

Re-assessment of the medicinal leech *Hirudo medicinalis* Linnaeus, 1758, in Ireland

Roy T. SAWYER

Medical Leech Museum, 2 Bryngwili Road,
Hendy, Pontarddulais, Swansea SA4 0XT (United Kingdom)
leechmuseum@compuserve.com

Sawyer R. T. 2013. — Re-assessment of the medicinal leech *Hirudo medicinalis* Linnaeus, 1758, in Ireland. *Zoosystema* 35 (1): 113-123. <http://dx.doi.org/10.5252/z2013n1a9>

ABSTRACT

The apparent absence of the medicinal leech *Hirudo medicinalis* Linnaeus, 1758, in Ireland has been noted for over 150 years. Furthermore, not a single native Irish specimen has been preserved to prove its existence. The status of the Irish medicinal leech has been subject to several retrospective interpretations which need to be put into perspective in view of new thinking and research. The predominant view that this leech was never indigenous to Ireland is based predominantly on the assumption that Ireland was once totally glaciated, and this leech did not naturally colonise the island in the post-glacial period. Recent genetic evidence that the common frog survived in an Irish glacial refugium invites re-examination of some of this argument. Another widely held view is that within historic times, leeches imported into Ireland for medicine established itself in the wild but disappeared in the 19th century. In fact, *Hirudo medicinalis* was notoriously difficult to transplant (hence its threatened status). In spite of the millions of leeches imported into the British Isles and North America in the 19th century not a single example of an escaped population has been demonstrated. A third interpretation that the medicinal leech was indeed indigenous to Ireland is, in the author's view, most compatible with a re-assessment of the historical and more recent evidence detailed in this paper. The author leaves open as a real biological possibility that the medicinal leech may be rediscovered in Ireland, but points out the historical precedent in mainland Britain that premature proclamation of extinction may delay potential rediscovery by decades.

KEY WORDS

Leech,
Hirudinea,
Hirudo medicinalis,
medicinal leech,
Ireland,
extinct species,
indigenous species,
IUCN,
CITES.

RÉSUMÉ

Réévaluation de la sangsue médicinale *Hirudo medicinalis* Linnaeus, 1758, en Irlande. L'absence supposée de la sangsue médicinale *Hirudo medicinalis* Linnaeus, 1758, en Irlande est mentionnée depuis plus de 150 ans. De plus, aucun spécimen originaire d'Irlande n'a été conservé pour prouver son existence. Le statut de la sangsue médicinale irlandaise a été l'objet de plusieurs interprétations rétrospectives, qui doivent être réexaminées dans un cadre de réflexion et de recherche nouveau. La thèse dominante selon laquelle cette sangsue n'a jamais été indigène en Irlande se fonde principalement sur l'hypothèse que l'Irlande a été

MOTS CLÉS

Sangsue,
Hirudinea,
Hirudo medicinalis,
sangsue médicinale,
Irlande,
espèces disparues,
espèces indigènes,
IUCN,
CITES.

totalemment recouverte de glace, et que cette sangsue n'a pas colonisé naturellement l'île durant la période post-glaciaire. Des données génétiques récentes sur la survie de la grenouille rousse dans un refuge glaciaire en Irlande nous invitent à réévaluer certains de ces arguments. Selon une opinion largement répandue, les sangsues introduites en Irlande pour usage médicinal pendant les temps historiques se seraient établies dans le milieu naturel, mais auraient disparues au 19^e siècle. En fait, *Hirudo medicinalis* est connue pour être très difficile à transplanter (d'où son statut d'espèce menacée). Malgré les millions de sangsues importées dans les îles Britanniques et en Amérique du Nord au 19^e siècle, on ne connaît aucun exemple de population implantée avec succès. Une troisième interprétation, postulant que la sangsue médicinale était effectivement indigène en Irlande est, selon l'auteur, la plus compatible avec la réévaluation des données historiques et plus récentes détaillées ici. On peut donc envisager comme une possibilité biologique fondée que la sangsue médicinale soit un jour retrouvée en Irlande, mais des exemples ont montré en Grande-Bretagne que sa redécouverte éventuelle pourrait être retardée de plusieurs décennies par l'annonce prématurée de son extinction.

INTRODUCTION

The apparent absence of the medicinal leech *Hirudo medicinalis* Linnaeus, 1758, in Ireland has been noted by zoologists for over 150 years (McCarthy 1975). Furthermore, as shown in this paper, not a single native Irish specimen has been preserved to prove its existence. Understandably, the status of the Irish medicinal leech has been subject to several retrospective interpretations, but these conflict with a modern understanding of the conservation and genetics of this threatened species (e.g., Trontelj & Utevsky 2005, 2012; Utevsky *et al.* 2010; Maitland 2011; Elliott & Kutschera 2011).

