Urban Ponds for Breeding Medicinal Leeches (*Hirudo medicinalis* LINNAEUS, 1758) in Sweden

Madeleine Bonow and Ingvar Svanberg

Leeches and their medicinal applications are well-studied in history. In Scandinavia the use of medicinal leeches for therapy is mentioned already by Olaus Magnus in his *Historia de gentibus septentrionalibus* (1555). Carl Linnaeus named the species *Hirudo medicinalis*. In the 1760s leeches became widely accepted as a medicament and the demand increased, not only in Sweden but all over Europe. By the 1830s around 50 million leeches were employed in hospitals every year causing a shortage of leeches all over Europe. However, the species is rare in Scandinavia. In Sweden medicinal leeches have been harvested in the southern part of the country. The local occurrence did not cover the large demand and imported leeches had to be used. In the nineteenth century, over-exploitation reduced many local populations and breeding medicinal leeches in ponds became a concern for authorities in many countries. Several farms for breeding leeches in ponds were also founded in rural and urban settings. We know very little about them, but toponyms serve to remind us of such ponds. This article aims to shed some light on the forgotten practice of breeding medicinal leeches in urban ponds in Sweden.

Introduction

Aquatic resources have always been utilized by human beings (Garchia-Quijano & Pitchon 2010). Fresh water fish and fisheries have for instance been of immense importance for the economy of rural population along rivers and lakes, including in Sweden. Trade in marine fish from coastal areas has also a long history. Bone assemblages in urban sites show that fish has been a common food also for urban dwellers since medieval times (Vretemark 1982; Jonsson 1986; Mannermaa 2015).

In order to have access to fresh fish, people in the towns could actu-

Figure. 1. Street sign for the "Leech-pond Street" in Stockholm (Photo Pia Axell)

ally keep fish caught in nearby rivers in store-ponds. Another alternative was to produce the fish themselves in breeding ponds. Although fish-ponds for storing and breeding fish, mostly cyprinids, were common in Swedish urban areas in the seventeenth and eighteenth centuries, traces of those are rare (Bonow & Svanberg 2016a, s. 104). A few urban ponds remain though – such as the Svandammen ('The Swan-pond') in the centre of Uppsala (founded as a fishpond in 1570). Archaeological remains of former ponds are rare and very few of them have been scientifically investigated (Bonow & Svanberg 2016b). Some toponyms recall now lost ponds, like Zinkensdamm and Ruddammen in Stockholm, Ruddammsgatan in Gävle and the urban block Rudan in Uppsala. There are many other examples (Bonow & Svanberg 2012, s. 139–140).

However, there was another kind of pond which also has left few traces. These were the ponds that were created for the purpose of breeding medicinal leeches (*Hirudo medicinalis* LINNAEUS, 1758). The street name *Igeldammsgatan* ('Leech-pond Street') on Kungsholmen in central Stockholm is a reminder of such production ponds (fig. 1). According to the zoologist August Wilhelm Malm (1863, s. 175) there were several instances of ponds for breeding medicinal leeches in Sweden. In this essay we aim to give a brief background and overview of the domestic production of medicinal leeches in ponds in Sweden. The attempts of developing a Swedish hirudoculture are probably an even more exciting story than the urban fishponds.

Background

Medicinal leeches are well-studied species when it comes to their medicinal applications in history (Linnaeus 1764, s. 5; Whitaker, Rao, Izado & Butler 2004). Leech therapy has been known since anti-

Figure. 2. Leech jar from Uddevalla Apotek. Medicinal leeches were usually stored in this kind of jars in the pharmacies (Photo Bohusläns Museum).

quity. They were depicted in ancient Egypt 3,000 years ago, and they are mentioned in sources in different languages from the time the nativity of Jesus. In the Nordic countries the use of medicinal leeches for therapy is mentioned by Olaus Magnus in his *Historia de gentibus septentrionalibus* (1555 book 22, s. 5). It was also mentioned in a Swedish medicinal handbook from the seventeenth century (Lindh 1675, s. 25). However, it was not until the eighteenth century that leeches became more widely used in medicine in Sweden. The wild species is rare in Scandinavia. In the mid-eighteenth century the medicinal leeches used in Sweden were therefore commonly imported from England, according to Linnaeus (Lönnberg 1913, s. 296). Linnaeus named the species *Hirudo medicinalis* and he was probably describing adult, 10 cm long specimens obtained from a local pharmacy in Uppsala (Elliot & Kutschera 2011).

