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THE CURRENT STATUS OF AQUATIC OLIGOCHAETES IN IRELAND

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Abstract

One hundred aquatic oligochaete species whose presence in Ireland has been confirmed are listed. An overview of the current knowledge regarding the occurrence and distribution of aquatic species of the Families Naididae (including species of the former Family Tubificidae), Pristinidae, Lumbriculidae, Lumbricidae and Phreodrilidae is given.
Key words: Oligochaetes, aquatic, Ireland, occurrence, distribution.

Introduction

Some major changes in the higher classification of the Phylum Annelida in recent years do not yet appear to have resulted in a final stabilized classification system. As the taxonomic name Oligochaeta can now be considered synonymous with Clitellata referring to a rank above the family group (Erséus *et al.*, 2008), the term 'oligochaete' is used here to refer to the species of oligochaetous annelids, excluding Polychaeta, leeches and leech-like worms. A change in classification at family level has resulted in the former Family Tubificidae being absorbed into the Family Naididae. As DNA data indicated that these two taxonomic groups should be treated as a single family, Erséus and Gustavsson (2002) proposed that the name Tubificidae be retained, because it was better known, even though Naididae is the older of the two names. However, the International Commission of Zoological Nomenclature (2007) ruled that there was not sufficient reason to justify reversal of procedure. Thus, the name Tubificidae is defunct. There is, however, a practical need to be able to use a term identifying the species of this former family, because of its use in biological water quality assessments. Erséus *et al*. (2008) suggest the term 'tubificoid Naididae', while Van Haaren and Soors (2013) simply use the vernacular term 'tubificids'. As further debates are resolved, it is to be expected that some more re-organisation at family or sub-family level will take place. However, the purpose of the present paper is not to become involved in these debates on oligochaete phylogeny or taxonomy, but rather to give, where possible, an overview of the current knowledge regarding the status, occurrence and distribution of the aquatic oligochaete fauna of Ireland.

Since the publication of species inventories and distribution data for freshwater oligochaetes by Trodd *et al*. (2005), six species new to Ireland have been found (Schmelz *et al*., 2015; Sweeney *et al*., 2013; Sweeney and Caroni, 2016; Sweeney and Gallagher, 2013; Sweeney and

Sweeney, 2013, 2016). In addition, a considerable body of data on freshwater oligochaete species distribution has been amassed, derived mainly from a combination of results of river biological water quality assessments carried out by Sweeney Consultancy and lake monitoring programmes undertaken by the Environmental Protection Agency and by the Northern Ireland Environment Agency to meet the requirements of the EU Water Framework Directive (2000/60/EC).

Published data on the distribution of Irish estuarine and marine oligochaete species is less comprehensive, particularly around the northern half of the coast of Ireland. The oligochaete fauna of Munster estuaries was described by Sweeney (2005). Oliver and Healy (1998) recorded oligochaete species in a survey of coastal lagoons from Wexford to Donegal. Healy (1979a) described the marine littoral and brackish water oligochaete fauna of Wexford. Kennedy (1964) included records of marine species from Antrim, Dublin, West Cork and West Mayo. McGrath (1975) identified oligochaetes from the marine littoral in Dublin Bay and Inishmore Island, Co. Galway. Some additional data from recent estuarine surveys carried out by Sweeney Consultancy are also available.

This paper is based on over 2000 species records from over 500 sites, which have been submitted to the National Biodiversity Data Centre (NBDC). For inclusion in the NBDC database, determination of the accuracy of the original identification is necessary. This necessitates the ignoring of many records, both published and unpublished, particularly of the species where identification can be in any doubt. Specimens of thirty four freshwater species recorded by Trodd *et al*. (2005) and of five additional estuarine species (Sweeney, 2005) were deposited in the National Museum of Ireland – Natural History (NMINH), following verification by Tarmo Timm, Estonia, a co-author of a taxonomic key to freshwater oligochaetes of north-west Europe (Timm and Veldhuijzen van Zanten, 2002). All aquatic oligochaete specimens in the possession of the National Museum of Ireland – Natural History prior to 2005 were examined, as were some other available material on which earlier records were based. Specimens of species confirmed as new to Ireland since 2005 have also been deposited in NMINH.