A predominant and long-standing view is that the medicinal leech was never indigenous to Ireland (Patterson 1854: 59; McCarthy 1986: 73; CITES 2006: 8). If this were the case, the medicinal leech could not have gone extinct in Ireland as presented by IUCN (2011), and furthermore the original range of this species would have to be redrawn to exclude Ireland. This view is based predominantly on the assumption that most freshwater invertebrates of Ireland were eliminated during the last glacial maximum (Reynolds 2008), and

the medicinal leech did not naturally colonise the island in the post-glacial period. In this context, recent genetic evidence invites a reassessment of potentially relict freshwater fauna in that at least one aquatic species apparently survived in a glacial refugium in southwest Ireland (Teacher *et al.* 2009). A case in point is the common frog, *Rana temporaria* Linnaeus, 1758, which was once believed overwhelmingly to be introduced into Ireland (Patterson 1854: 254; Lucey & Doris 2001: 25; Minchin 2007: 366).

A corollary interpretation is that within historic times (17th century) leeches imported for medicinal purposes established itself in the wild but disappeared by mid-nineteenth century (McCarthy 1986: 73; Lucey & Doris 2001: 23; Minchin 2007: 359). If this were the case, any surviving populations would not be genetically "Irish" in that they originated recently from other parts of the historical range of this species.

This widely held view is based on an assumption that importation of this species was paramount to its establishment in the wild. Unlike so many other invertebrate species where alien invasions were undoubtedly the case in Ireland (for a review see McCarthy 1986), we now know

this view is particularly not warranted in the case of *Hirudo medicinalis*. Ongoing studies in leech history demonstrate unequivocally that this species was notoriously difficult to transplant (hence its threatened status) (e.g., Sawyer *et al.* 1998; Sawyer 2013). In spite of the millions of *Hirudo medicinalis* imported into the British Isles, North America and elsewhere in the 19th century not a single example of an escaped population has been documented. The inability of introduced medicinal leeches to survive and reproduce in the wild in past centuries has been corroborated by several comprehensive genetic studies of the genus *Hirudo* Linnaeus, 1758 (Utevsky *et al.* 2010: 202, 203; Trontelj & Utevsky 2012: 475, 484) (Fig. 1).

A third interpretation is that the medicinal leech was indeed indigenous to Ireland. Whether it survived in the above-mentioned glacial refugium or naturally colonised the island during the post-glacial period (or both, as apparently was the case for the frog) could be settled by molecular genetics should surviving population(s) be eventually found.

The official view that such a native Irish leech is extinct needs to be actively reexamined in view of historical events on mainland Britain where the medicinal leech was authoritatively declared extinct in 1910 (Harding 1910: 174). Subsequently, a number of ponds harbouring healthy populations of native *Hirudo medicinalis* have been documented in various parts of mainland Britain, including nearby Wales (Lloyd 1998: 31,32) and Scotland (Maitland 2011: 3).

In the following paper the status of the Irish medicinal leech is revisited in light of new thinking and research bearing on aspects of this question.

METHODS

All efforts to locate voucher specimens of native Irish medicinal leeches were unsuccessful (this highlights the urgent need for voucher specimens of medicinal leeches from localities throughout its current range). No Irish specimens are known from the following natural history museums and medical institutions: National Museum of Ireland-Natural

History, Dublin; Museum of Zoology, Trinity College, Dublin; Royal College of Physicians of Ireland; Royal College of Surgeons of Ireland; Department of Natural Sciences, National Museums of Northern Ireland, Belfast; National Parks and Wildlife Service, Dublin; Armagh Natural History and Philosophical Society; Muséum national d'Histoire naturelle, Paris; National Museum of Natural History, Smithsonian Institution, Washington, DC; and Swedish Museum of Natural History, Stockholm.

A single specimen in the Natural History Museum in London is recorded “with the locality ‘Dublin neighbourhood’. No date. Unregistered, but it was in the Old Collection (i.e. it was in the British Museum before 1881, when it was transferred to the Natural History Museum in South Kensington). Presented by Mr. Lee. No. 17 on separate label.” (pers. comm., Alex Muir, 6 June 2006). Unfortunately, such a specimen may have originated from a Dublin pharmacy or doctor who had imported it for medical purposes, there being no evidence it was collected in the wild.

In the absence of any definitive Irish voucher specimens, this paper explores the primary literature relating to all known historical accounts of medicinal leeches from wild sources in Ireland. This includes Irish annals, travelogues, natural histories, and archival newspapers, as well as early Irish medical literature. In addition to online sources, the National Library of Ireland, Dublin, and the Public Records Office of Northern Ireland, Belfast, were particularly productive.

Scrupulous efforts were made to distinguish “leech” meaning the bloodsucking animal from “leech”, an Anglo-Saxon term meaning doctor or healer. In early literature of Ireland in the English language the latter term was in common currency at the time. For example, the paper, “The leech in ancient Ireland”, deals exclusively with early medical practitioners and does not mention the bloodsucking animal at all (Binchy 1952).

Finally, non-exhaustive etymological evidence of several “leech lakes” and “leech rivers” in the Irish Gaelic language are discussed in the context of whether they reflect the erstwhile presence of medicinal leeches in Ireland.

RESULTS

The earliest credible record that medicinal leeches may have existed in Ireland dates to around 1188 AD when Giraldus Cambrensis (Gerald of Wales) wrote: "There are neither snakes nor adders, toads nor frogs, tortoises nor scorpions, nor dragons. It [Ireland] produces, however, spiders, leeches, and lizards..." (Forester & Wright 2000: 27).