In the 1760s, bath attendants Ernst Diedrik Salomon in Stockholm, inspired by physician Nils Rosén von Rosenstein, published his research on the use of medicinal leeches for therapeutical purposes (Salomon 1760, 1764). He seems to have been quite a pioneer. He writes that leeches have not been used very long against diseases in Stockholm, but was a rather recent innovation. Using them became widely accepted as a medicament (fig. 2). With that of course the demand increased, not only in Sweden but all over Europe (Vallejo & Gonzáles 2015). Leech therapy reached its peak in Europe between 1825 and 1850 (when the supply was almost exhausted). According to Whitaker et al. (2004) most European hospitals bought in enormous quantities of medicinal leeches during the nineteenth century. Millions of leeches were employed all over Europe. For instance, in the 1830 yearly average of leeches use mounted to 5 to 6 million at the hospitals and Hôtel Dieu in Paris, and 7 million in London (Croserio 1837, s. 17). The annual consumption in Russia reached about 30 million (Whitaker et al. 2004). We also have figures from Scandinavia: 800,000 in Sweden and 200,000 in Finland in 1850 (Bonow & Svanberg 2016a). According to Ludvig Löfwenskiöld (1861, s. 48), about 680,000 leeches were used in Sweden in the mid-nineteenth century.

Harvesting wild leeches

Four taxa of medicinal leeches are known from Eurasia. *Hirudo medicinalis* LINNAEUS, 1758, is distributed over northern Europe, Great Britain and southern Norway (probably a non-native species) in the west to the southern Ural in the east, occupying the deciduous arboreal zone (fig. 3). Its range includes Austria, Belarus, Croatia, Czech Republic, France, Germany, Great Britain, Hungary, Latvia, Lithuania, Netherlands, Norway, Poland, Russia, Slovenia, Switzerland and Ukraine (Utevsky et al. 2010). The medicinal leech is a rare species in Sweden, known from ditches and ponds in southern Sweden north to the river Dalälven and on the Baltic Sea island Gotland. It seems to be generally agreed that many of these occurrences are a result of intentional releasing in ponds. Some even regard it as a feral species introduced already during medieval times (Forselius 1952; cf. Dolmen et al. 1994). This is hardly the case though (fig. 4).

Figure. 3. Medicinal leech, Hirudo medicinalis (fig. 1–6) and horse-leech, Haemopis sanguisuga (fig. 7). Illustration by Johan Palmstruch (From: Svensk zoologi, 1806).

Traditionally medicinal leeches have been harvested in the provinces Skåne, Blekinge, Västergötland, Dalsland, Östergötland, Södermanland, Uppland and Västmanland (Löfwenskiöld 1861, s. 32–33). Although leeches from Gotland were very much sought after by the pharmacies, the local occurrence did not cover the large demand (Modig 1986). Most leeches were therefore imported. We know very little about the capture and trade of leeches in Europe. France was for instance long dependent on imports of leeches from Hungary and Poland, but a family of fishermen in the Gironde worked out the intensive cultivation of leeches, and thus made France self-supporting in respect of leeches (Anonymous 1862, s. 261). Leech harvesting became a popular way of earning money in many places in Europe. Germany shipped almost 30 million leeches to the United States annually in the mid- nineteenth century. In Hungary there was a small marsh-dwelling ethnic group, known as Pákász that specialized in capturing aquatic organisms, including leeches, for the European trade (Gunda 1949, s. 370). The leech-gatherers, *nadályos*, used their bare legs as bait. By wading in the waters people attracted

leeches which then could be removed and sold to buyers and pharmacies (Magyar 2009, s. 1). Hungarian (and Galician) leeches also arrived to Sweden in the mid-nineteenth century (Swederus 1869, s. 45). There is reason to believe that the closely related *Hirudo verbana* CARENA, 1820, from Central Europe, was probably also imported to the Swedish pharmacies as a medicinal leech. The two taxa were actually long confused and seen as one species (Siddall, Trontelj, Utevsky, Nkamany & Macdonald 2007).

Artificial leech-ponds

The wild-captured leeches, native or imported, were expensive (Modig 1986). In the nineteenth century, over-exploitation reduced many local populations from ponds where they were gathered by the collectors (Elliot & Kutschera 2011). Already in 1831, some lobbyists in Sweden were asking the authorities to impose an embargo on the export of leeches in order to protect native supplies of them. This was supported by the Pharmaceutical Society (Apotekarsocieteten) of Sweden, but the request was turned down by the authorities. There was even piracy, with Norwegian leech-collectors raiding across Sweden's border in their search for leeches. The land reclamation that lowered the level of many leech-producing lakes in the nineteenth century was also disastrous for the native populations (Modig 1986).

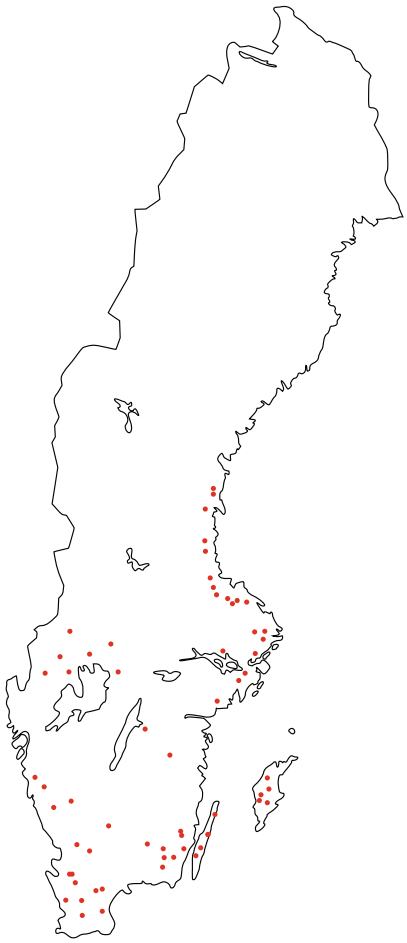

Figure. 4 Distribution map of the wild Hirudo medicinalis populations in Sweden. Map based on information from GBIF-Sweden (Madeleine Bonow).