Species Distribution and Occurrence

Family NAIDIDAE

Subfamily NAIDINAE

Oligochaetes of this subfamily are generally small and most are able to swim. While some are quite easy to identify to species level, others, particularly those of the genus *Nais*, can prove difficult.

***Chaetogaster cristallinus* Vejdovský, 1883**

A glass slide, labelled as *Chaetogaster cristallinus*, collected by Rowland Southern in 1908, at Powerscourt, Co. Wicklow, is in the possession of NMINH. This specimen is referred to in Southern (1909). However, the cover-slip and specimen are missing. There are no other confirmed records of this species in Ireland. It is considered that this species is sufficiently distinctive and that the recorder was sufficiently expert for the record to be accepted.

***Chaetogaster diaphanus* (Gruithuisen, 1828)**

Chaetogaster diaphanus, one of the few predators among Irish oligochaetes, is found in a variety of slow-flowing or still freshwater sites. It was first recorded by McGrath (1975) at two sites in Co. Galway and one in Co. Dublin. It is fairly common in the Killarney Lakes and has also been found in several other lakes and in the tidal freshwater sections of some rivers. A congener, *C. diastrophus* (Gruithuisen, 1828) was recorded by Southern (1909) in the River Dargle, Co. Wicklow, the River Annalee in Co. Cavan and a pond in the Phoenix Park, Co. Dublin, as well as from a stream on Clare Island, Co. Mayo (Southern, 1913). However, no specimen of *C. diastrophus* is lodged in NMINH. The facts that *C. diastrophus* is morphologically very similar to *C. diaphanus*, that Southern did not record any specimens of the latter species, which is fairly widely distributed, and as there have been no more recent published records of the former species in Ireland, suggests that the earlier records of *C. diastrophus* are possibly misidentifications of *C. diaphanus*.

***Chaetogaster limnaei* von Baer, 1827**

As *Chaetogaster limnaei* is commensal or parasitic on gastropods, attaching itself to the snails' body wall, under the shell, it is very easily overlooked and therefore, almost certainly, under-recorded. It was first recorded in Ireland by McCarthy (1974).

***Dero digitata* (Müller, 1773)**

Dero digitata is found mainly in still water locations throughout most of Ireland. It is quite tolerant of organic pollution.

***Dero obtusa* d'Udekem, 1855**

In 2011, *Dero obtusa* was recorded in abundance in Lough Ramor, Co. Cavan, where it had never previously been found, despite annual monitoring at the same location from 2002 to 2008 (Sweeney and Sweeney, 2014). It has not been recorded at any other location in Ireland. It could have been inadvertently introduced to Lough Ramor by anglers or other lake users. Alternatively, *D. obtusa* could just be a variation of *D. digitata*, as suggested by Milligan (1997).

***Nais alpina* Sperber, 1948**

Nais alpina is found in stony substrata of streams (Timm and Veldhuijzen van Zanten, 2002). A single specimen was collected in 1996 in Co. Wicklow.

***Nais barbata* Müller, 1773**

Nais barbata is quite common in littoral areas of the Killarney Lakes, Co. Kerry. The only other known Irish location at which this species has been found to date is the River Goul in Co. Kilkenny.

***Nais bretscheri* Michaelsen, 1899**

Nais bretscheri occurs in the Killarney Lakes, Co. Kerry, but has not been verified from any other Irish location.

***Nais christinae* Kasprzak, 1973**

Because the first description of *Nais christinae* was not until 1973, it was not included in the commonly used identification guide to aquatic oligochaetes by Brinkhurst (1971). A specimen, collected in 1978 in Lough Leane, Killarney, Co. Kerry, by the author and initially identified as *N. communis*, was corrected to *N. christinae* in 2002 by Tarmo Timm and deposited in NMINH. This species has subsequently been identified from Stoneyford Lough, Co. Fermanagh.