Giraldus travelled extensively in Ireland, mainly in the southeast, and was generally accurate in recording its animals and plants. The context of his record clearly indicates that he was referring to "leech" meaning the animal, and not to the Anglo-Saxon term "leech" meaning healer or doctor. It may be significant that he used the Latin word "sanguisugas" (literally, "bloodsuckers") in referring to these purported Irish animals: "Caret serpentibus et colubris; caret bufonibus et ranis; caret tortuis et scorpionibus; caret et draconibus. Habet tamen araneas, habet sanguisugas, habet et lacertas..." (Brewer 1867: 62).

In a resurgence of interest in Irish natural history in the 1680s several specific lakes and marshes, notably Lough Mask and Blarney Lough, were identified specifically as sources of leeches which were being used in contemporary medicine (Fig. 2). These reports persisted for about 150 years.

LOUGH MASK, COUNTIES GALWAY AND MAYO

Lough Mask is a limestone lake to the north of Galway in the Connaught region of west Ireland. In 1684 a local gentleman, Roderic O'Flaherty (1629-1718), wrote in a contemporary account of this lake: "There are also medicinal leeches on the south side of the lake" (Hardiman 1846: 19). A similar claim was made in 1755: "There is another lake within a few miles of this, called Lough-mask; it is remarkable for the leeches bred in it..." (Boate & Molyneux 1755: 190).

This reputed population of leeches at Lough Mask may have survived to at least the late 1840s, but these latter accounts, although by respected scholars, appear to be secondary, hearsay sources. Irish Academician James Hardiman, in a footnote to O'Flaherty's record, observed in 1846 that, "The leeches found here are stated to be of a good

kind, but whether they are used or approved of by medical men, for topical bleeding, I have not ascertained. The country people in the neighbourhood use them with good effect" (Hardiman 1846: 19). A few years later Dr William Wilde (1815-1876), foremost Dublin surgeon and originally from Connaught, reported to William Thompson (1805-1852), President of the Natural History Society of Belfast, in a communication dated November 1849 (Thompson 1856: 427):

"W. R. Wilde, Esq., when at Lough Mask in September last, inquired about this, and was told that it had of late become scarce in consequence of the draining of the lake by the canal between it and Lough Corrib. It is found in pools and wells in the vicinity of Lough Mask, near the canal. A woman who consulted him about her child, which he ordered to be bled with leeches, said the kind from the lake was far better than that at the doctor's, which was smaller and sold at 1s each. In summer the leech-gatherers there sit with their legs in the water, on which the creatures fasten and are thus obtained."

Interestingly, in a later detailed account of Lough Mask and adjacent Lough Corrib in 1867, Dr Wilde did not mention medicinal leeches (Wilde 1867).

BLARNEY LOUGH, COUNTY CORK

William Molyneux (1656-1698), influential Natural Philosopher from Dublin, asked the onetime Military Governor of Cork, Richard Cox (1650-1733), for a description of Cork and its environs as a contribution toward a proposed "Natural History of Ireland" (a work which was never published). In his response written about 1685, Cox included the following snippet: "Blarney, a very strong castle and a noble seat of the Earle of Clancarthy within 3 myles of Cork, in a large park well furnished with wood and water and particularly a large lough abounding with leeches" (Johnston & Lunham 1902: 361).

65 years later, in 1750, physician and natural historian Charles Smith (1715-1762) corroborated the presence of medicinal leeches here (Smith 1750: I, 169,170; II, 323,324):

"This castle [Kilcrea] is seated upon an eminence, with a river running beneath it, and on the other

