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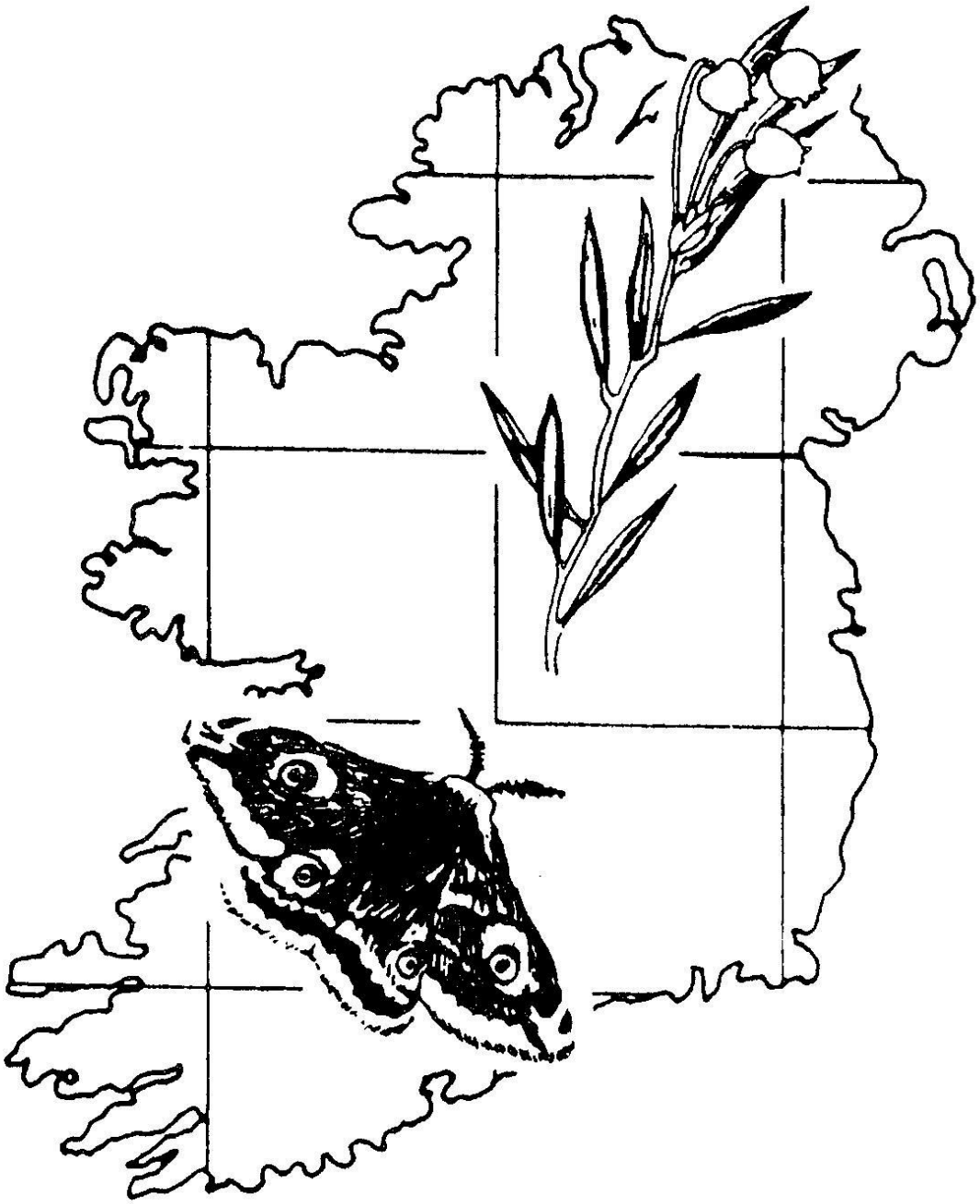

Bulletin No. 46

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DEDICATION

This Bulletin is dedicated to the memory of the following members who recently died:- Patrick (Paddy) Ashe (19 June 2022), Ruth Blackith (née Barraclough) (9 April 2022), Martin Cawley (26 November 2022) and Don C. F. Cotton (13 January 2022).

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BULLETIN OF THE IRISH BIOGEOGRAPHICAL SOCIETY
Number 46

CONTENTS

(*Contents continued overleaf*)

CONTENTS (continued)

Bulletin of the Irish Biogeographical Society **Number 46** (2023)

Editorial

The Chairman of the Irish Biogeographical Society, Dr Patrick Ashe died on 19 June 2022 after several months in hospital. He served as Chairman from 1987 until his death and also acted as the Honorary Secretary from 1999-2022. He enjoyed the Society meetings held in Kennedy's snug, Dublin, taking the minutes and thriving on the convivial conversations afterwards. He also faithfully posted out the *Bulletins* to members each year. An *in memoriam* article appears in this *Bulletin*. Three other members of the Society also died recently *viz.* Ruth Blackith (née Barraclough) (9 April, 2022), Martin Cawley (26 November 2022) and Don C. F. Cotton (13 January 2022). *Bulletin* **46** is dedicated to the memory of all four deceased members.

This year on the 28th February, the Society published *Bibliography of Irish insects (1802-2020)* by James P. O'Connor (*Occasional Electronic Publication* **Number 2**) on-line. Consisting of 566 pages, the volume lists books and papers published on Irish insects from 1802-2020. References are grouped into 20 chapters. It may be down-loaded as a searchable PDF from the Irish Biogeographical website <http://www.irishbiogeographicalsociety.com/>

Bulletin **46** contains a fascinating mixture of papers covering the Laurelwood *Calophyllum* sp. (Malpighiales: Calophyllaceae) drift endocarps from Irish maritime shores and a review of NW european and Western Atlantic records; Irish *Euplectus* (Coleoptera: Staphylinidae: Pselaphinae) from the Killarney area in the E. F. Bullock Collection; Adult stonefly (Plecoptera) records from Ireland in 2022; Possible first evidence that slow worms (*Anguis fragilis* Linnaeus, 1758) feed on ant colonies; The ground layer of alluvial forest as a habitat for Staphylinidae and Carabidae (Coleoptera) at the Gearagh (County Cork), Ireland; Recent records of Irish caddisflies (Trichoptera); Recent records of Chironomidae (Insecta: Diptera) in Ireland from Counties Dublin, Kildare and Meath and a brief numerical update of the Irish checklist; First record of *Chironomus* (*Chaetolabis*) *macani* Freeman, 1948 (Diptera: Chironomidae) in Ireland from Killarney, County Kerry and The Green-jawed Tube Spider *Segestria florentina* (Rossi) (Araneae: Segestriidae) established in Ireland. *S. florentina* is a large spider with adult female specimens sometimes attaining 22mm in length. There are a small number of records of it biting humans abroad and its venom is discussed.

Thanks are due to all the authors for their interesting contributions and the referees who reviewed them.

The support of our sponsors and members is greatly appreciated.

J. P. O'Connor
Editor
11 May 2023

REVISED INSTRUCTIONS TO AUTHORS

1. Submitted manuscripts should follow the format of articles in Bulletin **Number 46** and other recent issues. The titles of journals should be given in full in the references. The references should be arranged alphabetically with, where relevant, Anon. appearing first.

2. Manuscripts may be submitted by e-mail to the Editor at <joconnor@museum.ie> or *via* our Treasurer Mr John Walsh at <ampersandwalsh@gmail.com>. Figures and photographs should be sent as jpegs. Complex tables should also be sent as jpegs and not in Excel. Remember that all figures and tables should be submitted in a type size which will remain legible after reduction to A5.

3. Word is preferred and Times New Roman 13pt should be used.

4. Records: please ensure that, when possible, the following information is incorporated in each record included in a manuscript:-
(a) latin name of organism.
(b) statement of the reference work used as the source of nomenclature employed in the text. The describer's name should be also given when a zoological species is first mentioned in the text.
(c) locality details including at least a four figure Irish grid reference (e.g. N3946), county or vice-county and some ecological data about the collection site, plus date of capture.
(d) collector's name and determiner's name (where different from the collector's name), and
(e) altitude data should be included where relevant.

Bulletin of the Irish Biogeographical Society **Number 46** (2023)

IN MEMORIAM
DR PATRICK ASHE (1954–2022)

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Dr Patrick Ashe died on 19 June 2022 after several months in hospital. Also known as Paddy, or Pádraig, he was one of the most productive members of the small entomological community in Ireland and his passing is a great loss. Born in Dublin on 18 March 1954 and educated at Templeogue College, at the age of 19 in September 1973 Paddy enrolled in the Faculty of Science, University College Dublin. At that time Carmel F. Humphries (who had undertaken research during 1936-39 at Plön in Germany with August Thienemann, a doyen of Chironomidae systematics), was Professor and head of the Department of Zoology and the senior author (whose Ph.D. research had been directed by Humphries) was a member of the academic staff. During the second year of his studies Paddy exhibited a particular interest in zoology, and frequently sought information additional to course content. He exhibited a particular interest in freshwater ecology and in the senior author's ongoing research on insect taxonomy - it was then that he first heard the term *Chironomidae*.

An attentive and diligent student, Paddy achieved high standards in his examinations and easily qualified to enrol in the honours zoology degree course. On entering year 3 of the 4-year B.Sc. Honours course in September 1975 he opted to join the team investigating the freshwater insect fauna in southwest Ireland, where the Limnology Research Unit of the Zoology Department was coordinating a major multi-disciplinary project on the rivers and lakes in the Killarney National Park. Paddy indicated he would particularly like to be involved with the studies led by the senior author on the chironomid fauna of the River Flesk. He was aware that several unusual species had been discovered there, including the second record in Europe of *Buchonomyia thienemanni*, as well as exuviae of several undescribed pupal morphotypes, including *Eurycnemus crassipes* and other Orthocladiinae of taxonomic interest. He joined this

small research group. This introduction to ecological studies on chironomids in 1976 was the beginning of his lifelong taxonomic interest in non-biting midges.

He prepared his undergraduate thesis based on collections made in 1976 at the site on the River Flesk where *B. thienemanni* had been found. He graduated in September 1977 and, after graduation, commenced Ph.D. studies with the senior author as mentor, on the ecology and taxonomy of the Chironomidae of the River Flesk. His study was largely based on specimens he collected by drift net during 1978 and 1979, at several locations on the river from its source in the Kerry Mountains to its point of entry to Lough Leane, at Killarney.

It was during this period of Paddy's research that the 7th International Symposium on Chironomidae was coordinated by the senior author on the campus of University College Dublin in August 1979 when Paddy helped with organising and running of the event. The gathering of international experts in Dublin had a significant impact on the direction of Paddy's research as it provided valuable opportunities for him to mingle and discuss his work with the visiting leading eminent researchers of that time that included Lars Brundin, Bernhard Lindeberg, Sepp Fittkau, Freidrich Reiss, Selwyn Roback, Ole Sæther and many others. From these interactions Paddy developed a broader outlook on chironomid research and he became increasingly absorbed with taxonomic and nomenclatural issues in the Chironomidae. He went on to acquire a comprehensive understanding and interpretation of the International Code of Zoological Nomenclature. With this knowledge the scope of his doctorate research was expanded into two parts; Part I to give an account of his studies in the River Flesk with Part II being a literature-based study on taxonomic and nomenclature issues in the Family Chironomidae by compiling an up to date Catalogue of chironomid genera and subgenera of the world. He submitted his doctoral thesis in November 1982. The external examiner of Paddy's thesis commented "*Part I is a very valuable faunistic work and Part II is of very high importance for Chironomidae research in general…..for a long time we have needed such a catalogue of Chironomid genera – everybody in the world dealing with aquatic insects will be thankful of this basic contribution to make systematics in Chironomidae more comprehensible"*. Paddy was conferred with the degree of Ph.D. in Spring 1983. The catalogue, Part II of his thesis, was published as Supplement **No. 17** of *Entomologica scandinavica.*

After graduation Paddy held a three-year post-doctoral position in Trinity College Dublin and during this time he became a frequent visitor to the nearby Natural History Museum on Merrion Street, working on the collections and using its extensive library. During his post-doctoral studies in 1984 his ankle was badly damaged in a road traffic accident while traveling home following fieldwork at a bog site in Donegal on a project sponsored by An Taisce. He spent several weeks in hospital and he suffered from this injury for the rest of his life.

As he was recovering from the accident he received an invitation to join the Royal Entomological Society of London sponsored expedition "*Project Wallace*" in Sulawesi, Indonesia. He accepted the invitation and soon after participating at the 9th International Symposium on Chironomidae in Bergen in 1985, he travelled to Indonesia and spent almost six months researching the diversity of the chironomid fauna in the Sulawesi rainforests. On his return to Ireland he spent a temporary research period in the Zoology Department of University College Galway studying Chironomidae on Lough Corrib where he discovered a population of the Arctic relic species *Corynocera ambigua*. At this time he established himself as a freelance entomologist and commenced consultancy work for State Institutes and commercial businesses in Ireland. The Irish Forestry Service regularly called on his expertise. He also spent a period, employed by the National Museum, rearranging part of the foreign insect collections. He continued to be a regular visitor at the Natural History Museum until the Covid 19 epidemic in 2020 when the Museum had to close.

Throughout his working career as a freelance consultant entomologist Paddy was never distracted from his main interest in chironomid studies. He maintained lasting contact with similarly minded colleagues throughout the world and becoming a world authority, in cooperation published regularly - with numerous contributions on taxonomy, phylogeny, zoogeography and systematics and describing species and genera new to Science. He also acted as extern examiner for Ph.D. theses of candidates at the University of Bergen, Norway.

Having participated at the 7th International Chironomid Symposium in Dublin and since he loved traveling abroad, he was an enthusiastic and active participant, both as a scientist and socially, at subsequent Symposia in Talahassee, U.S.A. 1982; Bergen, Norway, 1985; Debrecen, Hungary, 1988; Amsterdam, Netherlands, 1991; Canberra, Australia, 1994; Freiburg, Germany, 1997; Madeira, 2006; Nankai, China, 2009; Trondheim, Norway, 2011, Ĉescké Budějovice, Czechoslovakia, 2014 and Trento, Italy 2017. He chaired scientific sessions at many of these events. Having accompanied the senior author on a few occasions to the Zoologische Staatssammlung, Munich, he became a regular visitor, maintaining contact with his friend Martin Spies and carrying out research. Paddy had another trip planned to go to Munich in September 2022 before his untimely death.

Paddy's entomological research went well beyond the chironomids. He was interested in related Diptera (Nematocera) including the craneflies (Tipulidae) and mosquitoes (Culicidae) and authored or co-authored numerous works, including Irish checklists, of these fascinating insects. He also worked on the higher Diptera, Coleoptera and Hymenoptera. He was a great collector and visited many countries abroad to obtain material. Following his participation in Project Wallace" in Sulawesi in 1985 he visited Malaysia and while in Indonesia and Malaysia he collected specimens from variety of insect taxa, other than the Chironomidae, which resulted

in descriptions of new species of Trichoptera and Hymenoptera. He was a frequent visitor to France where he undertook field-work with his friend Joel Moubayed-Breil over the Eastern Pyrenees, Auvergne Region, Maritime Alps and the French and Italian Alps.

Paddy's work as a freelance consultant entomologist suited him as it gave him time to look after his elderly parents in their later years. He became interested in pest insects and was frequently employed by pest control firms. With this expertise he was co-author (with J. P O'Connor) of the very successful book *Irish Indoor Insects – A popular guide* that was mostly written in the snug in Toners of Baggot Street and is commemorated there. He also worked on site surveys for Irish Forestry with his late friend Stuart Wistow, frequently taking the opportunity to collect plant galls.

He was a superb artist, spending hours drawing intricate insect genitalia and wings with wonderful accuracy. His drawings greatly enriched scientific papers not only in the Chironomidae but also other Diptera and Hymenoptera groups. Sometimes, these illustrations were used on his iconic Christmas cards which he spent hours designing.

He visited the Museum every Friday afternoon for over thirty years and later more often after the death of his mother. Several years prior to his own death, he had donated his large collection of chironomids, meticulously mounted on slides, to the Museum and subsequently he continued to add more slides. He enjoyed meeting various entomologists who visited the Museum and became a close friend of many of them. A tradition developed that on a Friday evening, there was a small gathering in Kennedys of Westland Row for drinks after the Museum closed to share opinions on ongoing "projects" and discuss (or argue about) taxonomic issues. The manager Pat Brogan had built a snug for meetings of the Irish Biogeographical Society there and this was used also for these Friday gatherings. Paddy thrived in this environment as it was the ideal forum to test out his ideas and puns on friends. Loving company, he was in his element there. At the annual Christmas gathering, he would bring in a lovely baked cake to share with his friends and the bar staff for he was an excellent cook. It was in this snug, that he came up with many innovative ideas including that of *A world catalogue of Chironomidae (Diptera)*. Being a perfectionist, he could be stubborn and delay completing a final draft of a publication until he was fully satisfied. This characteristic resulted in remarkable contributions such the work on chironomids associated with Trichoptera but the downside was that, when he died, a number of manuscripts remained unfinished. While two volumes of *A world catalogue of Chironomidae* have been published, sadly, the other two volumes are incomplete and in manuscript form. The authors plan to complete the fossil volume as per Paddy's dying wish.

Paddy valued his involvement with the Irish Biogeographical Society and contributed many papers to its *Bulletin*. He served as Chairman from 1987 until his death and also acted as the Honorary Secretary from 1999-2022. He enjoyed the Society meetings held in Kennedy's snug,

taking the minutes and thriving on the convivial conversations afterwards. He also faithfully posted out the *Bulletins* to members each year.

Apart from his incomplete entomological manuscripts he had unfinished work on a book dealing with his illustrious ancestor Dr Barry O'Meara who had been Napoleon Bonaparte's physician during his exile on St Helena. Paddy did remarkable research on O'Meara and had visited his former home in London. There he charmed the current owner of the private house into giving him a tour of the interior. Another passion was his buying and selling of paintings. He frequently attended auctions and was able to value works of art with the aid of his extensive library.

Paddy was enjoyable company, full of ideas including his invention of a Malaise trap for use in the forest canopy while in Sulawesi. Prior to his illness, in order to fill in gaps in the biogeography of the Chironomidae, he had planned to collect in Madagascar and islands in the Pacific, including Hawaii. He was held in high regard by the entomological community and merited the international reputation he achieved through cooperation with his colleagues in Ireland and abroad in Australia, France, Germany, Norway and the U.S.A.

Paddy has authored or co-authored more than 180 publications. A bibliography of his entomological publications is given below. We are indebted to him for these significant contributions, sadly abruptly cut off. Some photographs that capture memories of happy times with Paddy are given in Plates 1-7.

Paddy Ashe has been a good friend and colleague; he has left a notable legacy, as a person, a researcher and in what he achieved. He is greatly missed by the authors and a large circle of friends in Ireland and abroad.

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PLATE 1. During the 7th International Symposium on Chironomidae, University College Dublin, August 1979: Lars Brundin, Declan Murray, Paddy Ashe. Photograph: Matt Foster.

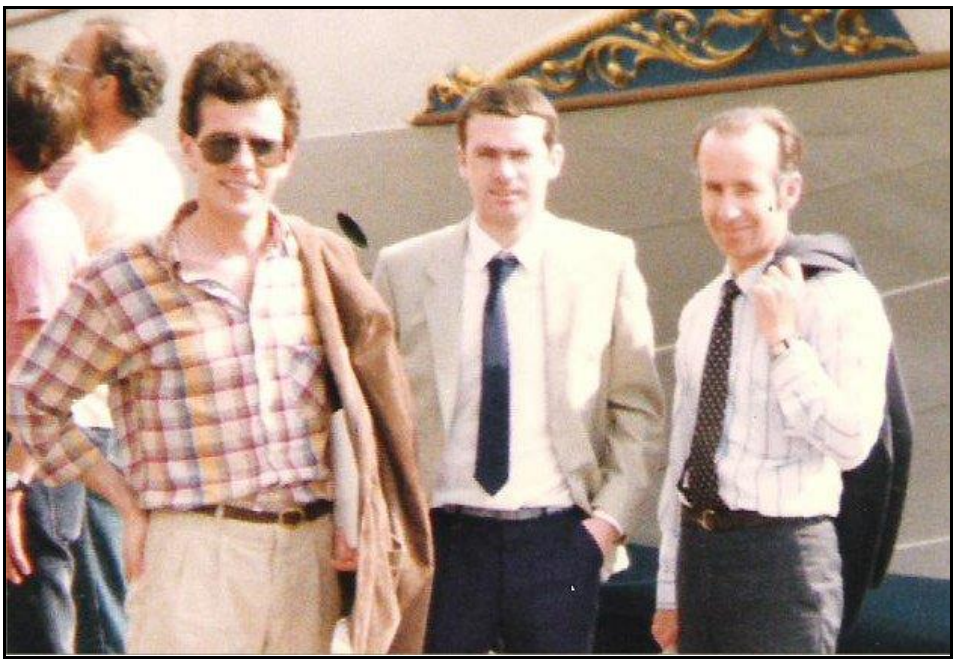

PLATE 2. During the 9th International Symposium on Chironomidae, Bergen, Norway, July 1987: Brian Hayes, Paddy Ashe, Declan Murray. Photograph: C. C. Omoku.