***Nais communis* Piguet, 1906**

Nais communis is a rare species in Ireland. It was first recorded on Clare Island, Co. Mayo, by Southern (1913). This record seems to have led to an erroneous statement in the Freshwater Biological Association identification guide to aquatic oligochaetes (Brinkhurst, 1971), that *N. communis* had been recorded in Co. Clare, which is the only mention in this guide to an Irish location for any of the five species of *Nais* with bifid dorsal crotchets. This, combined with the absence of *N. christinae* from the guide, led to incorrect identification of specimens as *N. communis* by several freshwater biologists, the author included, before more experience of this genus was acquired. O'Grady *et al.* (1979) recorded *N. communis* from Lough Leane, Killarney, Co. Kerry and Lough Sillan, Co. Cavan. The Killarney specimens were available for examination and were found to be *Dero digitata* with the hind end missing and therefore without the diagnostic posterior gills of the latter species. The only other confirmed record of *N. communis* in Ireland since the Clare Island record was a single specimen, collected in the River Barrow, Co. Carlow, in 2002.

***Nais elinguis* Müller, 1773**

Nais elinguis is common and widespread in rivers, lakes and the upper reaches of estuaries throughout Ireland. It can occur in abundance in organically enriched conditions.

***Nais pardalis* Piguet, 1906**

From the results of a survey of the rivers of Northern Ireland, Wright *et al.* (2000) recorded *Nais pardalis* as a species new to Ireland. A specimen of this species, in the possession of NMINH, was collected by the author in 1978 in Lough Leane, Killarney, Co. Kerry, where it is quite common on stony and sandy substrata in the littoral zone. It has subsequently been found in a few other river and lake littoral sites.

***Nais simplex* Piguet, 1906**

Nais simplex occurs throughout Ireland, mainly in lakes, but also occasionally in rivers, usually in low numbers.

***Nais variabilis* Piguet, 1906**

Most Irish records of *Nais variabilis* are from Co. Kerry, where it occurs in the Killarney lakes and in the upper parts of several estuaries. It has also been recorded from a stream in south Co. Dublin.

***Ophidonais serpentina* (Müller, 1773)**

Ophidonais serpentina is a very distinctive species that has been recorded throughout Ireland, mainly in lakes, but also occasionally in rivers.

***Paranais litoralis* (Müller, 1784)**

Paranais litoralis is found in saline waters around all surveyed parts of the Irish coast and can occur in great abundance in estuaries.

***Ripistes parasita* (Schmidt, 1847)**

The earliest known occurrence of *Ripistes parasita* in Ireland was in St John's Lake, Co. Leitrim in 2001 (Sweeney and Caroni, 2016). This location, as well as Lough Scur, Co. Leitrim, where *R. parasita* was subsequently recorded, are on the navigable Shannon-Erne Waterway, which could suggest that it was introduced in bilge water of second-hand boats imported from Britain or continental Europe. However, it has also been found in two Donegal lakes, which would be more difficult to explain by such human mediated introductions. It therefore seems more likely that *R. parasita* is a native species of quite limited distribution. It is a very distinctive species which is typically found in shallow, still or slow flowing waters and is usually associated with aquatic vegetation (Van Haaren and Soors, 2013).

***Slavina appendiculata* (d'Udekem, 1855)**

Because *Slavina appendiculata* is small and encrusted with foreign matter, it can easily be overlooked and is therefore probably under-recorded. It has been found at a few locations in Ireland, mostly associated with still water with peaty or detritus rich substrata.

***Specaria josinae* (Vejdovský, 1883)**

Specaria josinae can be difficult to distinguish from several species of the genus *Nai*s. It has been found in littoral and sublittoral zones of several Irish lakes.

***Stylaria lacustris* (Linnaeus, 1767)**

Stylaria lacustris is common and very widely distributed in freshwaters and in slightly brackish waters throughout Ireland.

***Uncinais uncinata* (Ørsted, 1842)**

Van Haaren and Soors (2013) describe *Uncinais uncinata* as a sub-rheophilic species. Most Irish records are from lakes in the south and midlands, where it is mainly associated with sandy

substrata. *U. uncinata* has also been found at the freshwater end of estuaries.

***Vejdovskyella comata* (Vejdovský, 1883)**

Vejdovskyella comata is a small, but very distinctive oligochaete, which has been found at a few still water sites in different parts of Ireland.