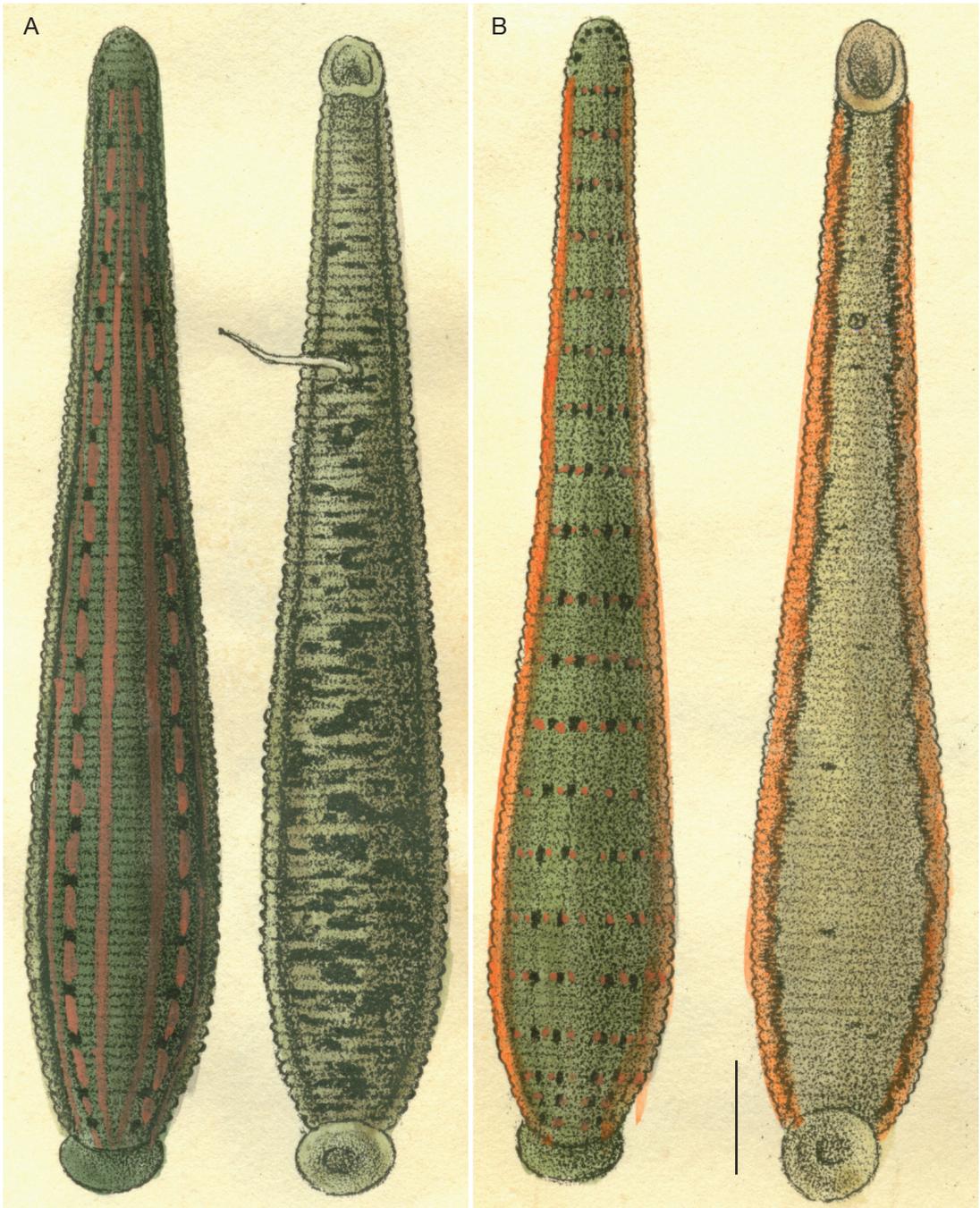


FIG. 1. — As early as 1827 the French hirudinologist Alfred Moquin-Tandon illustrated several nominal species of medicinal leech from western Europe (Moquin-Tandon 1827: 114-118). **A**, *Hirudo medicinalis* Linnaeus, 1758, from northern Europe; **B**, *Hirudo troctina* Johnson, 1816, from pharmacies in Montpellier. These species distinctions have been corroborated recently, both genetically and geographically (Utevsky *et al.* 2010; Trontelj & Utevsky 2012). Which species is indigenous to Ireland is discussed in the text. Scale bar: 1.0 cm.

side is a fine lake of about thirty acres, abounding with quantities of good leeches [...] Adjoining to the castle, is a fine park, sweetly wooded, and well watered; also, a fair bridge over Blarney river. The gardens of the castle are well laid out, and kept in good order [...] In this wood, are quarries of limestone [...] The common leech abounds in the lough of Blarney, from whence Cork and Dublin may be supplied with them..."

In this context the Irish poet, Richard Alfred Milliken (1767-1815) wrote, a poem in 1796, "The Groves of Blarney", which makes reference to its leeches, quoted here in part (Milliken 1900: 9):

"Tis there the lake that is stored with perches,
And comely eels in the verdant mud;
Beside the leeches, and groves of beeches,
All standing in order for to guard the flood."

Somewhat later, in 1813, the Rev James Hall confirmed first-hand that some sort of leech did live in the Lough of Blarney at that time (Hall 1813: 196-197):

"The lake of Blarney, about a mile in circumference, so abounds with perch, roach, eels, and other fish [...] This lake is also so full of leeches, that, if any person put in his foot, or his arm, it will soon be black with them. Two young gentlemen lately went thither, it seems, to bathe; but, before they were many minutes in, finding themselves attacked by they knew not what; they hastened to the shore, and found themselves completely black with leeches; which, as fast as possible, they rubbed off one another's back, after they had cleared the other parts of their body. I put my hand into the water, to try whether I could discover any, and in less than a minute found some of them appearing."

In 1824 another visitor claimed that leeches were still here, presumably basing this on locally acquired knowledge: "A short distance to the south west of the castle is a lake, said to abound with a species of leech" (Croker 1824: 306). Later still, in 1839, a meticulous history of the Cork region stated that the lake, "abounds in leeches, not prized however for their medicinal utility" (Windele 1839: 210). There is no evidence for the speculation that the medicinal leeches historically documented at Blarney Lough were imported and stored in the lake (McCarthy 1974: 47; 1986: 72).