PLATE 3. At Bodensee, during the excursion following the 13th International Symposium on Chironomidae, Freiburg, Germany: Frieder Reiss, Samantha Hughes, Declan Murray, Paddy Ashe and Peter Langton. Photograph: Freddie Murray.

PLATE 4. At the banquet during the 16th International Symposium on Chironomidae, Funchal, Madeira, Portugal, 2006: Uni and Ole Sæther, Freddie Murray, Peter Cranston, Jim O'Connor, Paddy Ashe (looking backwards). Photograph: Declan Murray.

PLATE 5. Committee meeting of the Irish Biogeographical Society during the 16th International Symposium on Chironomidae, Funchal, Madeira, Portugal, 2006: Jim O'Connor, Freddie Murray, Paddy Ashe. Photograph: Declan Murray.

PLATE 6. Social gathering of committee members following a Committee meeting of the Irish Biogeographical Society in the snug of Kennedy's of Westland Row, Dublin, October 2015: Freddie Murray, Declan Murray, Jim O'Connor, Paddy Ashe, John Walsh (sitting), Tom Bolger, Mark Holmes. Photograph: anon - staff member at Kennedy's.

PLATE 7. Paddy Ashe, cheers! in the snug at Kennedy's of Westland Row, Dublin, after a Committee meeting of the Irish Biogeographical Society, December 2016. (IBS publications visible in the display case). Photograph: Declan Murray.

FIRST RECORDS OF LAURELWOOD *CALOPHYLLUM* SP. (MALPIGHIALES: CALOPHYLLACEAE) DRIFT ENDOCARPS FROM IRISH MARITIME SHORES AND A REVIEW OF NW EUROPEAN AND WESTERN ATLANTIC RECORDS

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Abstract

The first three confirmed records of Laurelwood *Calophyllum* drift endocarps stranded on Irish maritime shores are reported. A previous specimen dating from the early 1900s, collected on the Isle of Barra, NW Scotland represents the first known record from NW Europe. *Calophyllum* drift endocarps are considered to be true peregrine disseminules originating from the Caribbean and/or tropical Western Atlantic.

Key words: Laurelwood, *Calophyllum*, drift endocarp, standings on Irish and NW European maritime shores.

Introduction

The Family Calophyllaceae includes about 12 genera and approximately 437 species occurring in tropical regions of either the Old or New World. *Calophyllum* is the largest genus, represented by about 190 species mostly found in the Old World ranging from eastern Africa to the Pacific. Only about 10 species and/or varieties of *Calophyllum* are currently known to occur in the New World, generally ranging from Mexico and the Caribbean Islands southwards to Argentina in South America (Stevens, 1980a; Vela Diaz, 2013).

At least five species and three varieties of *Calophyllum* are known to occur in hydrometric catchments draining into the Caribbean and/or tropical Western Atlantic: *C. brasiliense* Cambess., including three varieties (*C. brasiliense* var. *brasiliense*, *C. brasiliense* var. *antillanum* (Britton) Standl., and *C. brasiliense* var. *rekoi* (Standl.), *C. inophyllum* L., *C. longifolium* Willd., *C. mesoamericanum* Vela Diaz, and *C. pachyphyllum* Planch. & Triana (Funk *et al*., 2007; Vela Diaz, 2013; Anon., 2022).

Calophyllum angulare A.C.Sm., which is primarily confined to seasonally dry tropical biomes in the Mato Grosso region of central Brazil, and *C. pubescens* Vela Diaz, which is confined to wet tropical biomes on the Pacific coast of Ecuador, are unlikely to contribute diaspores to the Caribbean and/or tropical Western Atlantic (Vela Diaz, 2013; Anon., 2022).

Calophyllum brasiliense, *C. brasiliense* var. *brasiliense*, *and C. longifolium* are widely distributed in wet tropical biomes throughout Central and South America. *C. brasiliense* var. *antillanum*, which grows in wet tropical biomes in Costa Rica, Dominican Republic, Haiti, Jamaica and Windward Islands, has been introduced to Bermuda, southern Florida and Trindad-Tobago. *C. brasiliense* var. *rekoi* is widely distributed in seasonally dry tropical biomes throughout Central America as far north as southern Mexico. *C. mesoamericanum* is confined to wet tropical biomes in Costa Rica. *C. pachyphyllum* is widely distributed in wet tropical biomes throughout the Amazon Basin (Van Roosmalen, 1985; Vela Diaz, 2013; Anon., 2022).

Calophyllum inophyllum L, an Old World species, has been introduced into several regions well outside its native range (Eastern Africa to Eastern Pacific), including Bermuda and southern Florida, Central America (Nicaragua and Costa Rica), Caribbean (Cuba, Puerto Rico, Leeward Islands and Trinidad-Tobago), West Africa (The Gambia, Guinea, Ivory Coast, Ghana, Nigeria, Cameroon, Gabon and Congo), and Central Pacific (Line Islands, Phoenix Islands, Society Islands, Marquesas Islands, Tuamotu Island, Tubuai Island, Pitcairn Island and Hawaii) (Hemsley, 1885; Britton, 1918; Hutchinson and Dalziel, 1954; Stevens, 1980; Gunn *et al.*, 1999; Perry and Dennis, 2010; Vela Diaz, 2013; Anon., 2022).

Calophyllum africanum Cheek & Q.Luke, which is the only species of *Calophylum* known to be endemic to NW Africa, is restricted to seasonally dry tropical biomes in Mali (Anon., 2022), and is unlikely to contribute diaspores to the Eastern Atlantic.

Although *Calophyllum calaba* L. has frequently been cited as a species occurring in the New World (Furtado, 1941; Weaver, 1990; Gunn *et al.*, 1999; Perry and Dennis, 2010), it is now recognised as a synonym of *C. brasiliense* within this region (Anon., 2022), and that the typified species of *C. calaba* L. is restricted to the Old World, ranging from Sri Lanka to Malesia (Stevens, 1980a, b; Anon., 2022).

Some species of *Calophyllum* are economically important, particularly in terms of timber, ethno-medicinal, and potential biodiesel production (Wah, 1996; Chakrabarty and Balarkishnan, 2003; Rai, 2004; Warrier, 2010; Gupta and Gupta, 2020).

Morphology of *Calophylum* trees, fruits and seeds

Calophyllum are evergreen shrubs (rarely) and trees which can reach up to 49m in height and are easily recognised by their opposite entire leaves with close parallel venation alternating with resin canals. However, the distinction between species has often been difficult, represented by a long history of taxonomic confusion (Stevens, 1980a, b; Vela Diaz, 2013; Cabral *et al*., 2021).

Calophyllum fruits are drupe-like. The pericarp consists of a thin exocarp and a well-developed fleshy to fibrous mesocarp containing large air spaces. The endocarp consists of an outer stony layer, with or without a distinct basal plug (hilum). The inside of the endocarp is lined with a

spongy layer of aerenchymatous tissue. Endocarps may be rounded, sub-spherical, ovoid or slightly elliptic, with either an obtuse or apiculate apex. Due to their large range of morphological diversity, Stevens (1980a) noted that it is often difficult to discern clear specific differences between endocarps of separate species.

Stevens (1980a) and Vela Diaz (2013) provided taxonomic keys for most of New World and Old World *Calophyllum* species respectively. Endocarp descriptions of *Calophyllum* species reported from hydrometric catchments draining into the Caribbean and/or tropical Western Atlantic are summarized in Table 1.

Irish and NW European records of stranded *Calophyllum* drift endocarps

During the early 1900s, William L. MacGillivray discovered a *Calophyllum* (as *C. calaba* sic) drift endocarp measuring 21mm in diameter and 24mm in height, stranded on the Isle of Barra (56.9809^{o}N, 7.4568^{o}W), Outer Hebridies, NW Scotland (Nelson, 1988, 2000; Perry and Dennis, 2010). The remarkably well preserved ovoid shaped specimen, which is housed in the collections of the King's Museum, University of Aberdeen (Catalogue No. 26), represents the first known *Calophyllum* record from NW Europe (Plate 1).

On 13 March 1993, the late DC (RIP 13 January 2022) discovered a *Calophyllum* drift endocarp measuring 28mm in diameter and 31mm in height stranded on Trawalua Strand South (54.4403^{o}N, 8.4708^{o}W), County Sligo, NW Ireland. The well-preserved sub-spherical specimen exhibited a distinct basal plug and a rounded obtuse apex (Plate 2).

On 1 December 2015, AP discovered a second *Calophyllum* drift endocarp measuring 28mm in diameter and 31mm in height stranded on Kinard Beach (52.1209^{o}N, 10.2063^{o}W), Trabeg, near Sea Stack at mouth of Lispole River, Dingle, County Kerry, SW Ireland. The well preserved sub-spherical brown endocarp exhibited a distinct cream-coloured basal plug and a rounded obtuse apex (Plate 3). When rattled, it was noted that the endocarp contained a seed, and that the brown colour of the endocarp faded to an overall cream colour shortly after drying (Plate 4).

On 28 February 2019, LMN discovered a third *Calophyllum* drift endocarp measuring 28mm in diameter and 27mm in height stranded on Fanore Beach (53.1178^{o}N, 9.2889^{o}W), County Clare, on the west coast of Ireland. The heavily eroded sub-spherical specimen exhibited an obtuse apex, a distinct basal plug, and partly exposed internal spongy layer (Plates 5-6).

The current specimens represent the first three confirmed records of *Calophyllum* drift endocarps from Irish maritime shores. Details of the four NW European specimens are summarized in Table 2.

Flotation and sea-water drift dispersal potential of *Calophyllum* diaspores

The large air spaces within the mesocarp and the spongy layer of aerenchymatous tissue within

the endocarp undoubtedly facilitates the floatation properties and potential long distance sea-water dispersal of at least some *Calophyllum* diaspores (Ridley, 1930). Smith (1999) noted that although the exocarp of *Calophyllum* diaspores wrinkle on drying and are quickly lost after immersion in sea-water, leaving at best just a few basal fibres adhering to the smooth endocarp, the inner spongy layer of even damaged specimens continues to provide natural buoyancy. Flotation experiments in the U.S.A. have shown that intact *C. calaba* (sic) mesocarps can remain afloat for a maximum of two years (Gunn *et al*., 1999; Nelson, 1988, 2000; Thiel and Gutow, 2005; Perry and Dennis, 2010).

Stranded *Calophyllum* mesocarps have been recorded from a wide area in the Western Atlantic, including the Caribbean (Jamaica) (Hemsley, 1885), Gulf of Mexico (Gunn and Dennis, 1973; Gunn *et al.*, 1984; Sullivan, 2003; Norton, 2007), Bahamas (Foreman, 2007), Florida (Gunn, 1968; Perry and Dennis, 2010; Witherington and Witherington, 2017), as far north as North Carolina (Gunn and Denis, 1972; Perry and Dennis, 2010; Witherington and Witherington, 2011). Although Gunn *et al.* (1999) suggested that the mesocarps could have been either *C. inophyllum*, *C. brasiliense*, *C. calaba* (sic), and/or some other species, they acknowledged that they were unable to positively distinguish the mesocarps to species level. Perry and Dennis (2010) suggested that the stranded mesocarps found in the Gulf of Mexico as far as western Louisiana were probably *C. calaba* (sic), whereas those commonly found on the east coast of Florida and in the Florida Keys were probably derived from the introduced *C. inophyllum*, and most likely of local origin. Gunn *et al.* (1999) noted that about 50% of the *C. calaba* (sic) mesocarps contained viable seeds.

Stranded endocarps of *C. inophyllum* have been reported throughout the Old World, including the Indian and Pacific Oceans: South Africa (Muir, 1937; Hosten-Willems, 2005), Seychelles (Robertson, 1998), Christmas Island (Green, 1999; Barnes, 2004), Cocos (Keeling) Islands (Guppy, 1890; Claussen and Slip, 2002), Japan (Longhorn, 2004; Hanaoka *et al*., 2014; Kubota, 2015, 2017; Hayashi, 2020), Australia (Hacker, 1990; Smith 1990, 1991, 1994, 1999; Smith *et al.*, 1990), Papua New Guinea (Hemsley, 1885; Fortune Hopkinds, 1997), Kosrae Island, Micronesia (Sullivan and Flynn, 2009), Fiji (Smith, 1990; Ash, 1992), Solomon Islands (Hemsley, 1885; Guppy, 1906), Marshall Islands (Gunn, 1977), Midway Atoll (Wagner, 2002; Smith, 2006), Bikini Atoll (Vander Velde and Vander Velde, 2006), and Hawaii (Ebbesmeyer, 2003; Sullivan *et al*., 2006). *C. inophyllum* is essentially a coastal species producing diaspores well-adapted to sea-water dispersal for longer than 90 days without experiencing a significant decrease in germination rate (Hanoka *et al.* 2014). Indeed, *C. inophyllum* was one of the first species of plants to naturally recolonize Krakatau Island (Indonesia) following the cataclysmic volcanic eruption in 1883 (Sauer, 1988; Thornton, 1996).

Although stranded *C. inophyllum* endocarps have also been reported from The Gambia, West Africa (Verschoore, 2015), these were most likely derived from local introductions (Hutchinson

and Dalziel, 1954; Anon, 2022). It is conceivable that some of these North African *Calophyllum* endocarps could drift across to the Caribbean and Western Atlantic via the North Equatorial Current. For example, drift endocarps of the tropical West African Bitterbark Tree *Sacoglottis gabonensis* (Baill.) Urb. have been recorded, albeit rarely, from the Gulf of Mexico (Van der Ham *et al*., 2015). It has also been argued that the African Bottle Gourd *Lagenaria siceraria* (Molina) Standl. could have become naturalized in the New World by simple floating across the Atlantic during the late Pleistocene (Kistler *et al.* 2014).

Discussion

Considering that the maximum known flotation time in sea-water of *Calophyllum brasiliense* (as *C. calaba* sic) mesocarps in the Western Tropical Atlantic is about two years, it conceivable that at least some could drift from the Caribbean Region via the Antilles Current, Gulf Stream and North Atlantic Drift to NW Europe within the estimated minimum passive trans-Atlantic flotation time interval of 14 to 18 months (Quigley *et al*., 2016), which suggests that the NW European endocarps were true peregrine drifters.

At least five species and three varieties of *Calophyllum* are known to occur in hydrometric catchments draining into the Caribbean and/or tropical Western Atlantic. However, apart from *C. brasiliense*, the maximum flotation properties and sea-water dispersal potential of the other diaspores is currently unknown. As Steven's (1980a) remarked, it is difficult to discern clear specific differences between drift endocarps of separate species.

In contrast to the ovoid-shaped Scottish endocarp, the three Irish specimens were sub-spherical which suggests that the NW European records may represent two different species, possibly either *C. brasiliense* and/or *C. inophyllum*. DNA analysis may confirm this hypothesis.

Despite the fact that 95% (c.180) of *Calophyllum* species occur in the Old World, it is surprising that all of the drift endocarps reported to date from this vast area have been listed as *C. inophyllum*. Perhaps some of these drift endocarps may represent other *Calophyllum* species.

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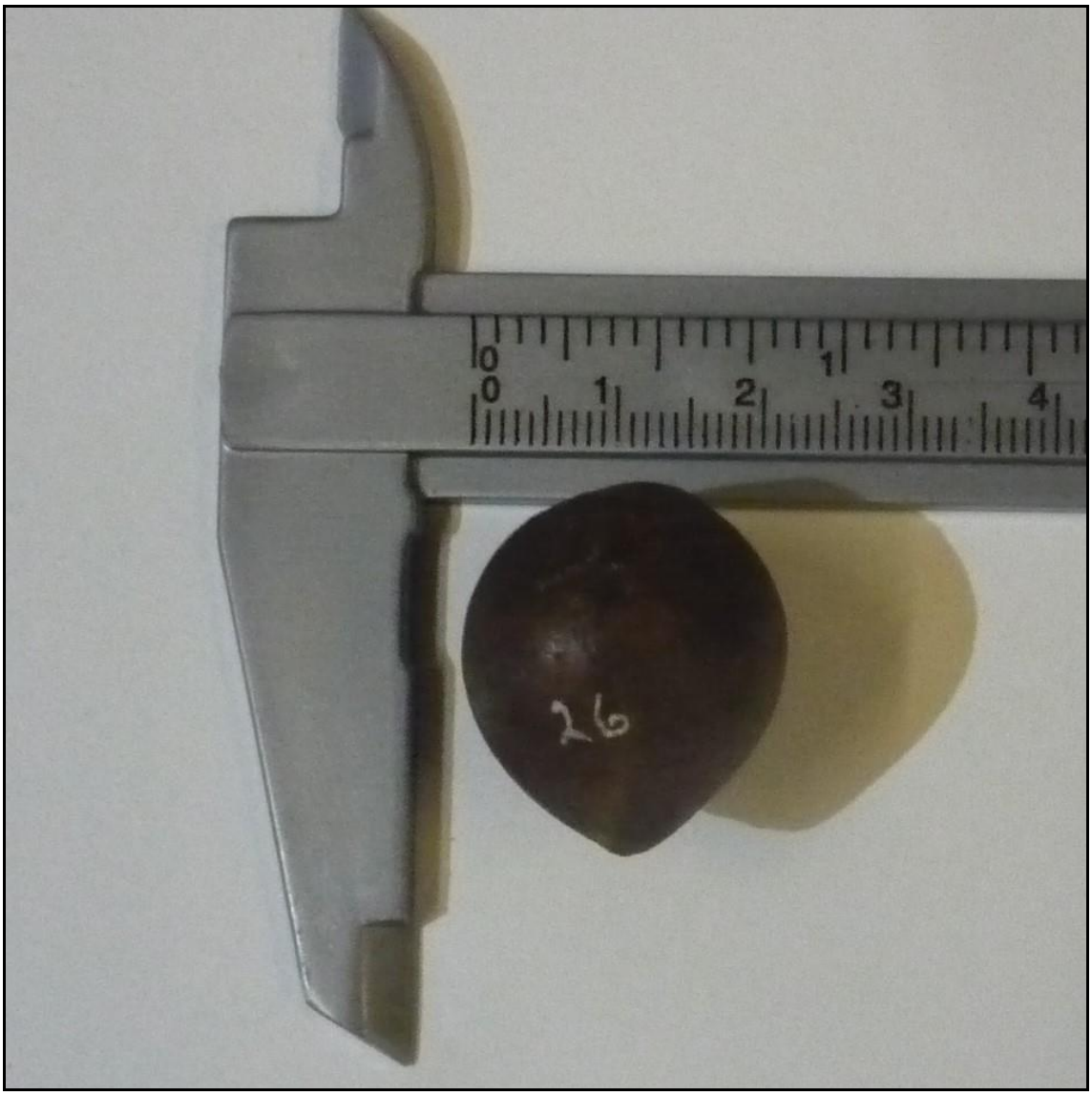

PLATE 1. *Calophyllum* endocarp, Isle of Barra, Outer Hebrides, NW Scotland, c. 1900. Photograph: Melia Knecht.

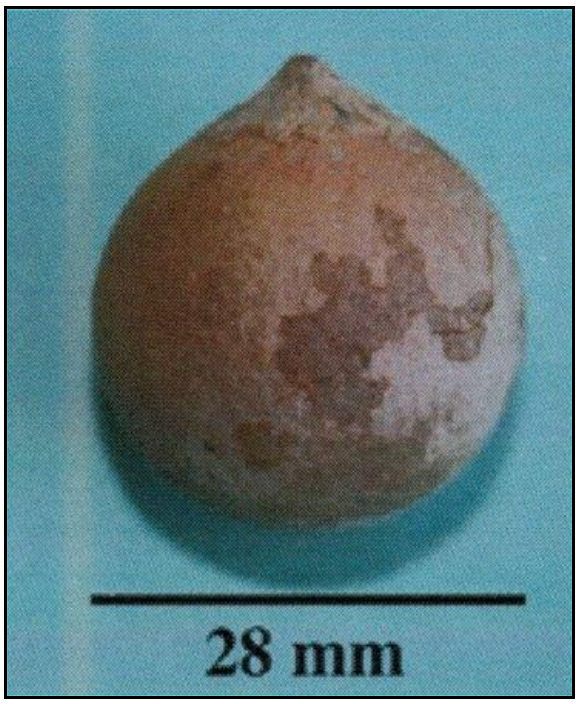

PLATE 2. *Calophyllum* endocarp, Trawalua Strand South, County Sligo, 13 September 1993. Photograph: Don Cotton.

