Why We Need to Save the Medicinal Leech

Roy T. Sawyer

The leech cure

Once abundant throughout its range, the medicinal leech became endangered largely because it was so widely used by doctors for blood-letting in the 19th century. France alone imported more than a thousand million over the century. Since then demands for research purposes have greatly increased following the discovery that this leech contains a potentially very valuable anticoagulant of human blood. Protection for the species is urgently needed, says the author. One school class could unknowingly wipe out the whole of a small remnant population.

The blood-sucking leech *Hirudo medicinalis* achieved notoriety for its medicinal uses in the 19th and earlier centuries. Few people, however, realise the size of the leech trade in the last century, and even fewer know that the result is the near extinction of this species. Now a revival of scientific and medical interest in the medicinal leech has renewed the pressure on the species to the point where we have to act quickly to protect it from extinction. Formerly the range of *Hirudo medicinalis* extended from western and southern Europe to the Ural Mountains and the countries bordering the eastern Mediterranean,[10] and many 19th century accounts document the fact that it was abundant nearly everywhere. Today it has been declared extinct or nearly extinct throughout its original range except in Hungary,[11 13 16 21 23] where export is periodically forbidden.

It is very difficult for us to understand the leech mania in Europe which reached its peak between 1825 and 1850. Physicians generally believed the medicinal leech to be endowed with special abilities to extract bad blood and to leave good blood behind. It was considered a cure for nearly everything, including headache, fever, insomnia, ulcers and obesity. However, using leeches had some medical justification, for at least eight medically useful substances are now known from their salivary secretions. In 1884 Haycraft's discovery[9] that the medicinal leech contained a remarkably potent anticoagulant, now called hirudin, stimulated a line of research that continues to the present day. Hirudin is of great interest to blood biochemists investigating the mechanism of the human blood-clotting process, but at present literally thousands of leeches must be sacrificed to obtain small quantities of purified hirudin. The European pharmaceutical companies supplying hirudin (almost

https://doi.org/10.1017/S0030605300017142 Published online by Cambridge University Press

entirely from Hungarian leeches) are unable to satisfy the requirements of European and American medical researchers, and this demand on populations already severely exhausted endangers the very existence of a species that promises to make a major contribution to medicine.

Historic Use

The use of leeches as a method of bloodletting therapy dates back over several centuries BC. Records document their use in ancient India, China, Greece and Rome. By the 17th century they were widely used in Europe, and by the early 19th century local sources in western Europe, especially France, Britain and Germany, were depleted – as Wordsworth's poem, *The Leech Gatherer* of 1802, poignantly confirms – and leech dealers started importing them, primarily from the vast marshes of Hungary and from the Balkans.

In the 19th century France was undoubtedly the biggest user of leeches thanks to two influential physicians, Broussais (1772-1838), an army surgeon in Napoleon's campaigns, and his student Bouillard (1798-1881), called 'the most sanguineous physicians in history' or, by way of a pun, the 'grands saigneurs'.[17] Soon every hospital in France was using enormous numbers of leeches. For example at Val-de-Grace, Paris, where Broussais was in charge, records show a total of over 2 million used in the seven years 1830-36. Most French hospitals were more moderate in their use, but each still used between 5000 and 60,000 annually, from 1820 to 1850.

On March 7 1817 the French government levied an import duty of one franc per 1000 leeches, and reliable documentation of the enormous numbers imported into France are available – over 1,000,000,000 leeches into France alone in the 19th century. Not surprisingly the leech became scarcer everywhere, and governments had to act to regulate the trade. In 1823 Hanover forbade the export of leeches. In 1827 the Austrian government gave two Viennese dealers a five-year lease for exclusive rights to use special reservoirs made specifically for the leech trade. In 1828 Sardinia forbade leech export for two years. Moldavia, which started exporting in 1835, soon exhausted its supplies. Wallachia stopped exports about 1844, and Spain and Portugal about 1850. By 1845 Bohemia and most of Italy could no longer export.