I sampled briefly for medicinal leeches at Blarney Lough in August 2012 using the traditional wading technique (Fig. 3). On this occasion no medicinal leeches were found in the lake which was otherwise rich in aquatic invertebrates, but another bloodsucking species *Theromyzon Philippi*, 1867, was remarkably abundant, as were its prey hosts, swans and geese. One potentially relevant observation is that at least two adjacent herds of cattle are currently fenced from entering the water of the lough, barring leeches from its main historic food source. Undoubtedly, farming practice in mid-19th century allowed cattle here to roam freely into the water. Still, a small population of medicinal leeches could subsist in Blarney Lough or other Irish sites on frogs and aquatic birds (Sawyer 2012), as is known in similar sites on mainland Britain (e.g., Maitland 2011:3).

MALLOW, COUNTY CORK

In 1750 Charles Smith added another source of leeches in County Cork: "There are great quantities of good leeches near Mallow, which are taken and sent to Cork and other places" (Smith 1750: I, 328, fn 6). Interestingly, this was during the peak of using the nearby thermal springs as a fashionable spa.

COUNTY DUBLIN

In his book on the natural history of County Dublin Dr John Ruttly (1698-1775) claimed in 1764, almost as an afterthought, that the medicinal leech "has been found in several places in this county" but, unfortunately, he did not give specific locations (Ruttly 1772: 390). Somewhere in this general area was a pond known as late as 1894 as the "leech pond", but no medicinal leeches were claimed (Furlong 1894: 537).

COUNTY KILKENNY

In 1849 Michael Donovan (1790-1876), Professor of Chemistry and Pharmacy to the Apothecaries' Company in Ireland, succinctly summarised the history of the Irish medicinal leech (Donovan 1849: 196): "They were once common in Ireland, but they disappeared by degrees; and the last of them were found in the county of Kilkenny and its immediate neighbourhood."

In essence this knowledgeable apothecary of the modern school declared the Irish medicinal leech extinct by 1849, and went on to state explicitly that “at all times we are obliged to send for them to foreign countries”.

ETYMOLOGICAL CONSIDERATIONS

In some parts of Europe the presence of medicinal leeches in antiquity can sometimes be inferred from place names bearing the name for leech in the endemic language of the country. For example, in nearby Wales Llyn y Gele (Leech Lake in Welsh) was documented as still harbouring medicinal leeches in recent times (Lloyd 1998: 18). Thus, in the earliest annals of Ireland there are at least two references to Lough Deel (Leech Lake) in Irish Gaelic (from *daoil*, *dallo*, for leech) (Scharff 1916: 146), located in Counties Donegal (O’Clery 1856: 1268, 1557) and Westmeath (Woods 1907: 4), respectively. Even today there are several widely separated rivers named River Deel, in Counties Limerick, Donegal and Westmeath (Connellan 1869: 448). While this does intimate that medicinal leeches may have been present in Ireland possibly into prehistory, a more critical etymological study is required. For example, in Scotland the Gaelic word for leech can sometimes mean “lamprey” or even “eel” (Forbes 1905: 42, 409).

SPECIES IDENTIFICATION

By way of caveat, one must be careful interpreting historical claims outlined above that it was unquestionably the medicinal leech *Hirudo medicinalis* which was being reported. Another leech species of similar size, the relatively common “horse leech” *Haemopis sanguisuga* (Linnaeus, 1758), can be confused with the notoriously sanguivorous medicinal leech (see Maitland 2011: 3). In spite of its scientific name *H. sanguisuga* is a non-bloodsucking species which feeds on earthworms and other invertebrates. This is a non-aggressive leech which goes characteristically flaccid when disturbed, and as a rule does not attach to people’s legs when wading (Sawyer 1986: I, 383, 416; II, 561-567). In South Wales near Swansea an upland lake (Llyn y Fan Fawr) is reputed locally to harbour many leeches, but upon inspection we found this lake to be populated with numerous,



FIG. 2. — Distribution of historic records of the medicinal leech in Ireland in relation to the nearest extant population in Wales: 1, Blarney Lough, County Cork; 2, Mallow, County Cork; 3, County Kilkenny; 4, County Dublin; 5, Lough Mask, Counties Galway and Mayo; 6, Marloes Mere, Pembrokeshire, Wales.

exceptionally large “horse leeches” rather than medicinal leeches (RTS, personal observation).

DISCUSSION

Historical evidence for the presence of medicinal leeches in Ireland predates by up to hundreds of years their importation for medicine starting from about 1750. Furthermore, there can be little doubt that medicinal leeches did live in the wild as late as mid-nineteenth century. Nonetheless, in the final analysis the majority of the historical accounts outlined above are secondary, essentially hearsay sources. In this context the account by Rev. James Hall in 1813 at the Blarney site is remarkable in being record of a first-hand experience. He clearly described an active leech with aggressive behaviour which is definitely not that of the sluggish “horse leech”.

