck	KP 1881, 186 (17 VIII)
1884	One sturgeon, 295 lbs., was caught in Poznań	KP 1884, 132 (10 VI)
1885	One sturgeon, 90 lbs., was caught in Poznań.	WP 1885, 110 (16 V)
1885	One sturgeon, 160 lbs., was caught in the Prosna River near Chocz.	KP 1885, 132 (13 VI)
1885	One sturgeon, 4 feet wide, 7 feet long, and over 250 (240?) lbs., was caught in Poznań	KP 1885, 154 (10 VII)
1885		DP 1885, 157 (14 VII)
1885	One sturgeon, 280 lbs., was the main prize in a bowling competition in Poznań	GW 1885, 163 (21 VII)
1885	Two large sturgeon were caught in Poznań.	DP 1885, 169 (28 VII)
1885	One sturgeon, 30 lbs., jumped into a boat in Gorzów (Landsberg)	GW 1885, 171 (30 VII)
1885	One large sturgeon was caught in Poznań.	DP 1885, 183 (13 VIII)
1886	Six sturgeon, some of them 4–5 feet long, were recently caught in Poznań.	OD 1886, 117 (23 V)
1886	Two sturgeon, each almost 7 feet long, were caught in Poznań.	DP 1886, 126 (3 VI)
1886	Two large sturgeon were caught in Poznań. This year ca. 40 fish were caught.	KP 1886, 155 (11 VII)
1886	One large sturgeon was caught in the Prosna River (unverified case - anecdote).	KP 1886, 161 (18 VII)
1886	In 1886 ca. 50–60 sturgeon were caught.	WP 1887, 87 (17 IV)
1887	The first sturgeon, 150 lbs., was caught on May 3.	KP 1887, 103 (6 V)
1887	Over 30 sturgeon, up to 150 lbs., was caught near Golina and brought to Poznań.	KP 1887, 172 (30 VII)
1887	One sturgeon, ca. 100 kg, was caught in Sieraków.	KP 1887, 186 (17 VIII)
1888	One sturgeon, 2.31 m and 75 kg, was caught in Skwierzyno.	OD 1888, 136 (15 VI)
1888	One sturgeon, 10 feet long and 300 lbs., was recently caught in Poznań. This year ca. 50 fish were caught in the stretch from Nowe Miasto to Oborniki.	OD 1888, 147 (28 VI)
1888	One sturgeon was caught near Biedrusko. The fish was divided in pieces in a booth at the market, but because of the large crowd curious to see the fish, the police banned the butchering in public.	DP 1888, 172 (28 VII)
1889	One sturgeon, 1.25 m, was caught near Szelaż.	KP 1889, 121 (26 V)
1889	One fisher caught 14 and another nine sturgeon, between 25 and 75 kg each.	DP 1889, 127 (4 VI)
1889	In the last few days, one fisher caught nine sturgeon, the largest was 150 kg.	DP 1889, 137 (16 VI)
1889	Recently one fisher caught four large sturgeon.	KP 1889, 141 (22 VI)
1889	This year over 60 sturgeon were caught mainly near Owińska.	KP 1889, 143 (25 VI)
1889	One sturgeon, 2.3 m, was caught in the Gwda River near Ryszki.	WP 1889, 153 (7 VII)
1889	One sturgeon, over 100 kg, was caught near Obrzyck.	DP 1889, 156 (11 VII)
1889	This year sturgeon came late (end of June), but many fish, 2–2.5 m and 250–300 lbs., were caught, and their price was low.	DP 1889, 180 (8 VIII)
1890	Four sturgeon were caught by one fisher in Poznań.	KP 1890, 121 (29 V)
1890	One large sturgeon was caught in Poznań	DP 1890, 131 (11 VI)
1890	This year near Owińska almost 60 sturgeon, up to 150 lbs. each, were caught.	KP 1890, 218 (23 IX)
1891	One sturgeon, over 100 kg, was caught.	DP 1891, 119 (28 V)
1892	Recently, the first sturgeon of the year was caught.	KP 1892, 107 (10 V)
1892	Two large sturgeon were caught yesterday in Poznań.	KP 1892, 131 (9 VI)
1892	Five sturgeon were caught in Poznań (this may include the previous reference)	KP 1892, 132 (10 VI)
1895	Eight sturgeon, each almost 8 feet and 125 kg, were caught in Poznań.	DK 1895, 135 (16 VI)
1895	Ten large sturgeon were caught in different places.	WP 1895, 137 (18 VI)
1896	One sturgeon, over 2 m, was caught in a mill-pond near Pleszew by the River Prosna.	DK 1896, 166 (23 VII)
1897	One sturgeon, 215 lbs., was caught in Krzywe Kolano near Wronki. Never before was such a large fish caught here. Eight years ago, a fish weighing 182 lbs. was caught here.	WP 1897, 100 (2 V)
1897	Four sturgeon were caught near Owińska.	DP 1897, 160 (17 VII)
1897	One sturgeon, 160 lbs., was caught near Czerwonak in December, which was rare at this time of the year.	OD 1897, 280 (8 XII)
1898	One sturgeon, 180 lbs., was caught near Wronki.	WP 1898, 128 (7 VI)
1898	A sturgeon, 2 m and 180 lbs., was caught in Poznań.	WP 1898, 142 (24 VI)

Table 2

Oldest advertisements of sturgeon (processed fish) in Poznań in 1808–1824.

Year	Fish and fish products	Source
1808	Caviar, pickling, sturgeon	GaP 1808, 18 (27 II)
1809	Marinated sturgeon, salted eels, Dutch herring	GaP 1809, 19 (8 III)
1809	Sturgeon and “white fish” (i.e., cyprinids)	GaP 1809, 23 (22 III)
1814	Caviar, beluga, sturgeon	GaP 1814, 20 (9 III)
1815	Caviar, sardela, Dutch herring, sturgeon	GaP 1815, 26 (1 IV)
1817	Caviar from Königsberg, Dutch herring, lamprey, sturgeon	GWXP 1817, 104 (27 XII)
1819	Lamprey, sturgeon	GWXP 1819, 93 (20 XI)
1820	Caviar, lamprey, sturgeon	GWXP 1820, 6 (22 I)
1820	Smoked salmon, lamprey, marinated sturgeon	GWXP 1820, 81 (4 X)
1821	Lamprey, marinated sturgeon	GWXP 1821, 88 (3 XI)
1821	Salmon, lamprey, Dutch herring, caviar, marinated sturgeon	GWXP 1821, 96 (1 XI)
1823	Salmon, lamprey, marinated and salted eels, sturgeon	GWXP 1823, 16 (22 II)
1823	Marinated sturgeon	GWXP 1823, 89 (25 XI)
1823	Rhine smoked salmon, marinated from Elbląg – lamprey, salmon, eel, and sturgeon	GWXP 1823, 99 (10 XII)
1824	Caviar, smoked and marinated salmon, lamprey, sturgeon	GWXP 1824, 3 (10 I)