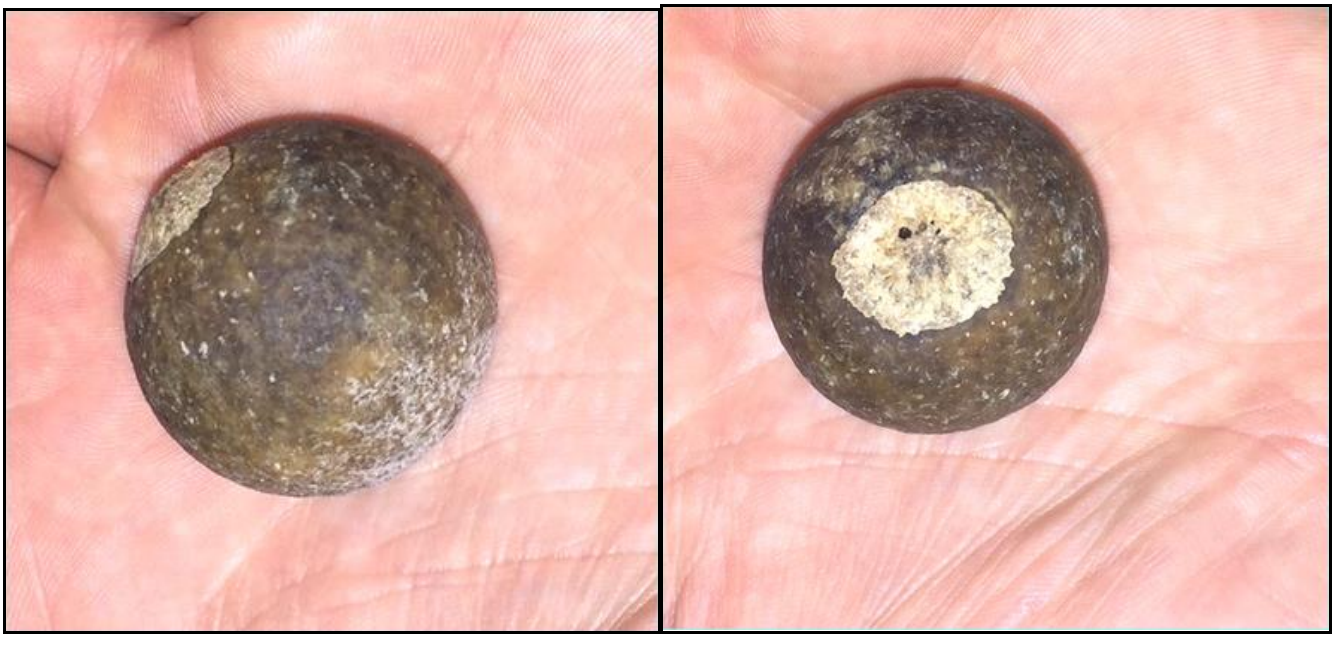

PLATE 3. *Calophyllum* endocarp, Kinard Beach, Dingle, County Kerry, 1 December 2015. Photograph: Alan Pyne.

PLATE 4. *Calophyllum* endocarp, Kinard Beach, Dingle, County Kerry, 1 December 2015. Photograph: Declan Quigley.

PLATE 5. *Calophyllum* endocarp, Fanore, County Clare, 28 February 2019. Photograph: Liam McNamara.

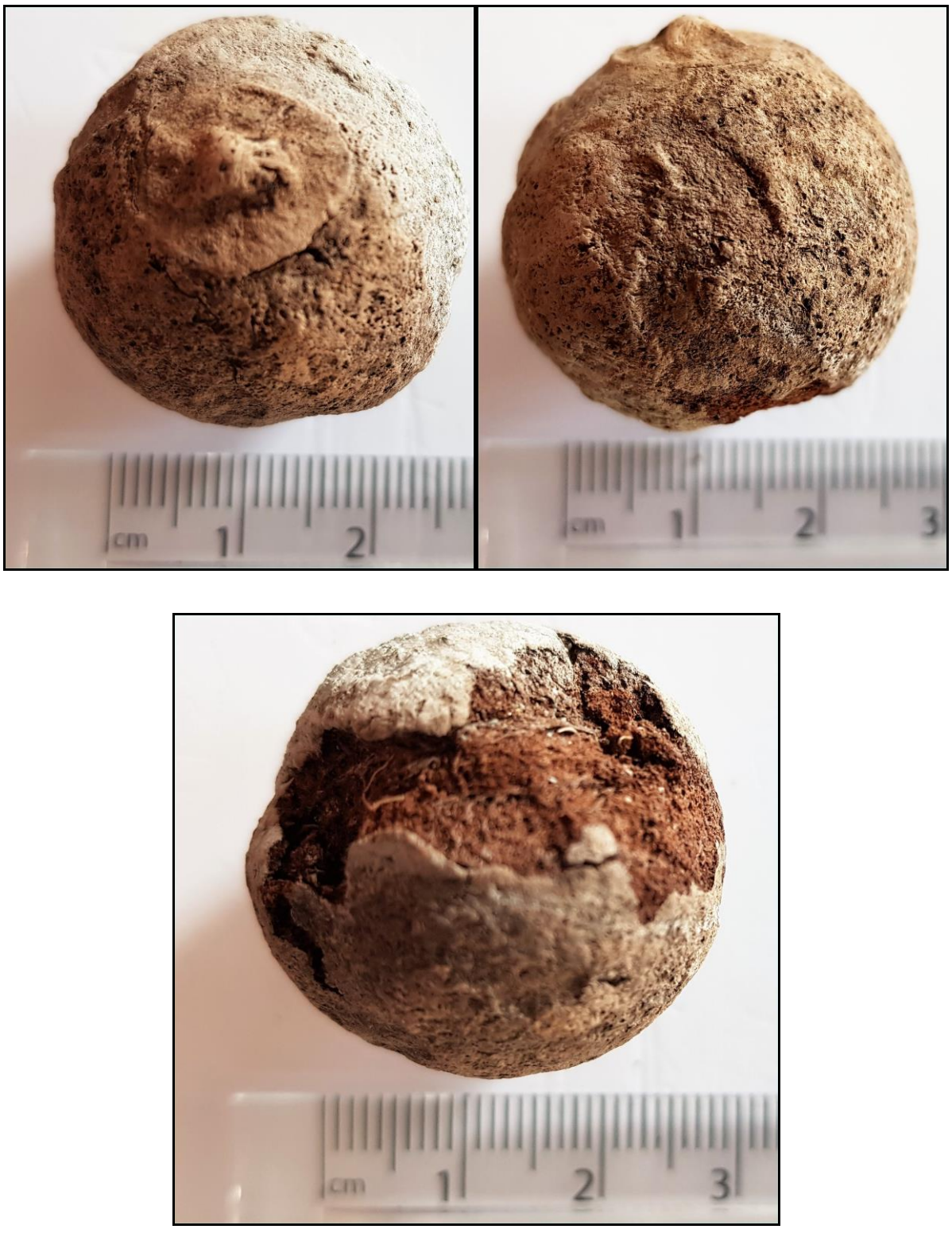

PLATE 6. *Calophyllum* endocarp, Fanore, County Clare, 28 February 2019. Photograph: Liam McNamara.

TABLE 1. Morphological and meristic characters of *Calophyllum* endocarps reported from hydrometric catchments draining into the Caribbean and/or tropical Western Atlantic

Species	**Shape**	**Dimensions (mm)**	**Apex**	**Basal Plug**	**Reference**
Calophyllum brasiliense	globose or ovoid	16-27 x 12-24	obtuse	present	Vela Diaz (2013)
Calophyllum longifolium	ovoid	12-33 x 10-28	obtuse	present	Vela Diaz (2013)
Calophyllum pachyphyllum	ovoid	13-26 x 12-25	obtuse	present	Vela Diaz (2013)
Calophyllum mesoamericanum	ovoid	22-28 x 19-23	obtuse	present	Vela Diaz (2013)
Calophyllum inophyllum	sub-spherical	17-39 x 19-34	obtuse (very rarely apiculate)	diameter 4-10 mm	Stevens (1980)
Calophyllum calaba	spherical, to ovoid or ellipsoid	50-115 x 50-80	obtuse	smooth, unmarked	Stevens (1980)

TABLE 2. NW European records of Laurelwood *Calophyllum* drift endocarps.

1. **Date:** early 1900s. **Location:** Isle of Barra, Outer Hebridies, NW Scotland. **Latitude (°N):** 56.9809. **Longitude (°W):** 7.4568. **Recorder:** William L. MacGillivray. **Diameter (mm):** 21. **Depth (mm):** 24. **Ratio (Diameter/Depth):** 0.88. **Reference:** Nelson (1990, 2000). **Collection Reference:** King's Museum (Aberdeen University) No. 26. **Notes:** as *Calophyllum calaba*.
2. **Date:** 13 March 1993. **Location:** Trawalua Strand South, County Sligo, NW Ireland (G6954). **Latitude (°N):** 54.4403. **Longitude (°W):** 8.4708. **Recorder:** Don Cotton. **Diameter (mm):** 28. **Depth (mm):** 31. **Ratio (Diameter/Depth):** 0.90. **Reference:** this paper. **Collection Reference:** Don Cotton's private collection. **Notes:** as *Calophyllum* sp.
3. **Date:** 1 December 2015. **Location:** Kinard Beach, Trabeg, near Sea Stack at mouth of Lispole River, Dingle, County Kerry, SW Ireland. **Latitude (°N):** 52.1209. **Longitude (°W):** 10.2063. **Recorder:** Alan Pyne. **Diameter (mm):** 28. **Depth (mm):** 31. **Ratio (Diameter/Depth):** 0.90. **Reference:** this paper. **Collection Reference:** Alan Pyne's private collection. **Notes:** as *Calophyllum* sp.
4. **Date:** 28 February 2019. **Location:** Fanore Beach, Fanore Mor, County Clare, W Ireland. **Latitude (°N):** 53.1200. **Longitude (°W):** 9.2882. **Recorder:** Liam McNamara. **Diameter (mm):** 28. **Depth (mm):** 27. **Ratio (Diameter/Depth):** 1.04. **Reference:** this paper. **Collection Reference:** Liam McNamara's private collection. **Notes:** as *Calophyllum* sp.

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IRISH *EUPLECTUS* (COLEOPTERA: STAPHYLINIDAE: PSELAPHINAE) FROM THE KILLARNEY AREA IN THE E. F. BULLOCK COLLECTION

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Abstract

Euplectus beetles collected in the Killarney area, County Kerry, Ireland, by E. F. Bullock, now in the National Museum of Ireland, were re-identified. Six species are recorded, including one male of *E. punctatus* Mulsant, confirming the occurrence of this old woodland species in Ireland in contradistinction to its sibling *E. tholini* (Guillebeau). *E. bescidicus* Reitter and *E. mutator* Fauvel, with Bullock literature records from Killarney, were not represented in the collection.

Key words: *Euplectus*, Killarney, Ireland, E. F. Bullock.

Introduction

Edwin Bullock collected beetles in the Killarney area for over 50 years between approximately 1910 and 1960, amassing a large collection, now held in the National Museum of Ireland (NMI), which provides a unique historical biodiversity baseline for the area. While representatives of many species were identified by leading coleopterists of the day, in some genera, however, there were misidentifications and species concepts have since considerably changed. An example is the genus *Euplectus*, a group of small (1-2mm) pselaphine beetles which prey on mites in decaying wood and plant refuse, and many of which are associated with old woodland. As has been the case elsewhere (e.g. Vorst, 1995), many *Euplectus* specimens in the NMI Bullock Collection were found to be misidentified, and none of the males had been dissected.

Methods

All Bullock NMI *Euplectus* specimens from Killarney were re-determined (by JAG), using Besuchet (1974), Hansen (1968), Jeannel (1950) and, to a lesser extent and with care due to confused names and reliance on dorsal external characters only, Pearce (1957), as well as English reference material in the Bullock Collection. Up to about 1920, Bullock specimens were labelled just 'Killarney'; thereafter, they were labelled 'Flesk, Killarney', 'Garden,

Killarney', etc. However, with the exception of *E. piceus* and *E. punctatus*, all records are combined below just as 'Killarney'. Also in the list below, the number after the dates refers to the number of specimens from that period.

Results

***Euplectus duponti* Aubé, 1833**

KERRY: 3♂♂3♀♀, Killarney, EFB: 1909 - 1941.

***Euplectus infirmus* Raffray, 1910**

KERRY: 6♂♂1♀, Killarney, EFB; 1914 - 1954.

***Euplectus karstenii* (Reichenbach, 1816)**

KERRY: 1♂1♀, Killarney, EFB; 1917 - ? [date illegible].

***Euplectus piceus* Motschulsky, 1835**

KERRY: 10♀♀4♂♂, Killarney, EFB: 1910 - 1919 - 12, 1920 - 1929 - 2; 1♀, Garden, Killarney, April 1930, EFB, rotten branch; 1♀, M[uck]ross, Killarney, February 1938, EFB; 1♀, Cahirnane, Killarney, May 1951, EFB; 1♂, Flesk, Killarney, March 1954, EFB, under *P*[*inus*] bark.

***Euplectus punctatus* Mulsant, 1861**

KERRY: 1♂, Torc, Killarney, May 1950, EFB. See Plate 1.

***Euplectus sanguineus* Denny, 1825**

KERRY: 24♀♀21♂♂, 3 unsexed, Killarney, EFB: 1910 - 1919 - 9, 1920 - 1929 - 1, 1930 - 1939 - 7, 1940 - 1949 - 2, 1950 - 1959 - 29.

***Euplectus bescidicus* Reitter, 1881**

The sole Irish record for *Euplectus bescidicus*, from Killarney, cited by Alexander and Anderson (2012), appears to be incorrect. Bullock (1928), indeed, added *E. bescidicus* Reitter to the Irish list, from "an old tree riddled with the burrows of *Sirex gigas*". However, *E. bescidicus* Reitter is an obsolete synonym for *E. decipiens* Raffray (Pearce, 1957), and, in 1935, H. Britten determined two Bullock specimens, labelled "Garden, Killarney, 4.24, EFB", as "*Euplectus decipiens* Raffray". These were found standing over the *'bescidicus'* label in the Bullock Collection, and very probably are the *'E. bescidicus*' referred to by Bullock. Both specimens were re-determined as *E. duponti* Aubé, and *E. bescidicus* was consequently excluded from the revised staphylinid list in Good and Anderson (2019). In addition, a further specimen standing over the same label has now been determined as *E. punctatus* (see below).

***Euplectus mutator* Fauvel, 1895** (= *fauveli* Guillebeau; = *falsus* Bedel; = *tomlini* Joy)

Alexander and Anderson (2012) cited a Bullock Killarney record for this species, based on

the *E. tomlini* Joy record published by O'Mahony (1929), provided by Bullock (*in litt*.). Pearce (1957) cited records from "Cos. Kerry and Waterford" for this species, as *falsus* Bedel. No specimens of *E. mutator* were located in the Bullock Collection in the NMI. Two specimens labelled '*Euplectus tomlini* Joy, t = H. Britten, 1935' (both ♂♂, March 1914 and April 1922) proved to be *E. infirmus* (determination based on aedeagal dissection). Dr Mark Pavett of the National Museum of Wales, where the E. J. Pearce collection is held, kindly examined the *mutator* material in the collection, but there were no specimens from Killarney, Kerry or Ireland present. Pearce also deposited material in the London (NHM) and Manchester Museums, and it is possible that there may be Irish *mutator* there, but there is as yet no available evidence that *E. mutator* was recorded from Killarney.

***Euplectus punctatus* Mulsant, 1861**

The County Kerry record for *Euplectus punctatus*, in Pearce (1957), was doubted as reliable by Pearce (1974). The Power (1878) Kerry record, cited in Alexander and Anderson (2012), appears to be an error, as Power (1878) does not mention *Euplectus*. However, a single 1950 Bullock male specimen from Torc (in the National Park) was determined as *E. punctatus* (see Plate 1). It was standing over the *'E. bescidicus'* label. *E. punctatus* sensu lato has been recently split into two species, *punctatus* sensu stricto and *tholini* (Guillebeau, 1888).

According to Alexander and Anderson (2012), *E. punctatus* is primarily a relict species of old growth forest, so the Torc record is ecologically significant for the woodland in Killarney National Park. The distribution of *punctatus* is more northerly in Europe and Asia, occurring in Finland, Norway, northern Russia and Siberia, where *tholini* is not recorded (Schülke and Smetana, 2015). This is also reflected in the British distribution of the two species, with *punctatus* recorded locally from the Scottish Highlands and England, while *tholini* has a more eastern distribution in England only (Johnson, 1977; National Biodiversity Database, 2022).

Although Koch (1989) stated that *E. tholini* occurs in pine (*Pinus* spp), and *E. punctatus* is found in a range of broadleaf trees, the habitat preference of this species is somewhat ambiguous. Johnson (1977) originally recorded *punctatus* from old Caledonian pine forest in Scotland, although he noted that "some" of his *punctatus* specimens were from oak and beech at the edge of the pine forest. Hjältén *et al*. (2017) recorded *punctatus* in large numbers (n>100) in window traps in a Swedish forest dominated by Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) with lesser cover of birch (*Betula* spp) and aspen (*Populus tremula*). Bekchiev (2011) recorded it from under bark of both *P. abies* (n=2) and *P. sylvestris* (n=1).

The Torc area was extensively planted with Norway spruce (*Picea abies*) during the twentieth century, with many mature and regenerating trees currently present in the Torc woodland. For *Euplectus punctatus*, the question arises as to the importance of this non-native

tree to its survival (The possibility of *punctatus* having been imported into Ireland with spruce plants can be dismissed, as Norway spruce was imported as seed (Jansen, Konrad and Geburek, 2017)). Norway spruce is unlikely to be important, however, for three reasons. Firstly, *E. punctatus* clearly occurs in many sites without spruce or pine, and in Killarney could have occurred in broadleaf woodland before spruce and pine planting (Scots pine was reintroduced to Killarney in the early nineteenth century (Roche, Mitchell and Waldren, 2009)). Secondly, *E. punctatus* disperses by flight, so would be expected to occur in small numbers in conifers, even if it only breeds in broadleaf trees. Thirdly, the species has been recorded from birch (e.g. Telnov and Kalniņš, 2003), which, even if not dominant, could have been the source of the large numbers recorded in window traps by Hjältén *et al*. (2017). Nevertheless, this question can only be definitively resolved by field data from the Torc area.

Discussion

Euplectus beetles are often difficult to find, and it is a tribute to Edwin Bullock's proficiency as an entomologist that he found so many individuals (82) and species (6) near Killarney. Flight interception traps are probably now the best modern method of capturing these beetles for the more time-bound field entomologist.

The subset of *Euplectus* species which are saproxylic is typical of Killarney woodland biodiversity, being rich in species little known elsewhere in Ireland (*infirmus*, *piceus*, *punctatus*), but missing a suite of species recorded from woodlands in southern, central and eastern England (*bescidicus*, *bonvouloiri* Reitter, *brunneus* (Grimmer), *kirbii* Denny, *nanus* (Reichenbach), *tholini*). Given the monumental collecting effort by Bullock in the Killarney area over a half a century, it is nevertheless surprising that there is only a single record of *E. punctatus*. While this could suggest the importance of scenic Torc in providing a refuge for woodland while much of the Killarney woodlands were felled in the early nineteenth century, we must also remember that Bullock exchanged specimens widely, and further Bullock examples of this species from elsewhere in the National Park may exist in other British and even continental collections.

In the above records, we have included the numbers of specimens per decade for *E. piceus* (a predominantly woodland species) and *E. sanguineus* (a predominantly synanthropic species), as they show a noticeable lack of overlap, those of the former being mostly before the 1920's, and those of the latter being mostly after. This may be due as much to a change in Bullock's life-style (see Beirne, 1984), rather than an actual change in relative abundance of these two species. It may therefore be a sampling bias to bear in mind when interpreting his records in other taxa.

Finally, a technical point regarding identification. The 4th-6th sternites of males of several species have characteristic impressions, indentations or pits. These are described by Besuchet

(1974), and illustrated by Hansen (1968) for *E. karstenii* and *E. mutator*, but unfortunately have not been illustrated comprehensively for the genus (Raffray (1910) did illustrate these features for all species known at the time, but the figures are partly inaccurate and were even dismissed as 'illusory'by Jeannel (1950)). These ventral features are seen much more clearly in spirit (after rehydrating the mounted specimens), and, in some cases, this may be useful if it can avoid the necessity for dissection of old specimens.

Acknowledgements

We are most grateful to Dr Mark Pavett, National Museum of Wales, for checking the Pearce collection for *Euplectus mutator*, and to Dr Jim O'Connor, Emeritus Entomologist, NMI, for advice on Bullock label names.

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PLATE 1. ♂ *Euplectus punctatus* from Torc, Killarney, Ireland, showing fore-dorsum and aedeagus, from the E. F. Bullock Collection in the National Museum of Ireland. Photograph: Jervis Good.

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ADULT STONEFLY (PLECOPTERA) RECORDS FROM IRELAND IN 2022

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Abstract

Adult distribution records for 17 species of stoneflies (Plecoptera) taken randomly on lakes and rivers across 12 counties from March to November 2022. Included are records of the first reported male specimens of *Protonemura praecox* in Ireland in 40 years. Additionally, we report adult specimens of *Leuctra nigra*, the first since 2005, and report adult *Brachyptera risi* from June, supporting observations on larval records of extended emergence period for this species into early summer in some Irish rivers. Records of brachyptery and microptery are also provided, as well as observations on wing crumpling and Entomophthora infection, where relevant.