It is persuasive, also, that the contemporary use of Irish-collected leeches was claimed explicitly by some of Ireland's most eminent medical practitioners and apothecaries, including John Rutty, Michael Donovan and William Wilde. In his capacity as foremost apothecary in Dublin, Michael Donovan clearly stated that the decline of Irish leeches was gradual and their unavailability was relatively recent. To meet increasing demand for leeches in contemporary medicine, they had to be imported into Ireland from abroad (for a review see Sawyer 2013). This decline in local sources parallels the experience in mainland Britain, France and other parts of western Europe.

To counter the high price of imported leeches Donovan proposed in 1849 that a leech farm be established in Ireland (Donovan 1849: 196). Such an enterprise was established briefly in 1852 near Callan by a French firm (Anonymous 1852: 3), but there is no evidence that it was successful (Simmonds 1870; Whitehead 1913). In fact, there is no evidence that imported medicinal leeches ever established themselves successfully anywhere in Ireland, in spite of speculation to the contrary (CITES 2006: 8). As discussed in the introduction, nowhere in the British Isles has it been shown that *Hirudo medicinalis* established itself in the wild, in spite of the millions of specimens imported into Britain and Ireland in the 19th century (Sawyer 2013). Consequentially, the speculative assumption that medicinal leeches once found in the wild in Ireland were alien escapees must be rejected as unfounded (see also Utevsky *et al.* 2010: 202, 203; Maitland 2011: 3; Trontelj & Utevsky 2012: 475, 484). This is in marked contrast to a tropical species of an Asian medicinal leech, *Hirudinaria manillensis* (Lesson, 1842), whose introduction into the West Indies from India in the nineteenth century has been documented in detail (Sawyer *et al.* 1998).

In any case, no medicinal leeches are known to live anywhere in Ireland today. In 1895 the very experienced Irish naturalist Robert F. Scharff (1856-1934), Director of the Natural History Museum in Dublin, wrote "I have not seen an Irish specimen, but it is quite probable that it does occur in this country" (Scharff 1895: 165). A few years

later he was more pessimistic: "I have never seen an Irish medicinal leech, and my efforts to get a specimen have hitherto proved fruitless" (Scharff 1898: 193). More recently, in his comprehensive study of Irish leeches Kieran McCarthy observed "...nor have I succeeded in collecting specimens there [Lough Mask] or elsewhere in the country" (McCarthy 1975: 413).

Notwithstanding the above, for reasons conveyed in this paper we must leave open the real biological possibility that the medicinal leech may eventually be rediscovered in Ireland. Furthermore, there is a caveat for official bodies such as IUCN and CITES to assume prematurely that this elusive species is extinct. Less pejorative would be to list it as, "no recent record".

An instructive case in point is what happened in mainland Britain. In 1910 the influential zoologist W. A. Harding declared the medicinal leech extinct: "... no doubt that this species is now extinct in the British Islands" (Harding 1910: 174). This proclamation was asserted with such intimidating authority that arguably it delayed by decades the rediscovery of the British medicinal leech, a possible lesson for Ireland (see Ladie *et al.* 2011). By 2006 "the situation was better than expected, with leeches in a remarkable number of new locations", involving over 135 sites in mainland Britain (CITES 2006: 9). Some of these sites are a remarkably short distance from Ireland, namely in south and west Wales where today more than ten localities are known to harbour this species (Lloyd 1998: 31-32).

On balance the most parsimonious conclusion is that at one time the medicinal leech was indeed indigenous to Ireland, and furthermore this native leech lived in the wild to at least 1850. In view of its potential genetic uniqueness, as recently shown for the Irish frog, efforts should be renewed to survey promising, including temporary, freshwater ponds or marshes, especially in south and west Ireland (Fig. 3).

Finally, by way of taxonomic caveat, it cannot be assumed which nominal species of medicinal leech is indigenous to Ireland (Fig. 1). *Hirudo medicinalis*, is a genetically distinctive species which lives in northern Europe, including mainland Britain (Tron-



FIG. 3. — Searching for the medicinal leech at Blarney Lough, the last known home for this species in Ireland. The traditional technique by which this bloodsucking species attaches to a wader's legs is much recommended over the more frequently used shoreline netting. The concentric motion waves direct this swimming species to its potential host. An additional technique for finding the medicinal leech is to look for them amongst spawning frogs in the spring (Maitland 2011: 3).

telj & Utevsky 2012). However, the biogeography of Ireland is peculiar in that a number of animal and plant species native to southwest Ireland have a disjunct distribution in common with northwest Spain, but are not found in mainland Britain (Lusitanian distribution). In this context it must be noted that the medicinal leech of northwest Spain is not *Hirudo medicinalis* (Utevsky *et al.* 2010: 202). Furthermore, evidence of an ice-age refugium reflected by genetically isolated aquatic species in southwest Ireland further complicates Irish phylogeography (Teacher *et al.* 2009), an intriguing subject which cannot be pursued further here.