Subfamily TUBIFICINAE

The twenty species of the subfamily Tubificinae known to occur in Ireland were included in the former family Tubificidae. Immature specimens of several species with hair chaetae, particularly *Tubifex tubifex*, *Ilyodrilus templetoni*, *Potamothrix hammoniensis*, *P. bavaricus* and *P. heuscheri* can be very difficult to separate. The same is true of immature specimens without hair chaetae belonging to the genus *Limnodrilus*.

***Aulodrilus limnobius* Bretscher, 1899**

Aulodrilus limnobius is rare in Ireland, having only been found in the Moyola River, Co. Derry and Ballyshunnock Lake, Co. Waterford.

***Aulodrilus pigueti* Kowalewshi, 1914**

The only record of *Aulodrilus pigueti* in Ireland is a single specimen, which was found in a grab sample from the deepest point of Lough Keenaghan, Co. Fermanagh in 2008 (Sweeney and Gallagher, 2013). This very distinctive species had not been recorded on either of two sampling events at the same location in 2004.

***Aulodrilus pluriseta* (Piguet, 1906)**

Aulodrilus pluriseta is widespread and common in sublittoral and profundal zones of mesotrophic Irish lakes.

***Baltidrilus costatus* (Claparède, 1863)**

Baltidrilus costatus (formerly *Heterochaeta costata*) is very common in brackish estuaries and mudflats around the Irish coast

***Ilyodrilus templetoni* (Southern, 1909)**

The type specimen of *Ilyodrilus templetoni* originated in a pond in the Phoenix Park, Co. Dublin. However, this species is undoubtedly very much under-recorded in Ireland, because of its small size and similarity to other species. After the early work of Southern, there was an interval of almost a century until *I. templetoni* was recorded by the author in thirteen widely distributed Irish lakes.

***Limnodrilus claparedianus* Ratzel, 1868**

Limnodrilus claparedianus is distributed throughout Ireland, but is uncommon. It has mainly been found in lakes.

***Limnodrilus hoffmeisteri* Clarapède, 1862**

Limnodrilus hoffmeisteri is one of the most frequently encountered macroinvertebrates in

Irish lakes and rivers that are subject to organic pollution. As much morphological variation occurs, it could be considered to be a species complex, as stated by Van Haaren and Soors (2013). Unusual specimens with an extra small tooth on anterior crotchets have been found in Lough Dan, Co. Wicklow.

***Limnodrilus profundicola* (Verrill, 1871)**

In summer 1982, 15 mature specimens, identified as *Limnodrilus profundicola*, were found among higher numbers of immature specimens of this genus in eight Ekman grab samples taken from the profundal zone of Lough Leane, Killarney, Co. Kerry. Despite annual monitoring of the same site from 1978 to 1997 and occasional sampling of the site before and since, this species was never recorded there on any other occasion (Bill Quirke, pers. comm.). It has never been recorded at any other Irish location. The identification of the Lough Leane specimens was based primarily on penial sheath length and shape and was confirmed by Tarmo Timm. However, Ton van Haaren (pers. comm.) suggests they could, in fact, be *L. hoffmeisteri* or any other yet to be described species within the *L. hoffmeisteri*-complex. This warrants further investigation.

***Limnodrilus udekemianus* Clarapède, 1862**

Limnodrilus udekemianus is an uncommon species, found in small polluted watercourses, where it can occasionally reach high abundances.

***Lophochaeta ignota* Štolc, 1886**

The older name of this species has been reinstated, replacing the more commonly known name, *Tubifex ignotus*. While it is quite widely distributed in rivers and the littoral zone of lakes throughout Ireland, it usually occurs in low abundance.

***Potamothrix bavaricus* (Öschmann, 1913)**

Potamothrix bavaricus is an uncommon species, which has been found at several still and slow-flowing sites throughout Ireland, but never in high abundance.

***Potamothrix hammoniensis* (Michaelsen, 1901)**

Potamothrix hammoniensis is found in the sublittoral and profundal of lakes throughout Ireland.