Key words: Plecoptera, stoneflies, lakes, rivers, *Leuctra nigra*, *Protonemura praecox*, wing length, wing crumpling, Entomophthora infection.

Introduction

From March to November 2022, while in the field, the authors took the opportunity to collect adult stoneflies from lake shores, streams and rivers across the island. Records presented were collected mainly from Counties Cavan, Dublin, Galway, Kerry, Kildare, Mayo, Sligo and Wicklow, but records from Counties Clare, Kilkenny, Westmeath and Waterford are also presented. Specimens collected by Elvira de Eyto, Bryan Kennedy and Ryan Mitchell were forwarded to Hugh Feeley for identification or verification. Similarly, specimens collected by Oscar Flynn, Kate O'Leary and Heather Swanwick were forwarded to Jan-Robert Baars for identification or verification.

In all, this paper presents records for 17 of the 19 extant Irish stoneflies species, and all stonefly families (Capniidae, Chloroperlidae, Leuctridae, Nemouridae, Perlidae, Perlodidae and Taeniopterygidae), confirmed in Ireland. Two species, *Nemoura avicularis* Morton, 1894 and *Zwicknia bifrons* (Newman, 1839), went unrecorded as adults by the authors in 2022. These two species are considered to have restricted distributions in Ireland (Feeley *et al*., 2016), and recent records have been reported by Feeley and Baars (2020) and Feeley *et al*. (2021). As a result, new adult records of all 19 extant Irish species of stoneflies and over 500 individual records have now been published since 2019.

This paper also notes brachyptery and microptery (e.g. Costello, 1988a; Feeley *et al*., 2021) where observed but all adults were fully winged (i.e. macropterous) and all male Perlidae were brachypterous unless otherwise stated. Similarly, the phenomenon of 'crumpled wings' (Feeley and Macadam 2021; Feeley *et al*., 2021; Plate 1) where observed are noted, while one observation of Entomophthora infection is also noted.

All specimens were identified using Hynes (1977) and Macadam *et al.* (2022). Nomenclature is based on Feeley *et al.* (2020) and Macadam *et al.* (2022) although additional notes on the taxonomic uncertainty of Irish *Perla* and *Isoperla* are discussed below. All records will be forwarded to the National Biodiversity Data Centre to update the dataset "Stoneflies (Plecoptera) of Ireland" (Feeley, 2022).

The records:

CAPNIIDAE

***Capnia atra* Morton, 1896**

KERRY: Devil's Punchbowl, Mangerton Mountain (V975817) 7♂♂14♀♀ 25 May 2022, collected by O. Flynn, K. O'Leary and H. Swanwick, verified by J-R. Baars, and 1♂16♀♀ 27 May 2022, J-R. Baars.

On both occasions all males and female were brachypterous.

Capnia atra was first reported in Ireland by King and Halbert (1910) using specimens collected from this location in June 1905. O'Connor (1978) confirmed it as a valid Irish species after Hynes (1977) questioned its validity owing to the short-wingedness of both sexes, a trait not observed in British populations. This species is now known to have a widespread, if localised, distribution along the western seaboard of Ireland (Feeley *et al*., 2016) although it is considered vulnerable to extinction because of climate change (Feeley *et al*., 2020).

CHLOROPERLIDAE

***Chloroperla tripunctata* (Scopoli, 1763)**

KERRY: Galway's River, Derrycunihy Woods (V910810) 2♂♂2♀♀ 28 March 2022;

Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 1♂ 24 May 2022; Owengarriff River, downstream of Torc Waterfall (V963848) 3♂♂4♀♀ 26 May 2022, all J-R. Baars.

WICKLOW: River Liffey, Ballyward Bridge (O023158) 1♂ 31 May 2022, H. B. Feeley.

***Siphonoperla torrentium* (Pictet, 1841)**

CAVAN: Maudabawn River, south bridge Canningstown (H625038) 2♀♀ 6 July 2022; Maudabawn River, bridge south of Drumcondra (H643073) 1♀ 6 July 2022; Stradone River, 2nd bridge downstream of Lough Alion (H490021) 1♂1♀ 6 July 2022, all H. B. Feeley.

DUBLIN: Owendoher River, Cruagh (bridge on R116) (O137227) 3♂♂ 11 May 2022; River Dodder, Dartry Mills (O160298) 2♂♂ 15 May 2022; River Dodder, upstream of Piperstown (O088238) 1♂2♀♀ 20 June 2022; River Dodder, 1.3km upstream reservoir upstream distributary (O111201) 4♂♂4♀♀ 20 June 2022; River Dodder, Old Bawn Road (O097263) 1♂2♀♀ 20 June 2022; Owendoher River, bridge (R116) southwest of Delamaine Cottage (O134240) 3♀♀ 20 June 2022; Owendoher River, bridge upstream River Dodder confluence (Rathfarnham) (O141289) 2♀♀ 21 June 2022; River Camac, bridge 1km southwest of Saggart (O033261) 1♀ 21 June 2022, all H. B. Feeley.

GALWAY: Clonbur River, Clonbur Woods (Roshill) (M097566) 1♂ 14 April 2022, H. B. Feeley.

KERRY: Galway's River, Derrycunihy Woods (V910810) 1♂2♀♀ 28 March 2022; Owengarriff River, Old Kenmare Road (V959831) 1♂4♀♀ 24 May 2022; Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 2♂♂13♀♀ 24 May 2022; Finoulagh River, Mangerton car park (V984848) 3♂♂4♀♀ 25 May 2022; Owengarriff River, downstream of the Devil's Punchbowl (V975818) 1♂1♀ 25 May 2022; Devil's Punchbowl, Mangerton Mountain (V975817) 1♂1♀ 25 May 2022, 1♂ 27 May 2022 and 1♂1♀ 29 August 2022; Galway's River (Ullauns branch) (V916799) 1♀ 26 May 2022; Galway's River, upstream of Cummenslaun Lake (V925774) 1♂ 26 May 2022; Nambrackdarrig Lake (V945783) 1♀ 26 May 2022; Owengarriff River, downstream of Torc Waterfall (V963848) 1♂1♀ 26 May 2022, all J-R. Baars.

KILDARE: Hartwell stream, bridge at Rathmore (N962198) 2♂♂ 13 June 2022, H. B. Feeley.

MAYO: Finny River, bridge southwest of Finny (M010586) 1♀ 5 June 2022, H. B. Feeley.

WICKLOW: River Liffey, 2km northwest of the Sally Gap (O109127) 7♂♂1♀ 30 May 2022; River Liffey, bridge east of Ballysmuttan (O056148) 11♂♂4♀♀ (1♂ with crumpled wings) 30 May 2022; Brittas River, bridge NNE of Moanaspick (O030207) 1♂2♀♀ 31 May 2022; Ballydonnell River, Ballylow Bridge (O060129) 7♂♂4♀♀ 31 May 2022; Ballylow Brook, bridge upstream Ballydonnell River confluence (O067133) 8♂♂3♀♀ 31 May 2022; River Liffey, Ballyward Bridge (O023158) 2♂♂1♀ 31 May 2022; Cock Brook, northwest of Kilmore

(O021088) 1♂5♀♀ 1 June 2022; Ballinagee River, Ballinagee Bridge (O056018) 4♂♂7♀♀ 2 June 2022; Glashaboy tributary, Glashaboy Bridge East (O066016) 1♂5♀♀ 2 June 2022; King's River, upstream Ballinagee River confluence (O033020) 6♂♂5♀♀ 2 June 2022; Annalecka River, Annalecka Bridge (O056018) 4♂♂11♀♀ 2 June 2022; Glashaboy Brook, Glashaboy Bridge (small stream) (O065016) 4♂♂3♀♀ 2 June 2022; King's River, bridge northwest of Lockstown Upper (N978034) 8♂♂4♀♀ 6 June 2022; Douglas (Liffey), Granamore Bridge upstream King's River confluence (N977031) 1♂4♀♀ 6 June 2022; Lemonstown (Toor Brook), bridge east of Athgreen (N933034) 2♂♂2♀♀ 6 June 2022, all H. B. Feeley.

LEUCTRIDAE

***Leuctra fusca* (Linnaeus, 1758)**

CAVAN: River Annalee, 2nd bridge upstream of Lough Sillan (H726861) 1♂3♀♀ 22 August 2022; River Annalee, bridge near Ann's Fort (H657103) 2♂♂1♀ 22 August 2022; Dromore River, Killycreeny Bridge (H557131) 4♂♂ 22 August 2022; River Annalee, Ballynallon Bridge (H500115) 1♀ 24 August 2022; Larah River, bridge west southwest of Knockataggart (H541020) 3♂♂1♀ 25 August 2022; River Annalee, 0.2km downstream of Cavan River confluence (H402101) 3♂♂1♀ 22 August 2022, all H. B. Feeley.

These are the first published adult records of this species from County Cavan, although several larval records have been published previously (see Feeley (2022) for full details).

DUBLIN: River Dodder, Old Bawn Road (O097263) 1♂1♀ 20 June 2022, H. B. Feeley.

KERRY: Owenreagh River, upstream of confluence with Gearhameen (V876799) 2♂♂1♀ 10 August 2022, H. B. Feeley; Owengarriff River, downstream of Devil's Punchbowl (V975818) 16♂♂9♀♀ 28 August 2022; Finoulagh River, Mangerton car park (V984848) 7♂♂ 28 August 2022; Owengarriff River, downstream of Torc Waterfall (New Bridge) (V965847) 10♂♂14♀♀ 28 August 2022; Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 10♂♂17♀♀ 28 August 2022, all J-R. Baars.

KILDARE: River Liffey, Carnalway New Bridge (N869099) 1♀ 3 November 2022, J-R. Baars.

MAYO: Trimoge River, bridge south west of Rinn Lough (M392909) 1♀ 10 August 2022; Shanwar, Foxford (G298037) 1♂ 3 November 2022, all collected by B. Kennedy, identified by H. B. Feeley.

SLIGO: Bellawaddy River, bridge upstream of Knocknagower Bridge (G317285) 1♂1♀ 29 September 2022, collected by B. Kennedy, identified by H. B. Feeley. Union Wood stream, Collooney (G680281) 1♂ 10 September 2022 and 3♀♀ 2 October 2022; Lough Gill, Slishwood (G739313) 1♀ 30 October 2022, identified by R. Mitchell, verified by H. B. Feeley.

WATERFORD: Glenshelane River, Glenshelane Wood (S116009) 1♂ 20 October 2022, identified by R. Mitchell, verified by H. B. Feeley.
WICKLOW: River Liffey, 2km northwest of the Sally Gap (O109127) 3♂♂2♀♀ 12 September 2022, H. B. Feeley. Glencullen River, Knocksink Woods (O218179) 1♂ 15 October 2022, identified by R. Mitchell, verified by H. B. Feeley.

***Leuctra hippopus* Kempny, 1899**

DUBLIN: Owendoher River, Cruagh (bridge on R116) (O1371422767) 1♂1♀ 6 March 2022 and 8♂♂9♀ 15 March 2022, H. B. Feeley. Glencullen River, Boranaraltry Bridge (O168206) 1♀ 6 March 2022, H. B. Feeley, and 1♂ 23 March 2022, J-R. Baars. Cot Brook, O'Rourkes Lane (O108200) 3♀♀ 15 March 2022, H. B. Feeley and 2♂♂1♀ 23 March 2022, J-R. Baars. Owendoher River, opposite car park (R1115) (O122222) 1♂ (crumpled wings) 15 March 2022, H. B. Feeley. River Dodder, bridge on Springfield Avenue (O135289) 1♀ 21 June 2022, H. B. Feeley.
KERRY: Owengarriff River, downstream of Torc Waterfall (New Bridge) (V965847) 1♂3♀♀ 28 March 2022; Galway's River, Derrycunihy Woods (V910810) 1♂ 28 March 2022; Galway's River, tributary of Galway's River (V909805) 1♂ 28 March 2022; Galway's River (Ullauns branch), (V916799) 1♀ 26 May 2022; tributary of Owengarriff River (V977824) 1♂ 26 May 2022; Devil's Punchbowl, Mangerton Mountain (V975817) 1♂ 27 May 2022; Owengarriff River, downstream of Devil's Punchbowl (V975818) 1♂1♀ 27 May 2022, all J-R. Baars.
MAYO: Finny River, bridge southwest of Finny (M010586) 2♂♂8♀♀ (1♂1♀ with crumpled wings) 16 April 2022, H. B. Feeley. Goulaun River, Srahmore, (F967069) 1♂1♀ 29 March 2022, identified by E. de Eyto, verified by H. B. Feeley. Gweedaney, bridge south east of Curraunboy (F851405) 1♂ 27 April 2022, collected by B. Kennedy, identified by H. B. Feeley.
SLIGO: Union Wood stream, Collooney (G680281) 2♂♂ 2 April 2022, 2♂♂3♀♀ 18 April 2022, 1♂5♀♀ 23 April 2022, 4♂♂3♀♀ 1 May 2022 and 1♀ 2 May 2022, all collected by R. Mitchell, identified by H. B. Feeley. Lough Talt shore/outflow (G403145) 1♀ 26 April 2022, collected by B. Kennedy, identified by H. B. Feeley.
WICKLOW: Toor stream, bridge on L8361 (south of Hollywood) (N933034) 1♀ 8 March 2022; Glenamore River (O021012) 1♂8♀♀ 13 March 2022 and 1♂ 23 March 2022, all J-R. Baars. Lough Bray outflow (tributary of Glencree River), Military Road (O141164) 17♂♂15♀♀ (1♀ with crumpled wings) 15 March 2022, J-R. Baars and H. B. Feeley. Cloghoge River (Avonmore), near Sally Gap (O144098) 6♀♀ 16 March 2022; Avonbeg River, Drumgoff Bridge (T105907) 2♂♂3♀♀ 18 March 2022; Annalecka Brook, Annalecka Bridge (O055018) 1♂ 23 March 2022, all J-R. Baars, Three Trout stream, Glen of the Downs (O258114) 2♂♂6♀♀ (1♂ with crumpled wings) 27 March 2022; Glashaboy Brook, Glashaboy Bridge (small stream) (O065016) 1♀ 7 April 2022; Glashaboy tributary, Glashaboy Bridge East

(O066016) 1♂ 7 April 2022; River Liffey, bridge east of Ballysmuttan (O056148) 1♀ 8 April 2022; River Liffey, 2km northwest of Sally Gap (O109127) 1♀ 8 April 2022, all H. B. Feeley.

***Leuctra inermis* Kempny, 1899**

GALWAY: Clonbur River, Clonbur Woods (Roshill) (M097566) 2♂♂1♀ 14 April 2022, H. B. Feeley.

WICKLOW: Cock Brook, northwest of Kilmore (O067133) 5♂♂2♀♀ 2 April 2022 and 14♂♂4♀♀ 1 June 2022; Annalecka River, Annalecka Bridge (O056018) 1♂4♀♀ 7 April 2022 and 4♂♂10♀♀ 2 June 2022, Glashaboy tributary, Glashaboy Bridge East (O066016) 2♂♂7 April 2022 and 4♂♂7♀♀ (1♂ with crumpled wings) 2 June 2022; River Liffey, bridge east of Ballysmuttan (O056148) 2♂♂1♀ 8 April 2022 and 1♀ 30 May 2022; Ballydonnell River, Ballylow Bridge (O060129) 1♂ 18 March 2022 (J-R. Baars); 1♀ 8 April 2022 and 3♂♂10♀♀ (1♂ with Entomophthora infection) 31 May 2022; River Liffey, 2km northwest of Sally Gap (O109127) 1♀ 8 April 2022 and 1♂5♀♀ (1♂ with crumpled wings) 30 May 2022; Ballylow Brook, bridge upstream Ballydonnell River confluence (O067133) 5♂♂2♀♀ 8 April 2022 and 5♂♂2♀♀ 31 May 2022; Brittas River, bridge northeast of Talbotstown (O055212) 1♂ 31 May 2022; Ballinagee River, Ballinagee Bridge (O056018) 1♀ 2 June 2022; King's River, upstream Ballinagee River confluence (O033020) 1♂3♀♀ 2 June 2022; Glashaboy Brook, Glashaboy Bridge (small stream) 10♂♂11♀♀ 2 June 2022; King's River, bridge northwest of Lockstown Upper (N978034) 1♂1♀ 7 June 2022; Lemonstown (Toor Brook), bridge east of Athgreen (N933034) 10♂ 7 June 2022, all H. B. Feeley, unless otherwise stated.

***Leuctra nigra* (Olivier, 1811)**

KERRY: Owengarriff River, downstream of Torc Waterfall (New Bridge) (V965847) 1♀ 26 May 2022, J-R. Baars.

WICKLOW: Three Trout stream, Glen of the Downs (O258114) 1♀ 27 March 2022, H. B. Feeley.

Only confirmed as an Irish species after several adults were discovered in County Cavan in June 1996 by O'Connor and Costello (1997). Since then only one further published adult record exist for this species, from County Kerry (O'Connor, 2005). Despite this *L. nigra* is considered to have a widespread, if a locally restricted, distribution across the island based on larval records, with populations more concentrated in the west and northwest in small, low-order, streams (Feeley *et al.,* 2016)

Several male specimens of *Leuctra nigra*, collected by Ryan Mitchell at Union Wood in Sligo in 2022, exhibited aberrant features. Previous observations of aberrant features were reported for male specimens of this species collected in County Kerry by O'Connor (2005). Additional steps, including genetic sequencing, are warranted to determine the identity of the Union Wood specimens. As a result, they are not included here.

NEMOURIDAE

***Amphinemura sulcicollis* (Stephens, 1836)**

DUBLIN: River Dodder, upstream of Piperstown (O088238) 1♂1♀ 20 June 2022; Owendoher River, bridge (R116) southwest of Delamaine Cottage (O134240) 2♀♀ 20 June 2022; River Dodder, 1.3km upstream of reservoir upstream distributary (O111201) 1♀ 20 June 2022; Owendoher River, bridge upstream River Dodder confluence (Rathfarnham) (O1413628971) 1♂1♀ 21 June 2022, all H. B. Feeley.

KERRY: Owengarriff River, downstream of Torc Waterfall (New Bridge) (V965847) 3♂♂1♀ 25 May 2022; Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 1♀ 26 May 2022; Galway's River, Derrycunihy Woods (V910810) 1♂3♀♀ 27 May 2022; Galway's River, upstream of Cummenslaun Lake (V925774) 1♂ 26 May 2022; Nambrackdarrig Lake (V945783) 1♂1♀ 26 May 2022; Galway's River (Ullauns branch) (V916799) 6♂♂4♀♀ 26 May 2022; Ownegarriff River, downstream of Devil's Punchbowl (V975818) 2♂♂4♀♀ 27 May 2022, all J-R. Baars.

WICKLOW: River Liffey, 2km northwest of the Sally Gap (O109127) 2♂♂3♀♀ 30 May 2022; River Liffey, bridge east of Ballysmuttan (O056148) 5♂♂3♀♀ (1♂ with crumpled wings)) 30 May 2022; Ballydonnell River, Ballylow bridge (O060129) 7♂♂11♀♀ 31 May 2022; Ballylow Brook, bridge upstream Ballydonnell River confluence (O067133) 11♂♂4♀♀ 31 May 2022; Cock Brook, northwest of Kilmore (O021088) 13♂♂11♀♀ 1 June 2022; Glashaboy tributary, Glashaboy bridge east (O066016) 4♂♂9♀♀ (2♀♀ with crumpled wings) 2 June 2022; King's River, upstream Ballinagee River confluence (O033020) 1♂ 2 June 2022; Annalecka River, Annalecka bridge (O056018) 3♂♂ 2 June 2022; Glashaboy Brook, Glashaboy bridge (small stream) (O065016) 5♂♂1♀ 2 June 2022, all H. B. Feeley.

***Nemoura cinerea* (Retzius, 1783)**

CLARE: Blackwater River, Ardnacrusha (R594620) 1♂ 11 April 2022, J-R. Baars.

GALWAY: Clonbur River, Clonbur Woods (Roshill) (M097566) 1♀ 14 April 2022, H. B. Feeley.

KERRY: Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 1♂ 28 March 2022; Galway's River (Ullauns branch), (V916799) 1♀ 26 May 2022. all J-R. Baars.

MAYO: River Deel, Knockadangan (G157191) 1♀ 2 April 2022, collected by B. Kennedy, identified by H. B. Feeley.

SLIGO: Union Wood stream, Collooney (G680281) 2♂♂ 18 April 2022 (1♂ with crumpled wings (Plate 1)), 1♂1♀ 1 May 2022, 1♂ 2 May 2022, 1♂ 25 May 2022, 1♂ 28 May 2022 and 1♂ 6 June 2022, all collected by R. Mitchell, identified by H. B. Feeley.

***Nemurella pictetii* Klapálek, 1900**

MAYO: Finny River, bridge southwest of Finny (M010586) 1♀ 16 April 2022, H. B. Feeley.

***Protonemura meyeri* (Pictet, 1841)**

CLARE: Blackwater River, Ardnacrusha (R594620) 1♂ 11 April 2022, J-R. Baars.