Acknowledgements

I would particularly like to acknowledge Fred Hechtel, Biopharm (UK) Ltd, Swansea, for many

insightful discussions regarding the status of medicinal leeches. In addition, the following individuals and institutions gave invaluable assistance on various aspects of this study: Jean-Lou Justine and A. Ohler, Muséum national d'Histoire naturelle, Paris; Alex Muir and Emma Sherlock, Department of Zoology, The Natural History Museum, London; Mary O'Doherty, Royal College of Surgeons in Ireland, Dublin; Harriet Wheelock, Royal College of Physicians of Ireland; Medical Library, Queen's University, Belfast; Martyn Linnie, Museum of Zoology, Trinity College, Dublin; Julia Sigwart, National Museum of Ireland-Natural History, Dublin; Peter Crowther, Department of Natural Sciences, National Museums of Northern Ireland, Belfast; John Faulkner, County Armagh Wildlife Society; Brian Gabriel, Blarney & District Historical Society; Wayne Trodd, John Lucey and Gary Free,

Environmental Protection Agency, Ireland; Simon Harrison and Patrick Sleeman, University College Cork; Brian Nelson, National Parks and Wildlife Service, Dublin; Jervis Good, National Parks and Wildlife Service, Cork; William Moser, Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, DC; and Elín Sigvaldadóttir, Swedish Museum of Natural History, Stockholm.

REFERENCES

- ANONYMOUS 1852. — A leech crop. *Nenagh Guardian* (Nenagh), 19 June 1852.
- BINCHY D. A. 1952. — The leech in ancient Ireland, in DOOLIN W. & FITZGERALD O. (eds), *What's Past is Prologue: A Retrospective of Irish Medicine*. Monument Press, Dublin: 5-9.
- BOATE F. & MOLYNEUX T. 1755. — *A Natural History of Ireland: In Three Parts*. G. and A. Ewing, Dublin, 213 p.
- BREWER J. S. (ed.) 1867. — *Topographia Hibernica*, in *Giraldi Cambrensis Opera*, Longman, London, 460 p.
- CITES 2006. — Convention on International Trade in Endangered Species of Wild Fauna and Flora. 22nd Meeting of the Animals Committee. Lima (Peru), 7-13 July 2006. AC22 Doc. 11.3 (Rev. 1), 46 p.
- CONNELLAN O. 1869. — On the rivers of Ireland, with derivations of their names. *Proceedings of the Royal Irish Academy* 10: 443-458.
- CROKER T. C. 1824. — *Researches in the South of Ireland*. John Murray, London, 393 p.
- DONOVAN M. 1849. — Letter from Mr. Donovan relative to a proposal for the propagation of leeches in Ireland. *Dublin Medical Press* 22 (26 September 1849): 196.
- ELLIOTT J. M. & KÜTSCHERA U. 2011. — Medicinal leeches: historical use, ecology, genetics and conservation. *Freshwater Reviews* 4: 21-41.
- FORBES A. R. 1905. — *Gaelic Names of Beasts (Mammalia), Birds, Fishes, Insects, Reptiles, Etc.* Oliver and Boyd, Edinburgh, 424 p.
- FORESTER T. (trans.) & WRIGHT T. (ed.) 2000. — *Giraldus Cambrensis: The Topography of Ireland*, Medieval Latin Series, Cambridge, Ontario, 92 p.
- FURLONG A. 1894. — Katie. A Memory (Died 27th July, 1894). *The Irish Monthly* 22: 536-543.
- HALL J. 1813. — *Tour Through Ireland: Particularly the Interior and Least Known Parts*. R. P. Moore, London, Volume 1, 340 p.
- HARDIMAN J. 1846. — *A Chorographical Description of West or H-Iar Connaught, written AD 1684 by Roderic O'Flaherty, Esq.*, The Irish Archaeological Society, Dublin, 469 p.
- HARDING W. A. 1910. — A revision of British leeches. *Parasitology* 3: 130-201.
- IUCN 2011. — *Red List of Threatened Species*. Version 2011.2. <http://www.iucnredlist.org> (downloaded 26 April 2012).
- JOHNSTON S. P. & LUNHAM T. A. 1902. — On a manuscript description of the city and county of Cork, circa. 1685, written by Sir Richard Cox. *The Journal of the Royal Society of Antiquarians of Ireland* 32 (4): 353-376.
- LADIE R. J., JEPSON P., MALHADO A. C. M., JENNINGS S. & BARUA M. 2011. — The causes and biogeographical significance of species' rediscovery. *Frontiers of Biogeography* 3: 111-118.
- LLOYD D. 1998. — The medicinal leech, *Hirudo medicinalis*, in Wales. CCW Report No. 311, Countryside Council for Wales, Bangor, Gwynedd, Wales, 126 p.
- LUCEY J. & DORIS Y. 2001. — *Biodiversity in Ireland. A Review of Habitats and Species*. Environmental Protection Agency, Wexford, 38 p.
- MAITLAND P. S. 2011. — The medicinal leech *Hirudo medicinalis* in Scotland. *BRISC Recorder News* 80: 1, 3, 4.
- MCCARTHY T. K. 1974. — A note on two interesting freshwater oligochaetes occurring in Ireland *Chaetogaster limnaei* von Baer (Naididae) and *Branchiura sowerbyi* Beddard (Tubificidae). *Irish Naturalists' Journal* 18: 46-48.
- MCCARTHY T. K. 1975. — Observations on the distribution of the freshwater leeches (Hirudinea) of Ireland. *Proceedings of the Royal Irish Academy*, Section B, 75: 401-450.
- MCCARTHY T. K. 1986. — Biogeographical aspects of Ireland's invertebrate fauna, in SLEEMAN D. P., DEVOY R. J. & WOODMAN P. C. (eds), *Proceedings of the Postglacial Colonisation Conference. Occasional Publications of the Irish Biogeographical Society* 1: 67-81.
- MILLIKEN R. A. 1900. — 'The Groves of Blarney', in YEATS W. B. (ed.), *A Book of Irish Verse*. Methuen and Co., London: 6-10.
- MINCHIN D. 2007. — A checklist of alien and cryptogenic aquatic species in Ireland. *Aquatic Invasions* 2 (4): 341-366.
- MOQUIN-TANDON A. 1827. — *Monographie de la Famille des Hirudinées*. Gabon and Co., Paris, 151 p.
- O'CLERY M. 1856. — *Annals of the Kingdom of Ireland by the Four Masters*. Hodges, Smith and Co., Dublin, 2nd edn, Volume 5: 1259-1875.
- PATTERSON R. 1854. — *Introduction to Zoology for the Use of Schools*. Simms and McIntyre, London and Belfast, 518 p.
- REYNOLDS J. D. 2008. — Man-handled? How and when did freshwater invertebrates cross the sea to Ireland? A review with particular reference to crustaceans. *Irish Naturalists' Journal* 29 (Special supplement: Mind the Gap: Postglacial Colonisation of Ireland): 83-95.
- RUTTY J. 1772. — *An Essay Towards a Natural History*