***Potamothrix heuscheri* (Bretscher, 1900)**

A Ponto-Caspian species, *Potamothrix heuscheri* was first recorded in Ireland from samples taken in 2007 at the deepest points of Drumlaheen Lough, Co. Leitrim, and Killinure Lough, Co. Westmeath, two lakes in the upper parts the River Shannon catchment (Sweeney *et al*., 2013). It is thought likely that, because *P. heuscheri* is particularly tolerant of anoxic conditions (Milbrink, 1999), it could have survived transportation in bilge water of second-hand boats imported from Britain or continental Europe and launched on the River Shannon.

***Potamothrix moldaviensis* (Vejdovský et Mrazek, 1902)**

Potamothrix moldaviensis is a Ponto-Caspian species that has spread through much of Europe, with overseas dispersal attributed to transportation in the ballast water of ships (Milbrink and Timm, 2001). An oligochaete specimen in NMINH, on which the first published record of *P. moldaviensis* was based (McGrath, 1975) was checked and was found to have been a misidentification of *P. hammoniensis*. A specimen, collected by the author in a tributary of the River Shannon in Co. Roscommon in 2002 and the identification confirmed by Tarmo Timm, was deposited in NMINH. *P. moldaviensis* has since been found at locations throughout the Shannon catchment, as well as the lower parts of the River Suir and the catchments of the Rivers Bann and Erne. A recent record of *P. moldaviensis* from the Grand Canal Barrow Branch at Athy, Co. Kildare, indicates that this species will probably soon spread to the River Barrow.

***Potamothrix vejdovskyi* (Hrabě, 1941)**

In 2002, *Potamothrix vejdovskyi*, a Ponto-Caspian species, was recorded in both the Cross River, Co. Roscommon and in the River Tolka, Co. Dublin (Sweeney *et al*., 2003). A single specimen was also found at the freshwater end of the Shannon estuary in 2003 (Sweeney, 2005). It has not been recorded since in Ireland.

***Psammoryctides barbatus* (Grube, 1891)**

Psammoryctides barbatus is found throughout Ireland in rivers and in the littoral zone of lakes, generally associated with sandy substrata. Its occurrence is not associated with organic pollution.

***Spirosperma ferox* (Eisen, 1879)**

Spirosperma ferox is widely distributed in Irish lakes and occasionally in rivers. It is usually found at low densities and is not associated with poor trophic status.

***Tubifex tubifex* (Müller, 1774)**

Although *Tubifex tubifex* is probably the best known aquatic oligochaete and is common and widespread, it is under-recorded due to difficulties in identification. Immature specimens are virtually impossible to distinguish from those of several other species and even mature specimens cause difficulties for the inexperienced worker. It is found in still and flowing freshwaters and can reach levels of high abundance at organically polluted sites.

***Tubificoides benedii* (d'Udekem, 1855)**

A widespread and common species of muddy saline intertidal habitats around all surveyed parts of the Irish coast, *Tubificoides benedii* reaches high densities in some estuaries.

***Tubificoides pseudogaster* (Dahl, 1960)**

Tubificoides pseudogaster is a common species of muddy saline intertidal habitats.

Subfamily RHYACODRILINAE

Species of the subfamily Rhyacodrilinae were included in the former family Tubificidae.

***Bothrioneurum vejdovskyanum* Štolc, 1888**

The only verified Irish record of *Bothrioneurum vejdovskyanum* is a single specimen collected in the littoral zone of Poulaphuca Reservoir, Co. Wicklow (Trodd and Kelly-Quinn, 2003).

***Branchiura sowerbyi* Beddard, 1892**

An Asian species, *Branchiura sowerbyi* has been known to occur in the giant lily pond glasshouse of the National Botanic Gardens, Glasnevin, Co. Dublin, since it was first discovered there in 1906 (Southern, 1909).

***Clitellio arenarius* (Müller, 1776)**

Clitellio arenarius is fairly widespread in intertidal mud around the Irish coast.

***Rhyacodrilus coccineus* (Vejdovský, 1875)**

Rhyacodrilus coccineus is widespread in rivers and streams with gravel and sand. It is quite intolerant of organic pollution.

***Rhyacodrilus falciformis* Bretscher, 1901**

In Ireland, *Rhyacodrilus falciformis* has only been found in two small streams in north Co. Dublin. A specimen, collected by Pat Colwell at Cloughran in 1980, is in NMINH. In 1998, a second specimen of *R. falciformis* was identified by the author from a sample taken at another stream in the same area.