DUBLIN: Owendoher River, Cruagh (bridge on R116) (O137227) 1♂ 6 March 2022, H. B. Feeley and 3♂♂5♀♀ 15 March 2022, J-R. Baars and H. B. Feeley. Glencullen River, Brockley Lane (O190194) 1♂ 6 March 2022, H. B. Feeley. Glencullen River, Boranaraltry bridge (O168206) 1♂ 6 March 2022, H. B. Feeley and 6♂♂6♀♀ 23 March 2022, J-R. Baars. Cot Brook, O'Rourkes Lane (O108200) 6♂♂6♀♀ 15 March 2022, H. B. Feeley. Glencullen River, Boranaraltry Bridge (O168206) 3♂♂1♀ 15 March 2022, H. B. Feeley. Brittas River (O075220) 1♂1♀ 23 March 2022, J-R. Baars. River Dodder, 1.3km upstream of reservoir upstream distributary (O111201) 1♀ 20 June 2022, H. B. Feeley.

KERRY: Owengarriff River, downstream of Torc Waterfall (New Bridge) (V965847) 1♂ 28 March 2022 and 3♂♂2♀♀ 25 May 2022; Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 1♀ 28 March 2022 and 2♀♀ 25 May 2022; Galway's River, Derrycunihy Woods (V910810) 1♀ 28 March 2022; Galway's River, tributary of Galway's River (V909805) 1♀ 28 March 2022; Devil's Punchbowl, Mangerton Mountain (V975817) 1♂ 28 May 2022, all J-R. Baars.

MAYO: Callow Lough Upper (G318033) 1♀ 3 April 2022; Callow Lough Lower (G312039) 1♀ 3 April 2022, all collected by B. Kennedy, identified by H. B. Feeley.

WICKLOW: Glenamore River (O021012) 1♂ 13 March 2022, J-R. Baars. Lough Bray outflow (tributary of Glencree River), Military Road (O141164) 21♂♂22♀♀ 15 March 2022, J-R. Baars and H. B. Feeley. Cloghoge River (Avonmore), near the Sally Gap (O144098) 10♂♂3♀♀ 16 March 2022; Avonbeg River, Drumgoff Bridge (T105907) 4♂♂2♀♀ 18 March 2022; Knickeen stream, Slaney Ford (S986948) 1♂ 18 March 2022; Toor Brook, Athgreany (N941033) 4♂♂1♀ 23 March 2022; Athdown Brook, Kippure Bridge (O079144) 3♀♀ 23 March 2022; Glencree River (O141180) 3♀♀ 24 March 2022, all J-R. Baars. Avonbeg River, Meeting of the Waters (T189830) 3♂♂1♀ 27 March 2022; Cock Brook, northwest of Kilmore (O021088) 1♂ 2 April 2022; Annalecka River, Annalecka Bridge (O056018) 5♂♂1♀ 7 April 2022 (1♂ with crumpled wings) and 1♀ 2 June 2022; Glashaboy Brook, Glashaboy Bridge (small stream) (O065016) 1♂ 7 April 2022 and 1♂1♀ 2 June 2022; River Liffey, bridge east of Ballysmuttan (O056148) 1♂ 8 April 2022; Ballydonnell River, Ballylow Bridge (O060129) 1♂2♀♀ 8 April 2022 and 1♂ 31 May 2022; River Liffey, 2km northwest of Sally Gap (O109127) 1♂ 8 April 2022; Ballylow Brook, bridge upstream Ballydonnell River confluence (O067133) 1♂3♀♀ 31 May 2022; Glashaboy tributary, Glashaboy Bridge East (O066016) 3♀♀ 2 June 2022; King's River, upstream Ballinagee River confluence (O033020) 1♀ 2 June 2022, all H. B. Feeley.

***Protonemura praecox* (Morton, 1894)**

DUBLIN: Owendoher River, Cruagh (bridge on R116) (O137227) 1♀ 6 March 2022, H. B. Feeley, and 10♂♂16♀♀ 15 March 2022, J-R. Baars and H. B. Feeley. Glencullen River, Boranaraltry Bridge (O168206) 1♀ 6 March 2022, H. B. Feeley and 4♀♀ 15 March 2022 J-R. Baars and H. B. Feeley, and 2♂♂2♀♀ 23 March 2022, J-R. Baars. Cot Brook, O'Rourkes Lane (O108200) 3♂♂1♀ 15 March 2022, J-R. Baars and H. B. Feeley. Brittas River (O075220) 2♀ 23 March 2022, J-R. Baars.

WICKLOW: Athdown Brook, Kippure Bridge (O079144) 1♂ 18 March 2022; Glencree River (O141180) 2♀♀ 24 March 2022, all J-R. Baars.

The adults collected at Cots Brook, Brittas River and Athdown Brook are new location records for this species (see Feeley, 2021 for more details) which is extremely rare in Ireland and was recently categorised as critically endangered under the International Union for the Conservation of Nature criteria (Feeley *et al.*, 2020). It appears restricted to a small geographical area in the Dublin-Wicklow Mountains (Feeley, 2021) and these are the first male specimens reported for the island in over 40 years. The last report of adult males, published by Costello (1988b), was by James O'Connor and Mary O'Connor collected at a stream [Three Trout stream] beside Glen of the Downs (O260114) 3♂♂ 28 March 1982. These specimens are available at the National Museum of Ireland and recently viewed by H. B. Feeley. Despite visiting the same location, almost 40 years later to the day, on 27 March 2022, the primary author failed to collect any *P. praecox* specimens. Continued work is required to establish the geographical distribution of the species in Ireland after Feeley (2021) questioned the validity of several previously published records from outside of the Dublin-Wicklow Mountain area. Both male and female specimens of *P. praecox* collected from Owendoher River, Cruagh (bridge on R116) (O137227), detailed above, were delivered to the National Museum of Ireland on 28 October 2022 by H. B. Feeley.

PERLIDAE

***Dinocras cephalotes* (Curtis, 1827)**

KERRY: Galway's River, Derrycunihy Woods (V910810) 2♂♂1♀ 27 May 2022, J-R. Baars.

***Perla bipunctata* Pictet, 1833**

KILKENNY: Dinnin River, Uskerty Bridge (S574694) 8♂♂14♀♀ 3 June 2022, J-R. Baars.

MAYO: Finny River, bridge southwest of Finny (M010586) 4♂♂ 5 June 2022, H. B. Feeley.

WICKLOW: River Liffey, Ballyward Bridge (O023158) 27♂♂9♀♀ (1♀ with crumpled wings) 31 May 2022, H. B. Feeley.

Originally British and Irish *Perla* were considered a subspecies *P. maxima carlukiana* (Klapálek, 1907) but then separated into a standalone species, *P. carlukiana* (Klapálek, 1923),

owing to the consistent brachypterous nature of the males, amongst other traits; however, Illies (1966) subsequently synonymised *P. carlukiana* with *P. bipunctata*. In recent years Sivec and Stark (2002) suggested that *P. carlukiana* may indeed be a valid species based on the characteristics of their eggs. Similarly, Jean-Paul Reding (pers. comm.) has suggested *P. carlukiana* should be reinstated for the species found in Britain and Ireland. More work is required to determine the identity of Irish, British and European *Perla* species.

PERLODIDAE

***Diura bicaudata* (Linnaeus, 1758)**

KERRY: Devil's Punchbowl, Mangerton Mountain (V975817) 5♀♀ 25 May 2022, collected by O. Flynn, K. O'Leary and H. Swanwick, verified by J-R. Baars, and 2♂♂3♀♀ 27 May 2022, J-R. Baars, Owengarriff River, downstream of Devil's Punchbowl (V975818) 2♂♂2♀♀ 25 May 2022 (1♂ with crumpled wings) collected by O. Flynn, K. O'Leary and H. Swanwick, verified by J-R. Baars.

All males collected were micropterous, while all females were macropterous.

MAYO: Lough Mask, shore at Paddy's Bar, Cappaghduff West (M086658) 1♂1♀ 16 April 2022, H. B. Feeley.

All females collected exhibited brachyptery, while males exhibited microptery (see Feeley *et al*., 2021 for more information).

WICKLOW: Glahaboy tributary, Glashaboy bridge east (O066016) 1♂ 7 April 2022, H. B. Feeley.

This male was micropterous.

***Isoperla grammatica* (Poda, 1761)**

DUBLIN: Owendoher River, Cruagh (bridge on R116) (O137227) 1♀ 11 May 2022; River Dodder, 1.3km upstream of reservoir upstream distributary (O111201) 2♂♂ 20 June 2022; River Dodder, Old Bawn Road (O097263) 1♂ 20 June 2022; River Dodder, upstream of Piperstown (O088238) 1♀ 20 June 2022; River Camac, bridge southeast of Baldonnell House (O049292) 1♀ 22 June 2022, all H. B. Feeley.

KERRY: Owengarriff River, upstream Torc Waterfall (Old Bridge) (V965838) 1♂ 25 May 2022; Owengarriff River, Torc Waterfall (V966844) 1♀ 26 May 2022, all J-R. Baars.

KILDARE: Lemonstown (Toor Brook), bridge north of Ballybought (N914082) 2♂♂1♀ 7 June 2022; Painstown River, Painstown Bridge (N940243) 1♂1♀ 13 June 2022; Hartwell stream, bridge at Rathmore (N962198) 1♀ 13 June 2022, all H. B. Feeley.

MAYO: Srahduggan stream, ford northwest of Srahduggan (F866071) 1♂ 27 April 2022, collected by B. Kennedy, identified by H. B. Feeley. Finny River, bridge southwest of Finny (M010586) 1♀ 5 June 2022, H. B. Feeley.

WESTMEATH: River Brosna, Ballinagore (N356396) 1♂ 5 May 2022, H. B. Feeley.
WICKLOW: River Liffey, bridge east of Ballysmuttan (O056148) 1♂1♀ 30 May 2022; Ballydonnell River, Ballylow Bridge (O060129) 1♀ 31 May 2022; Brittas River, bridge northeast of Talbotstown (O055212) 1♂ 31 May 2022; Ballylow Brook, bridge upstream Ballydonnell River confluence (O067133) 1♂2♀♀ 31 May 2022; River Liffey, Ballyward Bridge (O023158) 3♂♂2♀♀ 31 May 2022; Cock Brook, northwest of Kilmore (O021088) 1♂ 1 June 2022; Brittas River, Kilbride Bridge (O027180) 1♂1♀ 1 June 2022; Ballinagee River, Ballinagee Bridge (O056018) 1♂ 2 June 2022; Glashaboy Brook, Glashaboy Bridge (small stream) (O065016)) 1♂ 2 June 2022; Glashaboy tributary, Glashaboy Bridge east (O066016) 1♂ 2 June 2022; King's River, upstream Ballinagee River confluence (O033020) 1♂ 2 June 2022; Douglas (Liffey), Granamore Bridge upstream King's River confluence (N977031) 1♂1♀ 6 June 2022; King's River, bridge northwest of Lockstown Upper (N978034) 4♂♂7♀♀ 7 June 2022, all H. B. Feeley.

There is some doubt over the true identity of *Isoperla* in Ireland. British (and Irish) specimens were originally described as a separate subspecies, *Chloroperla grammatica subarmata* Despax, 1936 (Despax 1936), but Illies (1952) subsequently synonymised it with *Isoperla grammatica*. However, it is suggested that *I. subarmata* is a valid species based on the shape of the penal armature (Jean-Paul Reding, pers. comm.). Therefore, further work is required to determine the taxonomic status of *Isoperla* in Ireland (and Britain) and whether both *Isoperla grammatica* and *I. subarmata* are present here.

TAENIOPTERYGIDAE

***Brachyptera risi* (Morton, 1896)**

DUBLIN: Owendoher River, Cruagh (near bridge on R116) (O136228) 1♀ 15 March 2022; Brittas River (O074220) 1♀ 23 March 2022, all J-R. Baars.
SLIGO: Union Wood stream, Collooney (G680281) 1♂2♀♀ 1 May 2022, 1♀ 28 May 2022, and 1♀ 6 June 2022, collected by R. Mitchell and identified by H. B. Feeley.

The adult records for this species from early June support previous observations by Feeley *et al*. (2019), based on larval specimen records, of an extended adult emergence period into the early summer period. Interestingly, no adults were recorded in Wicklow in June despite extensive surveys suggesting the presence of this species into early summer is rare.
WICKLOW: Lough Bray outflow (tributary of Glencree River), Military Road (O141164) 1♀ 15 March 2022; Cloghoge River (Avonmore), near the Sally Gap (O144098) 1♂1♀ 16 March 2022; Avonbeg River, Drumgoff Bridge (T105907) 1♂ 18 March 2022; Toor Brook, Athgreany (N941033) 1♀ 23 March 2022, all J-R. Baars. Three Trout stream, Glen of the Downs (O258114) 2♂♂1♀ 27 March 2022; Annalecka River, Annalecka Bridge (O056018) 3♂♂2♀♀

7 April 2022; Glashaboy Brook, Glashaboy Bridge (small stream) (O065016) 5♂♂6♀♀ 7 April 2022; Glashaboy tributary, Glashaboy Bridge East (O066016) 1♀ 7 April 2022; River Liffey, bridge east of Ballysmuttan (O056148) 3♂♂3♀♀ (1♂ with crumpled wings) 8 April 2022; Ballydonnell River, Ballylow Bridge (O060129) 2♀♀ 8 April 2022, all H. B. Feeley.

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PLATE 1. Crumpling in hind wing of *Nemoura cinerea* (Retzius). Union Wood stream, Collooney, County Sligo, ♂ 18 April 2022. Collected by Ryan Mitchell. Photograph: Hugh B. Feeley.

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POSSIBLE FIRST EVIDENCE THAT SLOW WORMS (*ANGUIS FRAGILIS* LINNAEUS, 1758) FEED ON ANT COLONIES

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Abstract

A slow worm *Anguis fragilis* Linnaeus, 1758 was discovered eating an ant larva. In the Burren, Ireland, these lizards often lying partly or wholly buried in the perfectly churned soil that the ants conveniently manufacture under shelters. This behaviour may provide an opportunity to feed on ant larvae in the colonies.
Key words: *Anguis fragilis*, slow worm, Ireland, Burren, diet, ant larva, Formicidae.

Introduction

There is a population of slow worms, the legless lizard, *Anguis fragilis* Linnaeus, 1758 (Squamata: Anguidae), in the glacial karst landscaped Burren region of Counties Clare and Galway in the west of Ireland (Parry, 2020). My search for this species began in September 2015 with my first live discovery. In 2022, it is still continuing some 1,870 encounters later. Being cold blooded, lizards require the heat of the sun to warm their bodies but rather than bask directly in the sun as is the usual habit of lizards, slow worms prefer to lie beneath sun-warmed objects such as flat rocks, pieces of wood, decomposing vegetation and debris discarded by humans. This preference by slow worms makes possible the use of artificial cover objects (ACOs). These covers can then be positioned in suitable locations to encourage their use instead of their natural equivalents.

When discovered by slow worms the covers, which commonly consist of corrugated tin, hardboard, carpet, and roofing felt (Riddell,1996), are used as natural objects for thermoregulation, rest, and safety.

The diet of the slow worm consists of a variety of invertebrates with a particular preference for the Netted Slug (*Derocerus reticulatum* (O. F. Müller 1774)) (Inns, 2009) and on several occasions, upon lifting a cover I have discovered a slow worm in the process of consuming a slug (Plate 1).

Slow worms feeding on ants (Hymenoptera: Formicidae)

The relationship between slow worms and ants is well established as both species seek out the same environment and conditions to exist and artificial covers placed to encourage use by

slow worms, are an equally convenient alternative for both species. Within a very short time, often just hours, an item placed to encourage slow worm use is likely to show the initial signs of ant infestation, the beginning of a colony that may exist there for some years. Should the cover be appropriately placed close to a dry-stone wall or hedgerow for example and positioned to receive some sunshine, the ants may soon be joined by slow worms that will initially lie apparently peacefully often amidst a roiling mass of ant activity.

The slow worm being semi-fossorial benefits from this association not only by lying partly or wholly buried in the perfectly churned soil that the ants conveniently manufacture but also by retreating into this tilth at a sign of danger. Known to normally hibernate underground (Inns, 2009), it is likely that some slow worms hibernate within this tunnelled, soft earth. A known female that has been found beneath the same tin sheet over seven successive years is often discovered in late February or early March almost totally immersed in the ant worked soil. Juveniles born in late summer and recognisable by their head markings, that spent their time in the honeycomb of ant workings and runnels until hibernation, are often the first to re-appear there in early spring having most likely over wintered there.

Knowing that slow worms eat a variety of invertebrates raises the question of whether they feed on the constituents of the colony. Despite cohabitation, the published opinion is that the inclusion of ants in a slow worm's diet is unknown but unlikely. Frazer (1983) 'Ants are apparently not eaten despite the presence of slow-worms in their nests'. Smith (1951) 'Ants have not been recorded as forming part of a Slow-worm's diet although on many occasions Slow-worms have been found in ant's nests'. Beebee and Griffiths (2000) appeared unsure 'Slow-worms are often found lying within ant's nests but it is unlikely that these insects form a major component of the diet'. Street (1979) 'Although found in ants' nests it does not appear to feed on them'

Ants are capable of biting and acid attack neither of which would affect the hard outer body of the slow worm but may make the consumption of an adult ant unpleasant. Street (1979) 'Occasionally it may be found in anthills, being well protected by its tough skin and the underlying bony plates. It appears to be the only vertebrate capable of surviving such conditions.' However, upon lifting a corrugated tin cover, a photograph of a slow worm lying in a nest of *Formica* sp. may cast an element of doubt on this assumption. (Plate 2). Unnoticed by the author until the downloading and examination of the image, it appeared that the slow worm was possibly consuming an ant larva.

Discussion

Gibson (2022) states that ant larva are not completely inactive; they are capable of movement. Some species of ant larvae have been shown to sway to attract the attention of

passing workers in a behaviour that has been described as begging.

By contrast, ant eggs are static and as such would not attract a slow worm which require movement of their prey to induce a strike, but the nutritious larva, with their slight wriggling or swaying action would surely be acceptable. It may be a coincidence that the larva just happened to be so positioned though for such an immobile being how did it arrive in that position? The larva is clearly in or near the slow worm's mouth and on top of its body. According to available literature, ant larvae do not walk, climb, or jump. Perhaps a conclusion can only be reached by the examination of stomach contents.

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PLATE 1. Slow worm eating a slug. Burren, Ireland, 21 April 2019. Photograph: Nick Parry.

PLATE 2. Slow worm eating an ant larva. Burren, Ireland, 16 June 2022. Below, detail from the main photograph. Photograph: Nick Parry.

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THE GROUND LAYER OF ALLUVIAL FOREST AS A HABITAT FOR STAPHYLINIDAE AND CARABIDAE (COLEOPTERA) AT THE GEARAGH (COUNTY CORK), IRELAND

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Abstract

A total of 93 species (62 Staphylinidae and 31 Carabidae) were recorded from alluvial forest in the relict anastomosing ecosystem of the Gearagh during 1989 and 2021, at three different flood-duration levels characterised by *'Caltha* mud' (mostly bare soil with *Caltha palustris*, etc.), *Allium ursinum* dominated vegetation, and drier soil with *Hedera helix* cover. An additional 17 species (12 Staphylinidae and 5 Carabidae) were recorded from similar *'Caltha* mud' levels at two other alluvial woodlands in Counties Cork and Offaly. A relatively high proportion of the Gearagh species (9%) were considered indicators of well-developed alluvial forest habitat. This is despite the finding that the fine-textured soils of the Gearagh islands appear to be relatively recently formed. However, there are extremely few carabid or staphylinid species in north-west Atlantic Europe which are totally restricted to alluvial forest. Most of the characteristic or indicator species are better described as being restricted to shaded wetlands, which would include reed-beds, dense herbaceous wetland and/or willow carr. This type of habitat is likely to have been more extensive in the Gearagh in the past. Saproxylic, mycetophilous, exposed river sediment, peat-soil wetland and herbaceous riparian assemblages still need to be examined, and other sampling techniques need to be used, to obtain a complete view of the Gearagh carabid and staphylinid fauna.

Key words: The Gearagh, alluvial woodland, alluvial forest, Carabidae, Staphylinidae.

Introduction

Alluvial forests (including alluvial forests with *Alnus* and *Fraxinus* (EEA, 2007) and alluvial hardwood forests (Schnitzler, 1994)) are habitats of high conservation importance in Europe (Council of Europe, 2019; European Commission, 2013). One of the best physiographic examples in north-west Europe is the Gearagh (*an Gaorthadh*) in County Cork, Ireland, a residual piece of anastomosing alluvial forest at the confluence of the Lee and Toon Rivers, the rest of which was felled in the mid-1950s and then flooded for a hydroelectric scheme in 1956 (O'Mahony, 2009; Corcoran, 2021). The extent of the residual and regenerating forest is shown in the aerial photographs in O'Mahony (2009: 234), and aerial photographs of the now drowned

forest area, before and after flooding, are shown in Mitchell (1976: Plate 12) and Little *et al*. (2017: Fig. 4), and Cabot (1999: 264), respectively.