- of the County of Dublin. W. Sleater, Dublin, 392 p.
- SAWYER R. T. 1986. — *Leech Biology and Behaviour*. Oxford University Press, Oxford, 1065 p.
- SAWYER R. T. 2012. — Are medicinal leeches still at Blarney? *The Muskerry News* 10 (10): 2.
- SAWYER R. T. 2013. — History of the leech trade in Ireland, 1750-1915: microcosm of a global commodity. *Medical History*, 3 (July), in press.
- SAWYER R. T., HECHTEL F. O. P., HAGY J. W. & SCACHERI E. 1998. — A study in medical history: introduction of medicinal leeches into the West Indies in the nineteenth century. *Zoosystema* 20 (3): 451-470.
- SCHARFF R. F. 1895. — Some notes on Irish leeches. *The Irish Naturalist* 4 (6): 165-166.
- SCHARFF R. F. 1898. — The Irish freshwater leeches. *The Irish Naturalist* 7 (8): 188-194.
- SCHARFF R. F. 1916. — On the Irish names of invertebrate animals. *The Irish Naturalist* 25 (9): 140-152.
- SIMMONDS P. L. 1870. — The trade in leeches. *Pharmaceutical Journal*, series 3, 1: 521-522.
- SMITH C. 1750. — *The Ancient and Present State of the County and City of Cork containing a Natural, Civil, Ecclesiastical, Historical, and Topographical Description Thereof*. John Connor, Cork, 1815 edn, Two Volumes.
- TEACHER A. G. F., GARNER T. W. J. & NICHOLS R. A. 2009. — European phylogeography of the common frog (*Rana temporaria*): routes of postglacial colonization into the British Isles, and evidence for an Irish glacial refugium. *Heredity* 102: 490-496.
- THOMPSON W. 1856. — *The Natural History of Ireland*. Volume 4: *Mammalia, Reptiles, and Fishes, and Invertebrata*. Bohn, London, 516 p.
- TRONTELJ P. & UTEVSKY S. Y. 2005. — Celebrity with a neglected taxonomy: molecular systematics of the medicinal leech (genus *Hirudo*). *Molecular Phylogenetics and Evolution* 34: 616-624.
- TRONTELJ P. & UTEVSKY S. Y. 2012. — Phylogeny and phylogeography of medicinal leeches (genus *Hirudo*): fast dispersal and shallow genetic structure. *Molecular Phylogenetics and Evolution* 63: 475-485.
- UTEVSKY S., ZAGMAJSTER M., ATEMASOV A., ZINENKO O., UTEVSKA O., UTEVSKY A. & TRONTELJ P. 2010. — Distribution and status of medicinal leeches (genus *Hirudo*) in the Western Palaearctic: anthropogenic, ecological, or historical effects? *Aquatic Conservation: Marine and Freshwater Ecosystems* 20: 198-210.
- WHITEHEAD H. 1913. — The medicinal leech in Ireland. *The Irish Naturalist* 22 (1): 19-20.
- WILDE W. R. 1867. — *Lough Corrib, Its Shores and Islands: With Notices of Lough Mask*. McGlashan and Gill, Dublin, 306 p.
- WINDELE J. 1839. — *Historical and Descriptive Notices of the City of Cork and its Vicinity*. L H Bolster, Cork, 412 p.
- WOODS J. 1907. — *Annals of Westmeath: Ancient and Modern*. Sealy, Beyers and Walker, Dublin, 345 p.

Submitted on 7 May 2012;
 accepted on 23 November 2012;
 published on 29 March 2013.