

The infamous blood suckers from *Lacus Verbanus*

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With 1 figure

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The European medicinal leech (*Hirudo medicinalis* L.) is an amphibious ectoparasite of vertebrates such as frogs and mammals. This threatened annelid has been used for blood-letting (phlebotomy) since several centuries BC, a classical practice that is today employed by many physicians to aid vascular surgery. In this short communication I will show that the leeches that are currently used for scientific investigations and medical purposes throughout Europe are erroneously attributed to the taxon *H. medicinalis*. They belong to a separate endangered species, *H. verbana* Carena, 1820 that deserves the same conservation status as the famous medicinal leech.

1 Introduction

Two and a half centuries ago, Carl von Linné described the "worm" *Hirudo medicinalis* L. (Linnaeus, 1758). This semiaquatic annelid once inhabited slow-running and stagnant freshwater ecosystems throughout Europe. Today, it is an endangered species that is included in the *Invertebrate Red Data Book* (Elliott & Tullett 1992). In living specimens, the basic dorsal colour is brown to olive-green, with one characteristic longitudinal pair of paramedian black stripes, composed of drop-like spots. On the ventral side of the body, numerous dark-pigmented spots are visible, a species-specific feature of this taxon.

Sixty years later, a second, more colourful thermophilic leech of similar size was discovered in Italy and described in 1820 as a *nova species* (Carena, 1820). In his Fig. 6 on plate 11 the author depicted a representative specimen in such splendid detail that *H. verbana* (Locus typicus: Lago Maggiore, lat. *Lacus Verbanus*) can be easily distinguished from *H. medicinalis*. The leeches from *Lacus Verbanus* have a green-yellow basal colour with a red/orange-pigmented longitudinal reticulum on the dorsal side and no (or only very few) dark spots on the ventral surface that is characterized by a pair of black marginal stripes.

2 Results and Discussion

Over the past decade, I have purchased medicinal leeches from German leech farms and from other companies in Europe (Kutschera 2004). According to the suppliers, they were imported animals from Turkey that were cultivated and bred in captivity. The leeches were sold as "*H. medicinalis* L. 1758", but I identified all of them unequivocally as *H. verbana* Carena, 1820 (Fig. 1 A, B). We have repeatedly co-cultivated *H. medicinalis* (animals from free-living relict populations in Germany) and *H. verbana* in freshwater aquaria with a land area (4–6 adult individuals of each leech species; room temperature) (Kutschera & Wirtz, 2001). In September, the leeches produced spongy oval cocoons, laid above the water-line, but no interbreeding occurred. Newly hatched leeches had the species-specific colour pattern of their parents; no intermediate forms were found. Since *H. medicinalis* and *H. verbana* are also distinguishable based on molecular data (Trontelj et al. 2004, Trontelj & Utevsky 2005) it must be concluded that they are two separate biospecies, as originally suggested by Carena (1820) and more recently by Nesemann & Neubert (1999) and by Kutschera (2004).

In the classical monograph on leeches by Sawyer (1986) no distinction is made between the taxa *H. verbana* (syn. *H. officinalis*) and *H. medicinalis*. The results summarized here show that this view is no longer acceptable.

A report on the uses of the European blood-sucking leech (*Hirudo medicinalis*) for medical purposes, with a brief summary of contemporary leech trade and farming, was recently published in a leading international journal (Pilcher 2004). The "return of the blood suckers" is described in detail, but, unfortunately, the author referred to and depicted the wrong leech species. The "hard-working" laboratory animals described in this essay and other recent articles (see, for instance, Jauker & Clauss 2003) are the descendants of the infamous blood-suckers from *Lacus Verbanus* and not "true" European medicinal leeches. It should be added that in all modern biology textbooks I have inspected so far this "leech confusion" is documented, i. e., the authors usually depict *H. verbana* Carena, 1820 under the pseudonym *H. medicinalis* L. 1758 (see, for instance, Sawyer 1986, p. 571, Campbell & Reece 2002, p. 660 and Ludwig 2003, p. 144).

3 Conclusions

Current European conservation legislation (Bern Convention, EU Habitat Directive, CITES, IUCN) include *H. medicinalis*, but the taxon *H. verbana* is not mentioned in these documents. Today, the leeches discovered in the 18th century in *Lacus Verbanus* are still widely distributed in some regions of South eastern Europe and Turkey (Nesemann & Neubert 1999, Trontelj et al. 2004).