Botanical data were collected prior to the construction of the hydroelectric scheme (O'Reilly, 1955); however, pre-construction entomological data were confined to the Odonata (Hewetson and O'Rourke, 1960). After damage to the residual forest in 1983 and 1984, involving in-channel works in part of the Toon River (Hamilton, 2017), biogeographical interest in the site was renewed. White (1985) provided a botanical and phytosociological account of the site, concluding that the residual forest, upstream from the flooded zone, remained ecologically well-developed. Following an Irish Biogeographical Society field meeting at the Gearagh in 1985, more entomological data were collected (e.g. see Menzel, Smith and Chandler (2006) for sciarid Diptera collected by M. de Courcy Williams in 1990). These included a sample of Staphylinidae from soils with *Allium ursinum* dominated cover, collected by the author in 1989, which are reported here. In 2021, a more detailed survey, focussing on carabid and staphylinid samples from fine-textured soils at a lower level characterised by *Caltha palustris*, was undertaken. The latter also included samples from similar habitat on the Rivers Bandon (County Cork) and Shannon (County Offaly).

The term 'woodland' is more usually used in Ireland to refer to wooded habitats than 'forest'. Consequently, although the term 'alluvial woodland' has a specific meaning (European Commission, 2013), 'alluvial woodland' is used below to mean the broader habitat concept of 'alluvial forest'.

Methods

Carabid and staphylinid sampling was carried out in two parts of the Gearagh woodland (on the Lee and Toon rivers), in the relict area upstream of the reservoir which is not directly affected by the flooding by the Lee hydroelectricity scheme. Two other alluvial woodland sites were also briefly sampled, one on the River Bandon (near Dunmanway, County Cork), and one on a side channel of the River Shannon (Lavagh, County Offaly). All sampled areas were in the wet pedunculate oak-ash woodland with willows habitat type, as described by Little *et al*. (2017). Sampling was mostly focussed on silty sparsely-vegetated soil at a level with more frequent and longer-duration flooding , usually characterised by the presence of *Caltha palustris* (marsh marigold), and referred to below, by way of abbreviation, as *'Caltha* mud'. In the Gearagh, samples were also taken from the two next levels upslope in the flood-vegetation sequence, which were dominated (in spring) by *Allium ursinum* (ramsons), and by *Hedera helix* (ivy), respectively.

Suction sampling was carried out in May 1989, using a D-vac suction sampler (Dietrick, 1961) in *Allium* dominated vegetation on one of the alluvial islands. One set of pitfall traps

(plastic cups with ethylene glycol as preservative) was also set in May 1989. In 2021, pitfall traps were also used, which were glass containers with ethylene glycol as preservative. Pitfall trapping commenced in early June (commencing in May was precluded because of a flood) until late July. Two emergence traps (as described by Owen (1989) but without the base) were also briefly used in the Gearagh. Details of sampled sites and dates are given in Table 1. Carabidae were identified using Luff (2007) and Schmidt (2004), as well as Madison and Anderson (2016), Trautner and Geigenmüller (1987) and Lindroth (1974). Staphylinidae were identified, with most specimens being dissected, using Lott and Anderson (2011), Lott (2009), Assing and Schülke (2012), Lohse (1974), Benick and Lohse (1974), Strand and Vik (1964), Palm (1970, 1972), Brundin (1942), Tronquet (2014a), and a range of other papers. Beetle nomenclature follows Duff (2018), and plant nomenclature follows Stace (1997).

Species were selected as indicators of well-developed habitat if: (1) they have a restricted preference for flooded wetlands which include alluvial woodlands; and (2) they are reported in the literature as being local or rare, from which is it is assumed that they are less likely to survive in historically degraded ecosystems. 'Well-developed habitat' means that the ecosystem is sufficiently undisturbed by human land use to allow it to retain many local or rare characteristic species.

Results

In total, 31 carabid species (Tables 2, 3 and 8), and 62 staphylinid species (Tables 5, 6 and 8) were recorded from the Gearagh alluvial woodland, of which eight species (9%) are considered as indicator species. Both the carabid and staphylinid pitfall trapped assemblages were dominated, respectively, by a single species: *Limodromus* (= *Platynus*) *assimilis* and *Anotylus rugosus*. The suction sample assemblage was dominated by the parthenogenetic staphylinid *Atheta fungi*.

The smaller sample from near Dunmanway (County Cork) contained 14 carabid and 20 staphylinid species, of which two (6%) were considered to be indicator species. Another smaller sample from Lavagh (County Offaly) contained 14 carabid and 15 staphylinid species, of which five (17%) were considered to be indicator species. There were five carabid and 12 staphylinid species, respectively, from these two sites (Tables 4 and 7), not recorded from the Gearagh. The Dunmanway (River Bandon) sample was again dominated by *Limodromus assimilis* and *Anotylus rugosus*, but the Lavagh (River Shannon) sample was dominated by *Pterostichus minor* rather than *L. assimilis*.

Indicator and other species

Limodromus assimilis is one of the most habitat-specific species of those recorded in the

Gearagh, limited to wet woodland and carr habitat, although occurring throughout much of Ireland (Anderson *et al*., 2000). However, as it is not local in distribution, it is not classed as an indicator species here.

Agonum emarginatum (= *afrum* (Duftschmid)) occurs only locally in Ireland, being restricted to eutrophic lakeshores, or under alder in carr or fens, according to Anderson *et al*. (2000). Lindroth (1992) described its microhabitat requirements as "wet, more or less soft soil … and the rich vegetation of *Phragmites* and similar plants". It occurred in *'Caltha* mud' habitat throughout the Gearagh (Tables 2 and 3), and also in the same habitat near Dunmanway (Table 4). *A. emarginatum* is very closely related to *A. viduum* (Holloway *et al*., 2019), and the specimens were determined using the keys and descriptions (including illustration of the ♂ genital ring and ♀ gonocoxites) in Schmidt (2004), as well as in Luff (2007).

Agonum micans is very local in Ireland, being associated with lakeshore alder carr (Anderson *et al*., 2000). In Fennoscandia, it is particularly associated with "loamy-slimy" soil and oozy mud ("*gyttya*") (Lindroth, 1992). Like *A. emarginatum*, it occurred throughout the Gearagh in *'Caltha* mud' habitat (Tables 2 and 3), but, in contrast, was absent from the Dunmanway site (Table 4), reflecting its much more local distribution elsewhere in Ireland. Representative specimens were compared with reference material of English *A. scitulum* (Dejean) from the National Museum of Ireland collections to determine that it was not this species. *A. scitulum* was removed from the Irish list, having been previously erroneously recorded from Killarney (Anderson *et al.*, 2000); two Killarney specimens standing under the label *A. scitulum* in the NMI were also determined (by JAG) and found to be misidentified. *A. micans* is not restricted to alluvial woodland, also occurring in tall *Scirpus*, *Carex* and other herbaceous cover, as well as under *Salix* (Lindroth, 1992; Jachtenfuchs and Wagner, 2012).

A single female *Atheta aquatilis* was recorded from 'Caltha mud' habitat in the Gearagh (Table 6). It has been recorded from reedbeds in Counties Donegal and Clare (Good, 2004), Counties Antrim, Armagh, Down, Tyrone, Fermanagh, Londonderry (Derry), North Tipperary and North Kerry (R. Anderson, pers. comm.). It is a fairly stenotopic species restricted to moss and litter in flooded shaded habitats, springs, flushes and wet woodland (Palm, 1970; Koch, 1989; Hyman and Parsons, 1994), but also fungi in broadleaf woods, cut grass and carrion in Ireland as well as montane meadows in Poland (Burakowski *et al*., 1981).

There are only a few records of *Atheta hygrobia* (= *magniceps* Sahlberg) from Ireland (Brundin, 1942; Good, 2004), and it is local in Great Britain (Hyman and Parsons, 1994) and France (Tronquet, 2014b). The species occurs in moss in wet woodland and willow carr (Koch, 1989; Hyman and Parsons, 1994) but also open riparian marshes (Koch, 1989; Greenwood *et al*., 1991; Jachtenfuchs and Wagner, 2012) including lakeshore reedbeds (Brundin, 1942).

Two *Atheta vaga* (= *nigricornis* (Thomson)) occurred in the emergence traps. This species is

worth mentioning, not because it is local (there are many widespread records (R. Anderson, pers. comm.) but because of its method of capture. *A. vaga* is frequently found in numbers in bird's nests (83 individuals were recorded in a buzzard nest by Strand (1959), and 18 in a crow nest by Spittle (1947)). It is also reported from fungi and other vegetation debris. It is unlikely to have emerged from the ivy-dominated woodland soil, but more probably dispersing beetles flew into the oblique mesh sides of the trap, rolled down the side, crawled under the hem, and subsequently took flight within the trap.

Badister dilatatus is very local in Ireland, and local in Great Britain (Anderson *et al*., 2000; Luff, 1998). It a species of shaded, wet, muddy litter-covered lake or pool shore soil where the plant cover is dense and can be tall reeds, herbs, scrub or trees (Anderson *et al*., 2000; Lindroth, 1992). Turin (2000) considered *B. dilatatus* to be a good indicator of a natural gradual transition in ecotonal riparian habitat. It was found only at the River Shannon in the present study (Table 4).

Another *Badister* species, *B. sodalis*, was recorded in in a D-vac sample from the Gearagh (Table 8). It is only known locally in Ireland (Luff, 1998; Anderson *et al*., 2000), although probably under-recorded in the south where, based on its British distribution, it would be expected to be more widespread. According to Lott (2003), it is restricted to wet woodland in Great Britain; however, Koch (1989) also mentions riparian marshes and wet heaths as preferred habitats. Lindroth (1992) summarized it as a stenotopic species of deciduous forest swamps, although both he and Turin (2000) also mentioned rich meadows or dense grasslands under bushes and trees such as *Salix* and *Crataegus*. Records collected by Anderson in Ireland comprise 28 sites of which sixteen are clearly wet woodland including alder and willow carr (R. Anderson, pers. comm.).

Bembidion assimile is very local in Ireland (Anderson *et al*., 2000) away from coastal habitats, and was recorded only from the Shannon site (Table 4). The species occurs in both coastal and inland shorelines, in the latter case restricted to slow-moving water-bodies (Anderson *et al*., 2000). It occurs in *Carex* and *Phragmites* stands, always near the waterline (Lindroth, 1992).

Bembidion dentellum is local in Ireland (Anderson *et al.*, 2000), but given its southerly distribution in Great Britain (Luff, 1998), this may reflect the low level of carabid recording in southern Ireland. Nevertheless, this species is exclusively riparian (Lindroth, 1992) and particularly adapted to inundation (Zulka, 1994) being found on seasonally flooded riverbanks with coarser sediments and in the inundation zone of turloughs (R. Anderson, pers. comm.). Gerisch *et al.* (2006) considered the species particularly characteristic of inundated alluvial forest in Germany. Luff (2007) mentioned its preference for shaded muddy lakeshores and Lindroth (1992) its frequent association with *Salix*, *Alnus*, etc., but it is also often recorded from

open marshes (Koch, 1989; Greenwood *et al*., 1991; Castella *et al*., 1994; Anderson *et al*., 2000). A surprising result, given its flood-tolerance, was its absence from the Lee part of the woodland (Table 3) compared to its relative abundance in the Toon part (Table 2).

A single female *Oxypoda vittata* was recorded from the suction sample (Table 8), a species previously recorded from Counties Antrim (Johnson and Halbert, 1902) and Sligo (O'Mahony, 1938) (There is also at least one specimen from Killarney, County Kerry, in the E. F. Bullock collection in the National Museum of Ireland (det. JAG)). *O. vittata* is most frequently recorded in Europe in nests of the ant *Lasius fuliginosus* (Latreille), but is not strictly myrmecophilous and occurs in mammal and bumble-bee nests also (Palm, 1972), and has been recorded in Scotland outside the range of *L. fuliginosus* (Sharp, 1873). This may explain the record of *O. vittata* from County Antrim, but it is not impossible that *L. fuliginosus* could occur in the Gearagh, as the ant was recorded from several sites in Counties Cork and Kerry (O'Rourke, 1950; Collingwood, 1958). Whether *O. vittata* has a breeding population in the Gearagh alluvial woodland, despite the flooding risk to its habitat, or occurs as a 'tourist' from outside the annual floodplain, remains to be investigated.

Pterostichus anthracinus is a locally-occurring carabid species in Ireland and Great Britain (Anderson *et al*., 2000; Luff, 1998). In Ireland, according to Anderson *et al*. (2000), it is restricted to "partially shaded clayey or humus-rich soil on the margins of eutrophic lakes and ... in fens". Lindroth (1992) describes its habitats as usually stagnant freshwater and pools "with foul-smelling water that dries up in summer", with some shade usually by trees and bushes, and with ground vegetation sparse or absent.

Stenus carbonarius, recorded from the Shannon site (Table 4), is local in Ireland and Great Britain (Anderson, 1984; Hyman and Parson, 1994; Lott and Anderson, 2011). In France, it is rare outside of the north-east (Tronquet, 2014b); Dauphin (1993) mapped no records from Brittany and Normandy. In contrast, it is common and widespread in Scandanavia and Central Europe (Renkonen, 1938; Palm, 1961; Horion, 1963). *S. carbonarius* occurs in fens, mesotrophic bog and richly vegetated lakeshores and river margins (Horion, 1963; Anderson, 1984; Lott and Anderson, 2011). As it is frequent in non-woody fens, bogs and floodplain habitats, its localised distribution in north-west Atlantic Europe may be less due to floodplain deforestation than to its preference for colder habitats (see Renkonen, 1938). This might explain its absence in samples from the Gearagh. However, speculation on causes of distribution such as this, without experimental verification, was criticised by Lindroth (1992).

Stenus europaeus occurred in pitfall traps in the Toon River part of the Gearagh (Table 5). It is a local species in Ireland and Great Britain (Anderson, 1984, 1997; Hyman and Parsons, 1994), restricted to fen vegetation near *Alnus* or *Salix*, often on lakeshores (Lott and Anderson, 2011). In Central Europe, it has been reported from similar wooded habitats as well as shaded

lake-shores and riverbanks (Koch, 1989). Derunkov (2009) made the same observation as Lott and Anderson (above) that it occurs frequently in open habitats alternating with wooded plots in the Belorussian wetland region; it is clearly not dependant on alluvial forest.

Discussion

The Gearagh alluvial woodland

The relatively high proportion of indicator species (9%) shows the high conservation value of the Gearagh alluvial woodland, and supports the conclusion of White (1985) that the relict woodland area is ecologically well-developed. Furthermore, this result is based only on samples restricted to a fine-textured soil in a few areas of the Gearagh in the early summer of just two years. Experienced manual collecting can recover many localised species not obtained in pitfall traps (Knapp *et al*., 2020), and there are many other microhabitats in the Gearagh which will contain many species not recorded here; a case in point is *Stenus guttula*, readily found in a brief examination of the riparian *Pellia epiphylla* zone (Table 8), but not otherwise recorded. In particular, saproxylic species and those of open wooded and unwooded wetlands on peaty and coarse-textured soils have not yet been investigated.

An important insight into the habitat continuity of the Gearagh was given by Brown (1999), who investigated soil profiles of several of the wooded islands:

"The islands are underlain by woody and fibrous herbaceous peats sitting on the basal gravels, which are themselves covered by 1-1.5m of clay rich silt ... Four radiocarbon dates from wood and herbaceous peat at the base of two islands give a consistent date for the island formation of c. 1300 AD with the deposition of organic rich sediments until c. 1650 AD after which the inorganic clay rich silts are deposited. … The stratigraphy and date of formation of the two islands [sampled] suggests that the woodland is only of High Medieval Age (14th Century) and probably associated in some way with the construction of the flood embankments which constrained the channels causing rapid in-channel and over-bank siltation."

This recent deposition may also explain the unleached brown earth soil profile from the Gearagh woodland, illustrated by Cudmore (2012: Fig. 3.3). It is not confined to the Gearagh; the literature on Holocene geomorphology has many references to a similar recent alluvial deposition by anthropogenically-eroded soils (see Macklin, Jones and Lewin (2010: Fig. 18)).

The relatively high number of indicator species recorded should therefore be surprising, given that the fine-textured soils of the Gearagh islands appear to be relatively recently formed. However, there are extremely few carabid or staphylinid species in north-west Atlantic Europe which are completely restricted to alluvial woodland. Hammond (1998) and Lott (2003) listed only *Oxypoda nigrocincta* Mulsant and Rey, which is not recorded from Ireland, as being restricted to floodplain woodland in Great Britain. As can be seen from the species habitat

descriptions above, most of the characteristic or indicator species are better defined as being restricted to shaded wetlands, which would include other shaded muddy habitats, such as reed-beds, *Salix* carr or floodplain fens. These habitats are likely to be much more extensive in the past; for example, Corcoran (2021: 88) cited Smith (1774) referring to the regular occurrence of bitterns (*Botaurus stellaris* Linnaeus) at the Gearagh.

A further insight on the historical habitat is provided by Corcoran (2021: 91), describing the traditional flat-bottomed boats that were used to access the Gearagh islands:
"… the boats were used on an everyday basis to reach 'working' islands in order to collect herbs, tubers, fruit and nuts, coppice timber …"

This suggests that the woodland channels may have been kept much more open by human activity, which would favour woodland edge herbaceous species such as *Oenanthe crocata*. It would be currently impossible to navigate most of the Gearagh channels in the relict woodland, now abandoned, due to the fallen trees and overhanging branches causing the river channel to be frequently 'tunnelled' (in the sense of O'Grady, 2006: 38 *et seq*.).

Both insights indicate that a much more open wetland with wooded parts on mainly peaty or coarse-textured soils, but with localised patches of silty soils occurring in reed-beds, etc., would have existed in the past. All of the indicator species of carabid or staphylinid recorded here could also survive in such habitats outside of alluvial forest, albeit for most species with shade from reeds, carices, herbaceous wetland plants, or *Salix* bushes. It remains for the saproxylics to be investigated to indicate the woodland continuity suggested by the history of the area (see Cudmore (2012) and Corcoran (2021)).

Comparison between the results (Tables 2-6) for the Toon and the Lee parts of the woodland show that *Atheta aquatilis*, *Bembidion dentellum* and *Pterostichus anthracinus* were missing from the Lee samples. Most samples from the Toon part of the woodland were deliberately taken from its margin. This was to avoid potential reductions in species diversity which might have occurred on interior islands due to flooding (see McLaughlin, Emmerson and O'Gorman, 2013). However, all the four indicator species recorded from these Toon marginal samples also occurred on a central island ('oak') in the Toon woodland (Table 2). It is likely that the fauna that McLaughlin *et al.* (2013) referred to belonged to a higher, more terrestrial, level of the woodland soil.

Indeed, habitat levels (in relation to flood duration) appear to be especially important in understanding the carabid fauna (Antvogel and Bone, 2001). Cudmore (2012) recorded 21 carabid species from the Gearagh woodlands and grasslands, of which eight were reported from the upstream relict woodland area, the same area where the samples reported here were taken. Of these eight species, three were dominant: *Carabus nemoralis*, *Limodromus assimilis* and *Abax parallelipipedus*, in order of abundance. In contrast, *C. nemoralis* was not recorded in

2021 in the *Caltha* mud habitat, but one individual occurred in the higher woodland soil surface dominated by ivy (*Hedera helix*) cover (Table 3). Similarly, three *Abax parallelepipedus* were recorded in the ivy-covered station, but only five in all of the nine *Caltha* mud stations (Tables 2, 3 and 8). The differences appear to be microhabitat related (although some seasonality may have affected numbers also); both *C. nemoralis* and *A. parallelepipedus* being species of drier soils, the former eurytopic, and the latter occurring in woods and heathland (Anderson *et al*., 2000; Luff, 1998).

Dunmanway alluvial woodland

The Dunmanway samples (Tables 4 and 7) contained *Agonum emarginatum* and *Bembidion dentellum*, two indicator species also occurring in the Gearagh, but no staphylinid indicator species.

In contrast to much of the Gearagh, the 1842 O.S. map shows no wooded cover south of Dunmanway Long Bridge where alluvial woodland exists today. The sampled woodland is therefore secondary, recent and possibly partly planted. Further sampling at this site is necessary to establish the likely absence of *Agonum micans* and *Pterostichus anthracinus*, two species recorded from the Gearagh but not near Dunmanway. However, if they are absent, then this correlates with the much more restricted amount of open wetland associated with this woodland near Dunmanway, compared to the Gearagh. It is interesting that the ordination of the results from a study of alluvial gallery woodlands in the Loire valley (France) showed both these latter species to be more associated with floodplain wetland than with woodland (Castella *et al*., 1994). Nevertheless, if the habitat was available upstream, they should be able to readily recolonize the restored woodland (see Walter *et al*., 2017).