Smuggling

In 1848 the Russian government imposed a high tariff (4-5 roubles per 1000 animals) on the export of leeches, declared the months from May to July closed to collecting, and in other ways impeded the foreign traders. The German dealers even rented ponds near the Russian border into which they put leeches smuggled out of Russia, but in 1855 the German dealers terminated their trade in Russia. In Hungary in 1830 the wholesale price was one franc per kilogram, but by 1840 it had soared to 90-120 francs.[7] The German dealers left Hungary and Bukowina in 1861.

Long before 1854 the medicinal leech was extinct in Norway.[7] By 1910 it was declared extinct in Great Britain,[8] but is now known to have survived in isolated pockets at least up to the mid-1950s.[3 15 16 22] In Germany it was practically extinct by 1922 but a few isolated localities may still persist.[2] In the Netherlands it was rediscovered in 1946, after decades, in one locality.[4] In Sweden only one locality was known in 1939 (South Småland), and the leeches were being collected for use in a health resort.[2] But while collection was the

Leech Imports into France 1827-1843

Year	Number	Value in Francs	Year	Number	Value in Francs
1827	33,600,000	1,009,000	1837	25,800,000	774,000
1829	44,600,000	1,337,000	1839	22,400,000	672,000
1831	36,400,000	1,093,000	1841	17,500,000	524,000
1832*	57,491,000	1,724,730	1843	17,600,000	528,000
1833	41,600,000	1,250,000	1844*	15,224,671	456,740
1835	19,600,000	677,000			

*Moquin-Tandon, 1845 Based on Martin, 1845, unless otherwise specified

main cause of the medicinal leech's decline, destruction of suitable habitat resulting from changes in farming practices may have contributed, and since *Hirudo's* first meal appears to be on frogs, a decline in their numbers in recent years may have been another factor.

Commercial breeding programmes had been started in the mid-19th century, especially in France and Germany, with varying degrees of success.[7] In Paris the Society for the Encouragement of National Industry had awarded cash prizes and medals for contributions to the advancement of leech breeding and their medicinal use, and in Germany the Government of Saxony awarded a grant of 100-500 thalers to aid the establishment of leech farming.[5] At one time thousands of medicinal leeches were imported annually into the north-eastern United States where attempts were also made at breeding imported *H. medicinalis*, which never became established,[18] despite unsupported and anecdotal reports to the contrary. In both Europe and the USA the technical problems of breeding the medicinal leech *en masse*, coupled with the decline in their use, led to the abandonment of leech farming.

In order to ensure future leech supplies it is essential that the United States and the European countries should declare *H. medicinalis* an endangered species. In addition exports and imports of medicinal leeches collected in the wild should be made illegal or severely restricted; efforts should be made to assess and protect *Hirudo* which may have persisted in isolated localities – even incidental collecting by local schools or universities could contribute to its extinction where the population is already depressed; a breeding colony, especially for *Hirudo* of British origin, if any exist, should be maintained by an organisation such as the Jersey Wildlife Preservation Trust; attempts should be made to recolonise the species; demand for live medicinal leeches for their anticoagulant and other medically useful substances could be met by mass rearing facilities; priorities should be established for the use of *Hirudo* for research and instruction, and other species of leeches should be considered as suitable substitutes, such as the giant Amazonian leech *Haementeria ghilianii* which we have recently shown can be domesticated on a large scale.[19,20]

Acknowledgments

I would like to thank especially Susan M. Wells, Assistant to the Compiler, Invertebrate Red Data Book; Professor T.B. Reynoldson, Bangor; Dr P.S. Maitland, Institute of Terrestrial Ecology, Edinburgh; and Dr A. Minelli, University of Padova.

Roy T. Sawyer, 51 Llanyrnewydd, Penclawdd, West Glamorgan SA4 3JN, Wales

The picture on page 165, which shows the use of leeches to reduce obesity, is from Pierre Boaistuan's *Histoires Prodigieuses*, 1560, and reproduced by courtesy of the Wellcome Trustees.