Subfamily PHALLODRILINAE

Species of the subfamily Phallodrilinae were included in the former family Tubificidae.

***Atlantidrilus quadrisetis* (Erséus, 1982)**

The type specimen of *Atlantidrilus quadrisetis* was collected at a location within the Irish Continental Shelf, approximately 350 kilometers to the southwest of Mizen Head and at a depth of over 3,300 metres (Erséus, 1982).

***Inermidrilus georgei* (Erséus, 1987)**

Healy (1996) recorded *Inermidrilus georgei* from a rock pool at Carnsore Point, Co. Wexford. This is the only known Irish record of this species.

***Phallodrilus parthenopaeus* Pierantoni, 1902**

The only Irish record of *Phallodrilus parthenopaeus* is that of a single specimen from Sherkin Island, Co. Cork (Erséus, 1987).

***Thalassodrilus prostatus* (Knöllner, 1935)**

McGrath (1975) recorded *Thalassodrilus prostatus* on the shore at the Pigeonhouse, Co. Dublin, and deposited the specimen in NMINH. The only other known record of this species

was collected by the author in Cork Harbour in 2013. However, as this species is difficult to separate from the more common *Clitellio arenarius* when immature and because oligochaetes from the Irish shoreline are seldom fully identified, it is thought likely that *T. prostatus* is probably more common than these records might suggest.

Family PRISTININAE

Two species of the genus *Pristina* are known from Ireland. A problem exists with unconfirmed records of a third species in this family because, if immature specimens of the former Family Tubificidae with hair chaetae present are mistakenly keyed out using the Naididae section of the commonly used identification key by Brinkhurst (1971), the species arrived at is *P. idrensis* (Sperber, 1948), which is a synonym of *P. rosea* (Piguet, 1906).

***Pristina foreli* (Piguet, 1906)**

The only confirmed Irish record of *Pristina foreli* is a single specimen collected in 2010, downstream of a wastewater treatment plant outfall in a small watercourse in Co. Wexford (Sweeney and Sweeney, 2016). Loden and Harman (1980) suggest that *P. foreli* is an ecomorph of *P. aequiseta* Bourne, 1891, and that the distinctive giant ventral chaetae which distinguish the latter are induced by environmental conditions. There are no Irish records of *P. aequiseta*, which is widely distributed in Britain and continental Europe (Timm and Veldhuijzen van Zanten, 2002).

***Pristina longiseta* Ehrenberg, 1828**

Pristina longiseta is a very distinctive worm, which is quite common in the Killarney Lakes, Co. Kerry, but which has not been recorded with certainty elsewhere in Ireland.

Family LUMBRICULIDAE

***Lumbriculus variegatus* (Müller, 1774)**

Southern (1909) states that *Lumbriculus variegatus* is the most common aquatic oligochaete in the British Isles. It is widespread throughout Ireland in rivers and in the shallower parts of lakes and is tolerant of moderate organic pollution and enrichment. However, it does not occur in the very high densities at which some of the tubificid species can be found.

***Rhynchelmis limnosella* Hoffmeister, 1843**

In Ireland, *Rhynchelmis limnosella* is only known from the Annacloy River, Co. Down, where it was recorded by Wright *et al*. (2000).

***Stylodrilus heringianus* Clarapède, 1862**

Stylodrilus heringianus is widespread and common in shallow rivers and streams throughout Ireland. It is not very tolerant of organic pollution.

***Stylodrilus lemani* (Grube, 1879)**

Stylodrilus lemani occurs at several locations, but is an uncommon species of Irish rivers.

Family LUMBRICIDAE

***Eiseniella tetraedra* (Savigny, 1826)**

While several species of the family Lumbricidae can live for a few days in freshwater habitats, the only one that can be regarded as truly aquatic is *Eiseniella tetraedra*, which is common in streams and rivers, but never occurs in high abundance.

Family ENCHYTRAEIDAE

Enchytraeids are widely regarded as the most difficult oligochaetes to identify. The vast majority of records of aquatic Irish enchytraeids come from the work of the late Brenda Healy. As the author is not very familiar with this family, species distribution is not commented on here. They are mainly terrestrial oligochaetes, but many species have marked aquatic tendencies and can be found in samples taken from a variety of aquatic habitats. Healy and Bolger (1984) list the following species as showing a preference for wet soils.