Shannon alluvial woodland

The sampled alluvial woodland at the River Shannon (Lavagh, County Offaly) is only recently formed, and is in a semi-regulated river being <250m downstream of the Marlborough sluices managed in coordination with Meelick Weir. As can be seen from the 1842 O.S. maps (and see also Rhodes map in Delany, 2008:87), originally there were islands in the river channel and the sampled locations were originally where the river channel itself occurred. After construction of the flood relief channel and sluices in 1884 (Delany, 2008: 152), the channel was straightened and the islands within this straightened channel apparently excavated and removed to the far (Incherky Island) bank from the sampled area. In the intervening almost 140 years, alluvial processes have deposited silt on the Lavagh side, upon which alluvial woodland has developed, although there are several mature oak which may represent the ecological residue of the original islands. Unlike the Gearagh, however, the Shannon surface alluvium

contains a significant fraction of fine-textured peat, originating from commercial peat abstraction in upstream bogs (Fitzsimons and Igoe, 2004).

Although only two sets of pitfall trap data were collected, the results (Tables 4 and 7) allow two preliminary conclusions. Firstly, the occurrence of *Badister dilatatus*, *Bembidion assimile*, *B. dentellum*, *Pterostichus anthracinus* and *Stenus carbonarius* indicate the conservation value of this recently formed woodland, which must have been recolonised from patches of riparian habitat which survived the major navigation and flood relief modifications in this part of the river in the nineteenth century. These five wetland species are not restricted to riparian woodland/carr, occurring in non-wooded marsh and fen habitats also (Lindroth, 1992; Anderson, 1984; Luff, 1998; Anderson *et al*., 2000; Lott, 2003). Secondly, *B. dilatatus*, *B. assimile* or *S. carbonarius* were not recorded in the County Cork sites despite more intensive sampling in the same habitat, indicating a possible faunistic difference for the Shannon alluvial woodland habitat.

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TABLE 1. Details of sites and sampling of alluvial woodland in the Gearagh and other sites in Counties Cork and Offaly. Locality names are those used in 1:50 000 maps. Irish grid reference values were obtained using a Garmin hand-held GPS.

Generic abbreviations: *Ac. - Acer*; *An. - Angelica*; *Ap. - Apium*; *At. - Athyrium*; *Be. - Betula*; *Bl. - Blechnum*; *Ca. - Caltha*; *Cd. - Cardmines*; *Ch. - Chrysosplenium*; *Ci. - Circaea*; *Co. - Corylus*; *Cr. - Crataegus*; *Cx. - Carex*; *Dr. - Dryopteris*; *Fi. - Filipendula*; *Fr. - Fraxinus*; *Ga. - Galium*; *He. - Hedera*; *Ir. - Iris*; *Lo. - Lonicera*; *Ly. - Lythrum*; *Me. - Mentha*; *My. - Myosotis*; *Oe. - Oenanthe*; *Pe. - Pellia*; *Ph. - Phalaris*; *Po. - Polygonum*; *Qu. - Quercus*; *Ra. - Ranunculus*; *Ri. - Ribes*; *Ro. - Rorripa*; *Ru. - Rumex*; *Qu. - Quercus*; *Sa. - Salix*; *Se. - Senecio*; *So. - Solanum*; *Ur. - Urtica*; *Ve. - Veronica.*
Other abbreviations: *cong./sang. - conglomeratus/sanguineus*; em. - emergence; occ. – occasional; sam. - samples.

The Gearagh (R. Toon) (Co. Cork) [East] W29987065	Bare mud with Ca. palustris and Fi. ulmaria under Sa. cinerea, Co. avellana and Fr. excelsior, with At. filix-femina, Ph. arundinacea, Cx. remota, Ci. lutetiana, Cd. flexuosa, Ur. dioica.	4 pitfall traps 6 - 16 June; 16 June - 10 July 2021
The Gearagh (R. Toon) (Co. Cork) [West] W29977066	Bare mud with Ca. palustris and Fi. ulmaria under Fr. excelsior, with Sa. cinerea, Co. avellana, Be. pubescens, At. filix-femina, Ph. arundinacea, Cx. remota, Cd. flexuosa, Ur. dioica, Ve, montana, Ch. oppositifolium, Oe. crocata.	4 pitfall traps 6 - 16 June; 16 June - 10 July 2021
The Gearagh (R. Toon) (Co. Cork) [Oak Is.] W30107054	Bare mud with Ca. palustris under Qu. x rosacea, and Fr. exclesior, with Co. avellana, Be. pubescens, Ru. cong./sang., At. filix-femina, Cd. flexuosa, Ri. rubrum.	4 pitfall traps 16 June - 10 July 2021
The Gearagh (R. Lee) Co. Cork[First Is.] W30046973	Bare mud with Ca. palustris under Fr. excelsior and Cr. monogyna, on level below Ci. lutetiana, Fi. ulmeria, Al. ursinum, An. nemorosa, Ru. cong./sang., Ve. sylvatica, Dr. sp., Oe. crocata, Co. avellana.	4 pitfall traps 6 - 26 June 2021
The Gearagh (R. Lee) Co. Cork[Root Is.] W30026980	Bare mud with Ca. palustris under Fr. excelsior and Cr. monogyna, with Ci. lutetiana, Fi. ulmeria, Al. ursinum, An. nemorosa, Dr. sp., Oe. crocata, Ru. cong./sang., Ve. montana, Se. palustris, Ur. dioica.	4 pitfall traps 6 - 26 June 2021
The Gearagh (R. Lee) Co. Cork[Allium] W30016987	Bare soil with litter and Al. ursinum, under Co. avellana and Fr. excelsior, with Ac. pseduoplatanus, Be. pubescens, Cr. monogyna and occ. He. helix.	4 pitfall traps 8 - 29 June 2021
The Gearagh (R. Lee) Co. Cork[Hedera] W30036989	He. helix and Al. ursinum under Co. avellana and Fr. excelsior, with Ac. pseduoplatanus, Cr. monogyna, Qu. robur, and An. nemorosa, Fi. ulmeria, Dr. sp., Lo. periclymenum, Eu. hibernica, Bl. spicant.	4 pitfall traps 8 - 29 June; 2 em. traps 8 June - 24 July 2021
The Gearagh (R. Lee) Co. Cork. W3069	Al. ursinum dominated vegetation.	3 D-vac sam. 13 May 1989
Nr Dunmanway (R. Bandon) Co. Cork W241524 [West]	Bare mud under Co. avellana, Sa. cinerea, Fr. excelsior, Cr. monogyna, Qu. robur, with occ. Al. ursinum, Pe. sp; mosses.	4 pitfall traps 12 June - 3 July 2021
Nr Dunmanway (R. Bandon) Co. Cork W242524 [East]	Bare mud under Co. avellana, Sa. cinerea, Fr. excelsior; Cr. monogyna, with Ca. palustris, Al. ursinum, Pe. sp; mosses.	4 pitfall traps 12 June -3 July 2021

TABLE 1. (continued)

Lavagh (R. Shannon) Co. Offaly [South] M96081400	Bare mud under Sa. cinerea, young Fr. excelsior, Cr. monogyna with Ca. palustris, So. dulcamera, Fi. ulmeria, Ro. amphibia, Cd. flexuosa, Se. palustris, My. scorpioides, Ru. cong./sang.	4 pitfall traps 9 June - 6 July 2021
Lavagh (R. Shannon) Co. Offaly [North] M96061407	Bare mud under Sa. cinerea, Fr. excelsior, Cr. monogyna, Qu. robur, with Ca. palustris, So. dulcamera, Fi. ulmeria, Ci. lutetiana, Me. aquatica, Ph. arundinacea, Ap. nodiflorum, Ru. cong./sang., Ly. salicaria, Cd. flexuosa, An. sylvestris, Ir. pseudacorus	4 pitfall traps 9 June - 6 July 2021

TABLE 2. Carabidae recorded from pitfall traps from *'Caltha* mud' habitat in alluvial woodland in the Toon River part of the Gearagh, Conty Cork. 'Indicator species'are marked with an asterisk.

Species	**Toon - June**		**Toon - July**			**Total**
	West	**East**	**Oak**	**West**	**East**	
Abax parallelepipedus (Piller & Mitterp.)	-	1	-	2	-	3
Agonum emarginatum (Gyllenhal)*	1	1	1	-	1	4
Agonum fuliginosum (Panzer)	1	-	-	-	-	1
Agonum micans (Nicholai)*	4	1	3	3	2	13
Agonum muelleri (Herbst)	1	-	-	-	-	1
Agonum viduum (Panzer)	2	-	-	-	-	2
Bembidion dentellum (Thunberg)*	5	7	5	2	1	20
Bembidion guttula (Fabricius)	1	-	-	-	-	1
Bembidion mannerheimii Sahlberg	-	2	-	1	3	6
Carabus granulatus Linnaeus	4	-	3	6	-	13
Clivina fossor (Linnaeus)	-	-	-	-	1	1
Elaphrus cupreus Duftschmid	3	1	-	1	1	6
Limodromus assimilis (Paykull)	14	4	20	5	3	46
Nebria brevicollis (Fabricius)	1	-	-	-	1	2
Paranchus albipes (Fabricius)	1	3	8	2	-	14
Pterostichus anthracinus (Illiger)*	1	-	1	-	1	3
Pterostichus gracilis (Dejean)	1	-	-	-	-	1
Pterostichus melanarius (Illiger)	-	-	1	1	-	2
Pterostichus minor (Gyllenhal)	1	4	-	1	1	7
Pterostichus niger (Schaller)	-	-	-	-	1	1
Pterostichus nigrita (Paykull)	7	1	1	1	-	10
Pterostichus strenuus (Panzer)	2	1	1	3	-	7
Pterostichus vernalis (Panzer)	-	-	-	1	-	1
Total (no.)	50	26	44	29	16	165

TABLE 3. Carabidae recorded from pitfall traps from '*Caltha* mud' and '*Hedera* soil' habitat in alluvial woodland in the Lee River part of the Gearagh, County Cork. 'Indicator species' are marked with an asterisk.

Species	**June Root**	**June First**	**July Root**	**June *Allium***	**June *Hedera***	**Total**
Abax parallelepipedus (Piller & Mitterp.)	1	-	1	-	3	5
Agonum emarginatum (Gyllenhal)*	2	-	1	-	-	3
Agonum micans (Nicholai)*	1	1	-	-	-	2
Agonum viduum (Panzer)	-	1	2	-	-	3
Asaphidion curtum (Heyden)	-	-	-	1	-	1
Bembidion mannerheimii Sahlberg	1	3	-	-	-	4
Bembidion obtusum Audinet-Servile	-	-	4	-	-	4
Bembidion tetracolum Say	2	-	-	-	-	2
Carabus granulatus Linnaeus	5	7	10	4	7	33
Carabus nemoralis Müller	-	-	-	-	1	1
Chlaenius nigricornis (Fabricius)	-	-	1	-	-	1
Clivina fossor (Linnaeus)	-	2	1	2	-	5
Limodromus assimilis (Paykull)	23	18	9	36	13	99
Loricera pilicornis (Fabricius)	-	-	1	-	-	1
Ocys tachysoides (Antoine)	1	-		-	-	1
Paranchus albipes (Fabricius)	5	5	-	-	-	10
Pterostichus nigrita (Paykull)	5	4	2	2	-	13
Pterostichus strenuus (Panzer)	-	1	2	5	6	14
Total (no.)	46	40	34	50	30	200

TABLE 4. Carabidae recorded from pitfall traps from alluvial woodland at the River Bandon at Dunmanway, County Cork, and the River Shannon at Lavagh, County Offaly. All habitat was '*Caltha* mud' except for 'moss/*Pellia* mud' in Dunmanway (West). 'Indicator species' are marked with an asterisk.

Species	**Dunmanway**		**Lavagh**	
	West	**East**	**South**	**North**
Agonum emarginatum (Gyllenhal)*	-	1	-	-
Agonum fuliginosum (Panzer)	-	-	-	-
Anchomenus dorsalis (Pontopiddan)	1	-	-	-
Badister dilatatus Chaudoir*	-	-	1	-
Bembidion assimile Gyllenhal*	-	-	**2**	14
Bembidion dentellum (Thunberg)*	-	1	1	-
Bembidion lampros (Herbst)	**5**	**2**	-	-
Bembidion mannerheimii Sahlberg	-	6	6	1
Bembidion obtusum Audinet-Serville	-	-	-	-
Bembidion tetracolum Say	-	-	-	7
Carabus granulatus Linnaeus	2	2	-	-
Clivina fossor (Linnaeus)	2	4	-	-
Harpalus rufipes (De Geer)	-	2	-	-
Limodromus assimilis (Paykull)	8	2	1	2
Loricera pilicornis (Fabricius)	1	1	-	1
Nebria brevicollis(Fabricius)	**3**	**5**	-	-
Notiophilus biguttatus (Fabricius)	-	-	-	1
Oxypselaphus obscurus (Herbst)	-	-	2	4
Paranchus albipes (Fabricius)	-	3	1	-
Pterostichus anthracinus (Illiger)*	-	-	5	-
Pterostichus minor (Gyllenhal)	-	-	11	7
Pterostichus nigrita (Paykull)	-	-	2	1
Pterostichus strenuus (Panzer)	-	4	5	9
Pterostichus vernalis (Panzer)	-	-	-	-
Trechus obtusus Erichson	-	2	-	-

TABLE 5. Staphylinidae recorded from pitfall traps from '*Caltha* mud' habitat in alluvial woodland in the Toon River part of the Gearagh, County Cork. 'Indicator species'are marked with an asterisk.

Species	**Toon - June**		**Toon - July**			**Total**
	West	**East**	**Oak**	**West**	**East**	
Aloconota insecta (Thomson)	1	-	8	9	1	19
Anotylus rugosus (Fabricius)	12	3	14	35	27	91
Atheta amplicollis (Mulsant & Rey)	-	-	-	1	1	2
Atheta fungi (Gravenhorst)	1	-	6	-	6	13
Atheta hygrobia (Thomson)* ♂♀♀	2	-	1	1	2	6
Atheta (*Philhygra*) sp. ♀	-	-	-	2	-	2
Carpelimus elongatulus (Erichson)	-	-	-	1	2	3
Euconnus hirticollis (Illiger)	-	1	-	-	1	2
Gyrohypnus fracticornis (Müller)	-	-	-	-	1	1
Lathrobium fovulum Stephens	-	-	-	1	1	2
Megarthrus depressus (Paykull)	-	-	-	1	-	1
Omalium caesum Gravenhorst	-	1	-	-	-	1
Oxypoda brevicornis (Stephens)	-	-	6	1	-	7
Philonthus cognatus Stephens	1	-	-	-	-	1
Philonthus laminatus (Creutzer)	-	-	-	-	1	1
Quedius curtipennis Bernhauer ♂	1	-	-	-	-	1
Quedius fuliginosus (Gravenhorst) ♂	-	-	1	-	-	1
Quedius fumatus (Stephens)	-	-	-	1	-	1
Stenus bimaculatus Gyllenhal	2	-	-	-	1	3
Stenus canaliculatus Gyllenhal	1	-	-	-	-	1
Stenus europaeus Puthz*	1	-	-	2	1	4
Stenus juno (Paykull)	1	2	-	-	-	3
Stenus pusillus Stephens	-	-	-	-	1	1
Stenus tarsalis Ljungh	-	1	-	-	-	1
Tachinus laticollis Gravenhorst	1	-	-	-	-	1
Total (no.)	24	8	36	55	46	169

TABLE 6. Staphylinidae recorded from pitfall traps from '*Caltha* mud'and '*Hedera* soil'habitat in alluvial woodland in the Lee River part of the Gearagh, County Cork. 'Indicator species' are marked with an asterisk.

Species	**June Root**	**June First**	**July Root**	**June *Allium***	**June *Hedera***	**Total**
Aloconota insecta (Thomson)	3	2	3	-	-	8
Anotylus rugosus (Fabricius)	14	30	38	23	40	145
Atheta amplicollis (Mulsant & Rey)	-	-	4	13	3	20
Atheta aquatilis (Thomson)*	1	-	-	-	-	1
Atheta castanoptera (Mannerheim)	-	1	-	-	-	1
Atheta clientula (Erichson)	1	-	2	-	5	8
Atheta fungi (Gravenhorst)	1	3	2	4	15	25
Atheta graminicola (Gravenhorst)	-	1	-	1	-	2
Atheta hygrobia (Thomson)*	1	-	1	-	-	2
Atheta laticollis (Stephens)	1	-	-	-	-	1
Atheta malleus (Joy) ♂	1	-	-	-	-	1
Atheta (*Philhygra*) sp. ♀	-	1	-	-	-	1
Bisnius fimetarius (Gravenhorst)	-	-	-	1	-	1
Callicerus obscurus Gravenhorst	-	-	-	-	1	1
Deleaster dichrous (Gravenhorst)	-	1	-	-	-	1
Dinaraea aequata (Erichson)	-	-	1	-	-	1
Geostiba circellaris (Gravenhorst)	-	-	-	-	1	1
Lesteva punctata Erichson	-	-	1	-	-	1
Omalium caesum Gravenhorst	1	-	-	-	-	1
Oxypoda brevicornis (Stephens)	-	-	2	1	-	3
Stenus bimaculatus Gyllenhal	2	-	-	-	-	2
Stenus boops Ljungh	-	1	-	-	-	1
Stenus clavicornis (Scopoli)	-	-	2	-	-	2
Stenus juno (Paykull)	-	-	1	-	-	1
Stenus latifrons Erichson	1	-	-	-	-	1
Tachinus laticollis Gravenhorst	1	-	2	-	1	4
Total (no.)	28	40	59	42	66	235

TABLE 7. Staphylinidae recorded from pitfall traps from alluvial woodland at the River Bandon at Dunmanway, County Cork, and the River Shannon at Lavagh, County Offaly. All habitat was '*Caltha* mud' except for 'moss/*Pellia* mud' in Dunmanway (West). 'Indicator species' are marked with an asterisk.

Species	**Dunmanway**		**Lavagh**	
	West	**East**	**South**	**North**
Acrotona aterrima (Gravenhorst)	-	-	-	1
Aloconota gregaria (Erichson)	-	1	-	-
Aloconota insecta (Thomson)	5	1	-	-
Anotylus rugosus (Fabricius)	44	24	4	22
Atheta amplicollis (Mulsant & Rey)	6	4	3	4
Atheta aquatica (Thomson)	-	3	-	-
Atheta clientula (Erichson)	1	-	-	-
Atheta fungi (Gravenhorst)	5	2	1	6
Atheta graminicola (Gravenhorst)	-	-	-	1
Atheta indubia (Sharp)	1	-	-	-
Brachygluta fossulata (Reichenbach)	-	1	-	-
Carpelimus corticinus (Gravenhorst)	-	-	1	1
Carpelimus elongatulus (Erichson)	2	-	1	-
Dinaraea aequata (Erichson)	1	-	-	-
Euconnus hirticollis (Illiger)	-	1	-	-
Gabrius ?-*trossulus* (Nordmann) ♀	-	1	-	-
Geostiba circellaris (Gravenhorst)	-	-	-	3
Lathrobium fulvipenne (Gravenhorst)	-	-	-	1
Megarthrus depressus (Paykull)	1	-	-	-
Oxypoda brevicornis (Stephens)	2	-	1	16
Oxypoda elongatula Aubé	-	1	-	-
Proteinus laevigatus Hochhuth	-	-	-	1
Stenus bifoveolatus Gyllenhal	1	-	-	-
Stenus bimaculatus Gyllenhal	2	1	-	2
Stenus carbonarius Gyllenhal*	-	-	3	1
Stenus ?-*formicetorum* Mannerheim ♀	1	-	-	-
Stenus juno (Paykull)	1	-	1	-
Tachinus laticollis Gravenhorst	-	-	4	3

TABLE 8. Staphylinidae and Carabidae recorded in alluvial woodland in the Lee River part of the Gearagh, County Cork: D-vac suction samples and pitfall traps from *Allium ursinum* dominated vegetation; emergence traps from soil with *Hedera helix* cover; and from 'splash-sampling' riparian banks with *Pellia epiphylla* (23 April 1989). 'Indicator species'are marked with an asterisk. n.d. = no data.