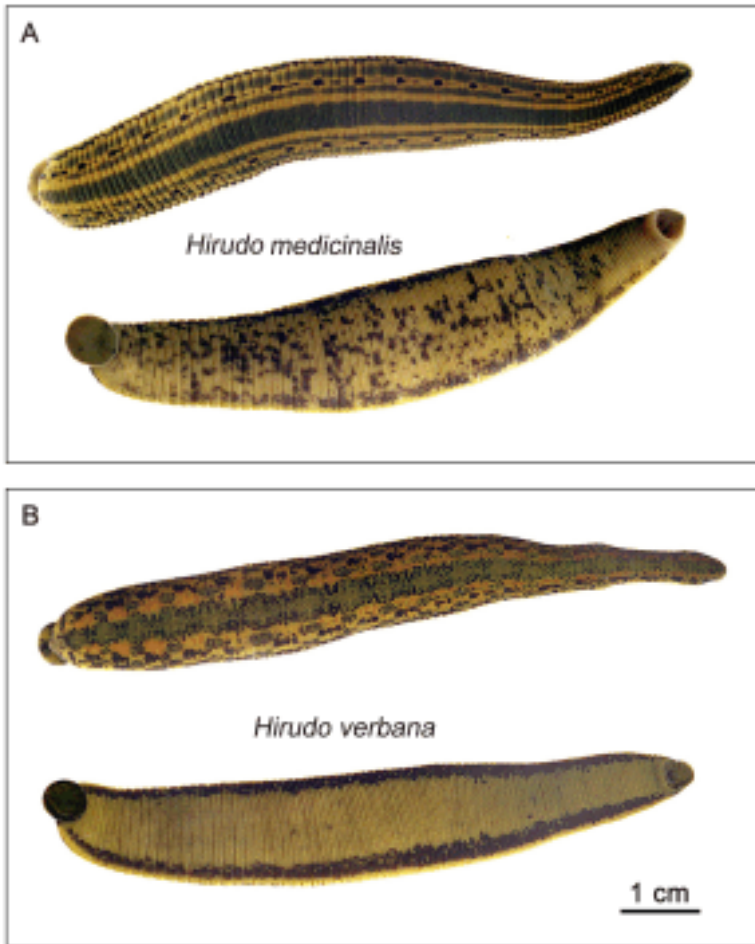


Fig. 1: The European medicinal leech *Hirudo medicinalis* Linnaeus 1758 (A) and its sister taxon *Hirudo verbana* Carena 1820 (B), living adult animals in dorsal and ventral view, respectively

However, due to over-collecting, mass export and habitat destruction *H. verban* may soon become a rare animal: protection under threatened species legislation is urgently necessary to save not only the "original", but also the second medicinal leech (Fig. 1 A, B). Ecological studies on free-living populations of both species are required for the scientific management and conservation of these exploited and endangered amphibious annelids.

References

- Campbell, N. A. & J. B. Reece (2002): Biology. Sixth Edition.- 1247 pp. (Benjamin Cummings), San Francisco
- Carena, H. (1820): Monographie du genre *Hirudo* ou description des espèces de sangsues qui se trouvent ou qui sont en usage en piémont, avec des observations sur la génération, et sur d'autres points de l'histoire naturelle de quelques unes de ces espèces. - *Memorie della Reale Accademia delle Scienze die Torino* 25: 273-316, Turin
- Elliott, J. M. & P. A. Tullett (1992): The medicinal leech.- *Biologist* 39: 153-158, London
- Jauker, F. & W. Clauss (2003): *Hirudo medicinalis*. Blutsauger in der Forschung.- *Biologie in unserer Zeit* 33: 29-35, Weinheim
- Kutschera, U. (2004): Species concepts: leeches versus bacteria.- *Lauterbornia* 52: 171-175, Dinkelscherben
- Kutschera, U. & P. Wirtz (2001): The evolution of parental care in freshwater leeches.- *Theory in Biosciences* 120: 115-137, Jena
- Linnaeus, C (1758): *Systema naturae. Regnum animale, Editio decima.*- 824 pp., Lipsia
- Ludwig, H. W. (2003): *Tiere und Pflanzen unserer Gewässer. Merkmale, Biologie, Lebensraum, Gefährdung.*- 287 pp. (BLV-Verlagsgesellschaft) München
- Nesemann, H. & E. Neubert (1999): Annelida, Clitellata: Branchiobdellida, Acanthobdellea, Hirudinea.- In: Schwoerbel, J. & P. Zwick (eds.): *Süßwasserfauna von Mitteleuropa* 6/2, 178 pp. (Spektrum), Heidelberg
- Pilcher, H. (2004): Suck on you.- *Nature* 432: 10-11, London
- Sawyer, R. T. (1986): *Leech Biology and Behaviour*. 3 Vols.- 1065 pp. (Clarendon Press), Oxford.
- Trontelj, P., M. Sotler & R. Verovnik (2004): Genetic differentiation between two species of the medicinal leech, *Hirudo medicinalis* and the neglected *H. verban*, based on random-amplified polymorphic DNA. - *Parasitology Research* 94: 118 - 124, Berlin
- Trontelj, P. & S. Y. Utevsy (2005): Celebrity with a neglected taxonomy: molecular systematics of the medicinal leech (genus *Hirudo*).- *Molecular Phylogenetics and Evolution* 34: 616-624, San Diego

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