To satisfy the high demand there were attempts to farm the leeches in ponds. Breeding medicinal leeches became a concern for authorities in many countries (Kirk & Pemberton 2013, s. 91–96). In the United States these leech farms were usually without success. However, in France and Germany they became common. Handbooks in practical

leech farming was published in several languages, such as the French *Guide pratique des éleveurs de sangsues*, by Louis Vayson (1852), German *Die Blutegelzucht, oder die Anlegung Künstlicher Blutegelsümpfe*, by Christian Heinrich Schmidt (1859), and the final chapter of Swedish *Medicinska Blodigeln i zoologisk, merkantilt och ekonomiskt hänseende*, by Ludvig Löfwensskiöld (1861). A short-lived leech farm existed south of Viborg in Denmark in 1872–75 (Jensen 1959, s. 130). As late as 1890, a farm near Hildesheim in Germany was producing between three and four million leeches per year (Kutschera & Elliot 2014).

Several farms for breeding leeches in ponds were founded in Sweden. We know very little about them, but toponyms, for instance Igeldammsvägen ('Leech-pond Road') in Falkenberg, serve to remind us of such ponds.

Swedish hirudoculture

The best known ponds are those constructed in central Stockholm. As already mentioned, the street name Igeldammsgatan on Kungsholmen (fig. 1) still reminds us of former leech-ponds that were constructed in the vicinity (Bonow & Svanberg 2015). In the 1830s, the Pharmaceutical Society appointed a committee that proposed that the local pharmacy owners should establish a committee in order to breed leeches (Modig 1986). Five ponds were constructed in Stadshagen, located on the northwest part of Kungsholmen. According to one document around 25,000 leeches were released in the ponds, but after four years they had only harvested 2,000 specimens (Ahlberg 1908, s. 541). The project was judged a failure, perhaps prematurely, since it was not known at the time that leeches do not attain their sexual maturity for seven to eight years (Modig 1986).

The zoologist August Wilhelm Malm (1863) gives a quite detailed description of the leech-ponds that were built at the estate Gibraltar in Gothenburg by a Dr. Sven Johan Stille in 1837–38. A "few thousands" leeches were released in the ponds, together with a few crucian carps, Carassius carassius (LINNAEUS, 1758), intended as fodder. The leeches were also feed with blood from slaughtered cattle. The leeches seem to have thrived. In 1840, around a thousand specimens were captured and sold to an importer in New York. Next year another two thousand leeches were captured for export. Due to the death of Dr. Stille in 1839, who was almost bankrupt when he passed away, the leech farm did not last more than a few years (*Post- och Inrikes Tidningar* 4 September 1838). The next owner of Gibraltar was not sufficiently interested in farming for leeches. At about the same time a pharmacist Hans Jacob Cavallin constructed a leech-pond in the early 1850s in the Garden Society of Gothenburg (Göteborgs Trädgårdsförening).

This pond was merely for storing the leeches rather than for breeding them (Malm 1863).

Conclusions

More detailed information on the efforts to breed medicinal leeches in ponds is still lacking. The topic definitely requires further research by scholars interested in urban culture and aquatic ethnobiology. To date, very few ponds have been archaeological investigated. Urban man-made ponds in the past have had a variety of uses, the most common of which were for the breeding of fish, and also the storage of fish for later consumption. The species kept in them can be identified by studying zooarchaeological remains. Leeches, on the other hand, due to the absence of hard tissues, do not leave any trace at the pond sites. However, we know very little about the construction of both leech-ponds and fishponds. Old maps give very scanty information, although the locations of the pond sites are easily identified. The technology of pond construction is sometimes described in old foreign handbooks, but how they were actually made in Swedish cities is still an unexplored area (cf. Keller 2015). A study by archaeologists of how production ponds in the old days were constructed is urgently needed.

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Madeleine Bonow, senior lecturer, School of Natural Science, Technology and Environmental Studies, Södertörn University, SE-141 89 Huddinge, Sweden;
E-mail: madeleine.bonow@sh.se

Ingvar Svanberg, senior scholar, Uppsala Centre for Russian and Eurasian Studies, Uppsala University, Box 514, SE-751 20 Uppsala, Sweden;
E-mail: ingvar.svanberg@ucrs.uu.se (Corresponding author)

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