References

1. ACKERNECHT, E.H. 1967. Medicine at the Paris Hospital, 1794-1848. Johns Hopkins.
2. ARNDT, W. 1940. Als Heilmittel gebrauchte stoffe. Q. Blutegel, 524-73. Die Rohstoffe des Tierreiches Q. Berlin.
3. BLAIR, W.N. 1928. Notes on *Hirudo medicinalis*, the medicinal leech, as a British species. *Proc. Zool. Soc. London* 1927: 999-1002.
4. DRESSCHER, T.G.N. and H. ENGEL 1946. De Medicinale Bloedzuiger in Nederland. *Natuurhist. Maanblad.* **35**:47-9.
5. EGIDY, H.E. 1844. Die Blutegelzucht, nächst ausführlicher Beschreibung der Blutegel, seiner Arten und Varietäten. 185pp.
6. ELLIOTT, J.M., and K.H. MANN 1979. A Key to the British Freshwater Leeches. Freshwater Biological Association. Scientific Publication no. 40. 72pp.
7. FERMOND, C. 1854. Monographie des Sangsues Médicinales. Paris. 512pp.
8. HARDING, W.A. 1910. A revision of the British leeches. *Parasitology* **3**:130-201.
9. HAYCRAFT, J.B. 1844. On the action of a secretion obtained from the medicinal leech on the coagulation of the blood. *Proc. Roy. Soc. London* **36**:478-87.
10. LUKIN, E.I. 1957. On the distribution of the medicinal leech in the USSR. *Zool. Zh.* **36**:658-69.
11. McCARTHY, T.K. 1975. Observations on the distribution of the freshwater leeches (Hirudinea) of Ireland. *Proc. Roy. Ir. Acad. Sci.* **75**:401-51.
12. MARTIN, J. 1845. Histoire Pratique des Sangsues. Paris.
13. MINELLI, A. 1979. Hirudinea. *Fauna d'Italia* **15**:1-152.
14. MOQUIN-TANDON, A. 1846. Monographie de la Famille des Hirudinées, 2nd ed. 448pp.
15. REYNOLDSON, T.B. 1952. A record of the leech *Hirudo medicinalis* from Islay, with brief mention of other species. *Scot. Nat.* **64**:164-6.
16. REYNOLDSON, T.B. 1956. An Anglesey record of the medicinal leech *Hirudo medicinalis* L. *Trans. of the Anglesey Antiquarian Soc. and Field Club* 1956:54.
17. ROLLESTON, J.D. 1939. F.J.V. Broussais, 1772-1838: His Life and Doctrines. *Proc. Roy. Soc. Med.* **32**:408.
18. SAWYER, R.T. 1972. North American Freshwater Leeches, Exclusive of the Piscicolidae with a Key to All Species. University of Illinois Press, Urbana. 155pp.
19. SAWYER, R.T. 1978. Domestication of the world's largest leech for developmental neurobiology. Year Book of the American Philosophical Society:212-3.
20. SAWYER, R.T., F. LePONT, D.K. STUART and A.P. KRAMER 1981. Growth and reproduction of the giant glossiphoniid leech *Haementeria ghilianii*. *Biol. Bull.* **160**: 322-331.
21. SINEVA, M.V. 1944. Observations on breeding the medicinal leech. *Zool. Zh.* **23**,6:293-303.
22. WARWICK, T. 1961. The vice-county distribution of the Scottish freshwater leeches and notes on the ecology of *Trocheta bykowskii* (Gedroyc) and *Hirudo medicinalis* L. in Scotland. *Glasgow Nat.* **18**:130-5.
23. ZAPKUVENE, D.V. 1972. Breeding and growing of medicinal leeches under laboratory conditions. *Lietuvos TSR Moksl. Acad. Darb. Ser. C.* (In Russian Trudy Acad. Nauk Litovski CCP, Ser. B) **3**,59:71-6.

Delta in Greece

IUCN/WWF reports that the delta of two rivers on Greece's west coast, the Lauras and the Arachtos, on the Gulf of Arta, a 250-sq-km Wetland of International Importance under the Ramsar Convention, is still in a comparatively natural state and comparable in richness of species with the Camargue, the Danube delta and the Doñana National Park in Spain. Forty per cent is neither cultivated nor grazed. Between 10 and 20 per cent of all ducks and geese wintering in the Mediterranean visit the area. Greek and German scientists are doing a major study, on which management plans can be based.