***Mesenchytraeus armatus* (Levinsen, 1884)**
***Mesenchytraeus sanguineus* Nielsen and Christensen, 1959**
***Cernosvitoviella atrata* (Bretscher, 1903)**
***Cernosvitoviella goodhui* Healy, 1975**
***Cernosvitoviella sphaerotheca* Healy, 1975**
***Cernosvitoviella palustris* Healy, 1979**
***Achaeta aberrans* Nielsen and Christensen, 1961**
***Cognettia sphagnetorum* (Vejdovský, 1877)**
***Cognettia glandulosa* (Michaelsen, 1888)**
***Cognettia hibernica* Healy, 1975**
***Henlea perpusilla* Friend, 1911; augm. Cernosvitov 1937**
***Fridericia perrieri* (Vejdovksky, 1877)**
***Fridericia polychaeta* Bretscher, 1900**
***Marionina argentea* (Michaelsen, 1889)**
***Marionina riparia* Bretscher, 1899**
***Marionina filiformis* Nielsen and Christensen, 1959**

Three other aquatic species were found in a quaking marsh in Co. Louth (Healy, 1987): *Enchytraeus christenseni* Dózsa-Farkas, 1992 (recorded under the synonym *E. minutus*), *Henlea ventriculosa* (d'Udekem, 1854) and *Buchholzia fallax* Michaelsen, 1887

Marine species

Marine enchytraeids are mainly associated with habitats in the upper intertidal, and only the genus *Grania* is widespread in offshore benthos (Erséus and Healy, 2001). The type specimen of *Grania maricola* Southern, 1913 was collected at Clare Island, Co. Mayo (Southern, 1913). The following species were recorded from Irish marine and brackish habitats by Healy (1979b, 1996).

***Grania pusilla* Erséus, 1974**
***Cernosvitoviella immota* (Knöllner, 1935)**
***Enchytraeus albidus* Henle, 1837**
***Enchytraeus capitiatus* von Bülow, 1957**
***Fridericia callosa* (Eisen, 1878)**
***Lumbricillus rivalis* Levinsen, 1883; augm. Ditlevsen, 1904**
***Lumbricillus kaloensis* Nielsen and Christensen, 1959**
***Lumbricillus semifuscus* (Claparède, 1861); augm. Stephenson, 1911**
***Lumbricillus viridis* Stephenson, 1911; augm. 1922**
***Lumbricillus pagenstecheri* Ratzel, 1869**
***Lumbricillus bulowi* Nielsen and Christensen, 1959**
***Marionina achaeta* Lasserre, 1964**
***Marionina macgrathi* Healy, 1996**
***Marionina ulstrupae* Healy, 1996**
***Marionina preclitellochaeta* Nielsen and Christensen, 1963**
***Marionina subterranea* (Knöllner, 1935)**
***Marionina southerni* Cernosvitov, 1937**
***Marionina sjaelandica* Nielsen and Christensen, 1961**
***Marionina spicula* Leuckart, 1847**
***Marionina appendiculata* Nielsen and Christensen, 1959**

Family PHREODRILIDAE

The global distribution of the family Phreodrilidae indicates a Gondwanan origin, with most species occurring in the Southern Hemisphere (Martin and Ohtaka, 2008). The first record of this family in Europe was a single specimen collected in a small tributary of the River Lagan in Co. Down in 2000 (Gunn *et al*., 2003). However, because the specimen was cleared in polyvinyl lactophenol, the internal structures necessary for species level identification were dissolved. Pinder *et al*. (2013) consider the identifiable features of the River Lagan specimen to be very similar to those of *Insulodrilus* cf. *lacustris* (Benham, 1903), which was found in the Thames Estuary, London, England, in 2012. In 2006, over 100 specimens of a hitherto unknown species

of the genus *Insulodrilus* were found at three bogland sites in Co. Mayo (Schmelz *et al*., 2015), raising the question as to whether this species is part of the natural fauna of Ireland or a recent introduction.

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