Species	***Allium* D-vac**	***Allium* traps**	**Em. traps**	***Pellia***
STAPHYLINIDAE				
Aloconota insecta (Thomson)	-	1	-	-
Amischa analis (Gravenhorst)	1	-	-	-
Anotylus rugosus (Fabricius)	8	2	-	-
Atheta amplicollis (Mulsant & Rey)	16	2	-	-
Atheta aquatilis (Thomson)*	-	1	1	-
Atheta elongatula (Gravenhorst)	1	-	-	-
Atheta fungi (Gravenhorst)	95	2	-	-
Atheta graminicola (Gravenhorst)	-	2	-	-
Atheta vaga (Heer)	-	-	2	-
Bryaxis bulbifer (Reichenbach)	1	-	-	-
Geostiba circellaris (Gravenhorst)	1	-	-	-
Lesteva punctata Erichson	6	1	-	-
Lesteva sicula Erichson	8	-	-	-
Ocalea picata (Stephens)	-	3	-	-
Omalium rivulare (Paykull)	-	1	-	-
Omalium rugatum Mulsant & Rey	1	-	-	-
Oxypoda brevicornis (Stephens)	1	-	-	-
Oxypoda elongatula Aubé	13	-	-	-
Oxypoda vittata Märkel*	1	-	-	-
Quedius fumatus (Stephens)	-	1	-	-
Sepedophilus nigripennis (Stephens)	-	-	1	-
Stenus brunnipes Stephens	1	-	-	-
Stenus cicindeloides (Schaller)	2	-	1	-
Stenus clavicornis (Scopoli)	1	-	-	-
Stenus flavipes Stephens	8	-	-	-
Stenus fulvicornis Stephens	1	-	1	-
Stenus guttula Müller	-	-	-	3
Stenus juno (Paykull)	3	-	-	-
Stenus latifrons Erichson	1	-	-	-
Stenus lustrator Erichson	3	-	-	-
Stenus nitidiusculus Stephens	2	-	-	-
Stenus picipes Stephens	8	-	-	-
Tachinus laticollis Gravenhorst	2	5	-	-
Tachinus rufipes (Linnaeus)	-	5	-	-
Tachyporus obtusus (Linnaeus)	1	-	-	-
Tachyporus tersus Erichson	1	-	-	-
Tinotus morion (Gravenhorst)	-	-	1	-

TABLE 8 (continued)

species	***Allium* D-vac**	***Allium* traps**	**Em. traps**	***Pellia***
CARABIDAE				
Badister sodalis Duftschmid*	1	n.d.	-	-
Bembidion mannerheimii Sahlberg	3	n.d.	-	-
Trechus obtusus Erichson	1	n.d.	-	-

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RECENT RECORDS OF IRISH CADDISFLIES (TRICHOPTERA)

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Abstract

Recently discovered records of the caddisflies (Trichoptera) of Ireland are reported including new monad and hectad ones. New county records are also noted.

Key words: Trichoptera, *Anabolia brevipennis*, *Oxyethira tristella*, caddisflies, Ireland, new records, distribution.

Introduction

Since O'Connor and O'Connor (2021), a large amount of new information has been discovered including new monad (1km^2) and hectad (10km^2) records. Numerous new county records are reported. Previous county records will be found in O'Connor (2021a). Four figure (1km^2) Irish grid references are given for each record. The more important discoveries are shown. Unless otherwise stated, specimens were identified by the senior author using Malicky (2004), Barnard and Ross (2012) and Salokannel and Mattila (2018). Other records were confirmed by JPOC. Trichoptera records received through the Citizen Science Portal of National Biodiversity Data Centre in 2021 and 2022 are indicated by (NBDC, 2022) and (NBDC, 2023) respectively.

Addendum 6 and Addendum 7

Addendum 6 to the dataset "Caddisflies (Trichoptera) of Ireland", was uploaded by the National Biodiversity Data Centre on the 29 November 2021 <https://maps.biodiversityireland.ie/Dataset/250> (O'Connor, 2021b). There are presently 17719 records for 156 species from 830 sites.

The records in this paper will be sent to the National Biodiversity Data Centre as Addendum 7 for incorporation into the above dataset.

The new records

RHYACOPHILIDAE

***Rhyacophila dorsalis* (Curtis, 1834)**

CAVAN: Crover Public Quay, Lough Sheelin (N4786), 3♀♀ 8 September 2021, light-trap, C. McNaughton.

OFFALY: Camcor River, Birr town (N0604), larva 6 July 2022, R. Mc Kenna, determined by H. Feeley from photograph (NBDC, 2023).

WICKLOW: Glashaboy Brook, Glashaboy Bridge (O0601), 2♂♂ 2 June 2022, H. Feeley. River Liffey, 2km north-west of the Sally Gap (O1012), 1♂ 30 May 2022, H. Feeley.

***Rhyacophila munda* McLachlan, 1862**

TIPPERARY: Ballywilliam, Ballyporeen, Cahir (R9009), 1♂ 5 October 2022, in a shed, S. Voss.

WICKLOW: River Liffey, 2km north-west of the Sally Gap (O1012), 1♂ 30 May 2022, H. Feeley.

GLOSSOSOMATIDAE

***Agapetus fuscipes* Curtis, 1834**

DUBLIN: River Camac, bridge 1km south-west of Saggart (O0326), ♀ 21 June 2022, H. Feeley.

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 14 July 2022, T. Bryant. Glen Road, Tramore (S5803), 1♀ 20 August 2022, T. Bryant.

WICKLOW: River Brittas, bridge north-east of Talbotstown House (O0521), 1♂1♀ 31 May 2022, H. Feeley.

***Glossosoma boltoni* Curtis, 1834**

DUBLIN: River Dodder, Dodder Walk (Dartry) (O1629), 1♂ 15 May 2022, H. Feeley.

WATERFORD: Glen Road, Tramore (S5803), 1♀ 26 July 2022, light-trap, T. Bryant.

***Glossosoma conformis* Neboiss, 1963**

WICKLOW: Cock Brook, bridge north-west of Kilmore (O0208), 1♂1♀ 1 June 2022, H. Feeley.

HYDROPTILIDAE

***Hydroptila cornuta* Mosley, 1922 New to County Waterford**

WATERFORD: Tramore (S5701), 1♀ 17 August 2022, light-trap, T. Bryant.

***Hydroptila sparsa* Mosely, 1920 (Plate 1)**

DUBLIN: River Liffey, near Chapelizod (O1134), 1♂ 24 July 2022, River Liffey, War Memorial Park (O1234), 3♂♂3♀♀ 5 September 2022, J. P. O'Connor & M. A. O'Connor.

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 2♂♂4♀♀ 18 September 2022, J. P. O'Connor & M. A. O'Connor. Royal Canal Supply from Lough Owel (N4256), 4♂♂3♀♀ 25 September 2022, J. P. O'Connor & M. A. O'Connor.

***Oxyethira flavicornis* (Pictet, 1834)**

ANTRIM: Lough na Trosk, Garron Plateau (D2720) 6♂♂3♀♀ 21 August 2022, at light, C. McNaughton.

***Oxyethira frici* Klapálek, 1891 New to County Waterford (Fig. 1) (Plate 2)**

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 16 July 2022, light-trap, T. Bryant.

***Oxyethira tristella* Klapálek, 1895 (Fig. 2)**

Recorded new to County Westmeath from the Royal Canal Supply exiting Lough Owel (N4256) by O'Connor and O'Connor (2023). This is the first Irish record east of the River Shannon.

PHILOPOTAMIDAE

***Chimarra marginata* (Linnaeus, 1761)**

SLIGO: Unshin River, Riverstown (G7320), 1♀ 25 May 2022, H. Feeley.

***Philopotamus montanus* (Donovan, 1813)**

CAVAN: stream exiting Lady's Lake, Dún an Rí Forest Park (N7897), 4♂♂ 7 August 2022, J. P. O'Connor & M. A. O'Connor.

CORK: Ballymacshoneen, Seven Heads (W5036), adult flying around small bouldery stream flowing into the sea in the cove 7 May 2022, J. Deasy (NBDC, 2023). Clogagh (W4646), adult 19 February 2022 collected and determined M. O'Sullivan, confirmed C. McNaughton from photograph (NBDC, 2023). Coolnagearagh (W4373), adult 16 March 2021, M. O'Sullivan (NBDC, 2022). Mullinhassig (W4275), adult 23 February 2022, collected and determined M. O'Sullivan, confirmed C. McNaughton from photograph (NBDC, 2023).

KERRY: Cores Cascade (V9381), adult 5 July 2021, N. O'Reilly (NBDC, 2022).

WICKLOW: near Ballinard (S958959), adult 4 April 2021, C. Taylor (NBDC, 2022). River Brittas, bridge north-east of Talbotstown House (O0521), 1♀ 31 May 2022, H. Feeley.

***Wormaldia occipitalis* (Pictet, 1834)**

CORK: Rahan, Mallow (W6398), larvae 19 January 2014, trickle from a spring, collected and determined P. Sweeney.

ECNOMIDAE

***Ecnomus tenellus* (Rambur, 1842)**

WATERFORD: Ballyscanlan Lake (S5302), 2♂♂1♀ 16 July 2022, 1♀ 29 July 2022, light-trap, T. Bryant.

POLYCENTROPODIDAE

***Cyrnus flavidus* McLachlan, 1864**

LEITRIM: Lough Allen, Drumshambo (G9611), 1♂ 26 Mayo 2022, H. Feeley.

***Cyrnus trimaculatus* (Curtis, 1834)**

ANTRIM: Loughisland, Garron Plateau (D2519), 4♂♂ 22 July 2022, C. McNaughton.

LEITRIM: Lough Allen, Drumshambo (G9611), 1♂ 26 May 2022, H. Feeley.

***Holocentropus dubius* (Rambur, 1842)**

WATERFORD: Carrickavrantry Reservoir (S5402), 1♂ 14 June 2022, T. Bryant.

***Holocentropus picicornis* (Stephens, 1836)**

WATERFORD: Ballinlough Lake, near Kill (S4403), larvae 3 December 2014, collected by kayak and determined P. Sweeney. Glen Road, Tramore (S5803), 1♀ 26 July 2022, light-trap, T. Bryant.

***Neureclipsis bimaculata* (Linnaeus, 1758)**

CAVAN: Crover Public Quay, Lough Sheelin (N4786), 1♂ 8 September 2021, light-trap, C. McNaughton.

KERRY: River Maine near Molahiffe (Q9105), adult 17 July 2021, J. Hurley (NBDC, 2022).

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 8♂♂1♀ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Plectrocnemia conspersa* (Curtis, 1834)**

ANTRIM: Dungonnell Reservoir (D2018), 1♀ 27 July 2022, C. McNaughton. Lough Fine, Garron Plateau (D2620), 1♀ 1 September 2022, dead on shoreline, C. McNaughton.

MONAGHAN: Avaghon Lake stream, second bridge downstream of the lake (H6714), 1♀ 28 June 2022, H. Feeley.

WICKLOW: Glashaboy Brook, Glashaboy Bridge (O0601), 1♀ 2 June 2022, H. Feeley. River Liffey, 2km north-west of the Sally Gap (O1012), 1♀ 30 May 2022, H. Feeley.

***Plectrocnemia geniculata* McLachlan, 1871**

WICKLOW: Glashaboy Brook, Glashaboy Bridge (O0601), 2♀♀ 2 June 2022, H. Feeley.

***Polycentropus flavomaculatus* (Pictet, 1834)**

ANTRIM: Loughisland, Garron Plateau (D2519), 1♂ 22 July 2022, C. McNaughton.

DUBLIN: River Liffey, War Memorial Park (O1234), 1♀ 5 September 2022, J. P. O'Connor & M. A. O'Connor.

LEITRIM: Lough Allen, Drumshambo (G9611), 1♂ 26 May 2022, H. Feeley.

SLIGO: Unshin River, Bellarush Bridge (G7615), 2♂♂ 24 May 2022, H. Feeley.

WICKLOW: Annalecka Brook, Annalecka Bridge (O0501), 1♂2♀♀ 2 June 2022, H. Feeley. Ballinagee River, Ballinagee Bridge (O0302), 1♀ 2 June 2022, H. Feeley. Balydonnell Brook, Ballylow Bridge (O0513), 1♂1♀ 31 May 2022, H. Feeley. River Liffey, 2km north-west of

Sally Gap (O1012), 1♂1♀, 15 September 2022, H. Feeley. River Liffey, Ballyward Bridge (O0215), 1♂ 31 May 2022, H. Feeley.

PSYCHOMYIIDAE

***Lype phaeopa* (Stephens, 1836)**

CAVAN: Lady's Lake, Dún an Rí Forest Park (N7897), 1♂1♀ 7 August 2022, J. P. O'Connor & M. A. O'Connor.

CORK: Fota Wildlife Park (W7871), 1♀ 8-16 August 2020, Rothamsted Insect Survey light-trap, per A. Riley. River Lee near Coolnagearagh (W4373), adult 13 June 2021, M. O'Sullivan (NBDC, 2022).

MEATH: River Boyne, Ramparts, Navan (N8767), 1♂ 14 August 2022, J. P. O'Connor & M. A. O'Connor.

***Lype reducta* (Hagen, 1868)**

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 11 May 2022, T. Bryant.

***Psychomyia pusilla* (Pictet, 1834)**

WICKLOW: River Liffey, Ballymore Eustace Bridge (N9209), 1♂ 7 June 2022, H. Feeley.

***Tinodes maclachlani* Kimmins, 1966**

WATERFORD: Glen Road, Tramore (S5803), 1♂ 25 July 2022, T. Bryant.

***Tinodes maculicornis* (Pictet, 1834)**

WESTMEATH: Athlone Canal, Athlone (N0242), 1♂ 18 September 2022, J. P. O'Connor & M. A. O'Connor. Golden Mile, River Shannon, Athlone (N0342), 3♂♂2♀♀ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Tinodes waeneri* (Linnaeus, 1758)**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 2♀♀ 21 August 2022, light, C. McNaughton. Lough Natullig (D2521). 1♂ 28 July 2022, C. McNaughton.

DUBLIN: River Liffey, War Memorial Park (O1234), 2♂♂ 24 July 2022, near Chapelizod (O1134), 3♂♂ 24 July 2022, J. P. O'Connor & M. A. O'Connor.

LEITRIM: Lough Allen, Drumshambo (G9611), 1♂ 26 May 2022, Lough Allen, Spenser Dock (G9321), 1♂ 26 May 2022, H. Feeley.

MONAGHAN: Ballybay (H7220), 2 adults 21 June 2022, photographed and determined by F. Duffy (NBDC, 2023).

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 2♂♂ 18 September 2022, J. P. O'Connor & M. A. O'Connor. Lough Derravaragh (N4663), 2♀♀ 2 October 2022, J. P. O'Connor & M. A. O'Connor.

HYDROPSYCHIDAE

***Cheumatopsyche lepida* (Pictet, 1834)**

DUBLIN: River Liffey, War Memorial Park (O1234), 1♂ 24 July 2022, J. P. O'Connor & M. A. O'Connor.

***Diplectrona felix* McLachlan, 1878**

CORK: Rahan, Mallow (W6398), larvae 19 January 2014, trickle from a spring, collected and determined P. Sweeney.

***Hydropsyche angustipennis* (Curtis, 1834) New to County Monaghan**

MONAGHAN: Avaghon Lake stream, second bridge downstream of the lake (H6714), 1♂ 28 June 2022, H. Feeley.

***Hydropsyche instabilis* (Curtis, 1834)**

KILDARE: Kilcullen, bridge upstream of the River Liffey confluence (N8409), 1♀ 8 June 2022, H. Feeley.

WATERFORD: Glen Road, Tramore (S5803), 1♀ 26 July 2022, light-trap, T. Bryant.

***Hydropsyche siltalai* Döhler, 1963**

LIMERICK: Ballingarry (R4136), larva 11 January 2022, A. Vrieling, determined from photograph (NBDC, 2023).

WICKLOW: Brittas River, Kilbride Bridge (O0218), 1♂1♀ 1 June 2022, H. Feeley. River Dodder, upstream of Piperstown (O0823), 2♂♂ 20 June 2022, H. Feeley. River Liffey, Ballyward Bridge (O0215), 1♂ 31 May 2022, H. Feeley.

PHRYGANEIDAE

***Agrypnia obsoleta* (Hagen, 1864)**

ANTRIM: Lough Fad, Garron Plateau (D2519), 1♂ 22 August 2022, C. McNaughton. Lough na Trosk, Garron Plateau (D2720), 1♂ 21 August 2022, light, C. McNaughton. Lough Natullig (D2521), 1♀ 28 July 2022, C. McNaughton.

***Agrypnia pagetana* Curtis, 1835**

CAVAN: Chambers Bay, Lough Sheelin (N4285), 1♂ 24 September 2021, light-trap, C. McNaughton.

This is the latest recorded Irish adult.

***Agrypnia varia* (Fabricius, 1793) New to County Derry**

DERRY: Binevenagh Lake (C689308), adult 9 August 2021, S. Clawson (NBDC, 2022).

DUBLIN: Carrickmines (O224243), adult 26 September 2021, H. Gallagher (NBDC, 2022).

MONAGHAN: Ballybay (H7120), adult 16 May 2022, F. Duffy (NBDC, 2023).

WATERFORD: Carrickavrantry Reservoir (S5402), 1♀ 9 September 2022, light-trap, T. Bryant.

WESTMEATH: Lough Lene (N5368), 1♂ 31July 2022, in a spider's web, J. P. O'Connor & M. A. O'Connor.

***Phryganea grandis* Linnaeus, 1758 New to County Monaghan**

GALWAY: Portumna Forest Park (M8302), adult 26 June 2022, photographed and determined by K. Finch (NBDC, 2023).

MONAGHAN: Ballybay (H7120), 1♀ 9 June 2022 & 1♀ 20 June 2022, photographed and determined F. Duffy (NBDC, 2023).

OFFALY: Tullamore (N342234), 1♀ 25 May 2021, R. Mc Kenna, det. J. P. O'Connor from photograph (NBDC, 2022).

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 3 June 2022, T. Bryant.

GOERIDAE

***Goera pilosa* (Fabricius, 1775)**

CORK: Glashagarriff River near Carrigathou (W4374), adult 25 July 2021, M. O'Sullivan (NBDC, 2022).

MONAGHAN: Carrickatee (H7215), adult 21 May 2022, photographed and determined F. Duffy (NBDC, 2023).

SLIGO: Unshin River, Ballygania Bridge (G6925), 1♀ 25 May 2022, H. Feeley.

WESTMEATH: Lough Lene (N5368), 1♂ 31 July 2022, in a spider's web, J. P. O'Connor & M. A. O'Connor.

***Silo pallipes* (Fabricius, 1781)**

ANTRIM: stream near Parochial Hall, Glenariff (D2524), 1♂ 14 August 2022, C. McNaughton.

CAVAN: Cabra River, Dún an Rí Forest Park (N7997), 1♂ 7 August 2022, J. P. O'Connor & M. A. O'Connor.

WICKLOW: Cock Brook, bridge north-west of Kilmore (O0208), 1♂ 1 June 2022, H. Feeley.

LEPIDOSTOMATIDAE

***Crunoecia irrorata* (Curtis, 1834)**

CORK: Fota Wildlife Park (W7871), 1♂ 21-31 July 2022 & 1♂ 8-16 August 2022, Rothamsted Insect Survey light-trap, per A. Riley.

***Lepidostoma hirtum* (Fabricius, 1775)**

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 1♂ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

APATANIDAE

***Apatania wallengreni* McLachlan, 1871**

MAYO: Lough Mask, Car park (north west shore) (M1170), 1♂2♀♀ 16 April 2022, H. Feeley.

LIMNEPHILIDAE

***Drusus annulatus* (Stephens, 1837)**

CORK: Fota Wildlife Park (W7871), 1♂ 25-31 October 2021, per A. Riley, Rothamsted Insect Survey light-trap.

DUBLIN: River Camac, bridge 1km south-west of Saggart (O0326), 1♂ 21 June 2022, H. Feeley.

***Ecclisopteryx dalecarlica* Kolenati, 1848**

WICKLOW: Ballylow Brook, bridge upstream of the Ballydonnell River confluence (O0613), 1♂ 31 May 2022, H. Feeley. Balydonnell Brook, Ballylow Bridge (O0513), 1♂ 31 May 2022, H. Feeley.

***Chaetopteryx villosa* (Fabricius, 1798)**

CORK: Rahan, Mallow (W6398), 1♀ 27 November 2022, in polytunnel, P. Sweeney.

***Anabolia brevipennis* (Curtis, 1834) New to Northern Ireland and County Antrim (Fig. 3)**

ANTRIM: Rea's Wood (J1485), adult 13 September 2022, R. Monteith, determined I. D. Wallace (pers. comm.) from photograph on iRECORD.

***Anabolia nervosa* (Curtis, 1834)**

CORK: Fota Wildlife Park (W7871), 1♂ 22-28 August 2022, Rothamsted Insect Survey light-trap per A. Riley.

This is the first Irish adult taken in August.

TIPPERARY: Cahir (Caher) (S055225), adult 21 September 2021, L. Garcia (NBDC, 2022).

WESTMEATH: Lough Derravaragh (N4663), 16♂♂6♀♀ 2 October 2022, J. P. O'Connor & M. A. O'Connor.

***Glyphotaelius pellucidus* (Retzius, 1783)**

LOUTH: Donore (O0071), 1♀ 19 June 2022, photographed and determined by G. Nee.

MEATH: River Boyne, Ramparts, Navan (N8868), 1♀ 14 August 2022, J. P. O'Connor & M. A. O'Connor.

MONAGHAN: Ballybay (H7220), 1♂ 8 May 2022, (H7120), 1♀ 16 May 2022, both photographed and identified by F. Duffy.

OFFALY: Rathgibbon near Birr (N1407), 2♀♀ 28 May 2021 and 1♂ 26 June 2021, R. Mc Kenna, determined H. Feeley and C. McNaughton (NBDC, 2022).

***Limnephilus affinis* Curtis, 1834**

WESTMEATH: Gaynor Point, Lough Owel (N4158), 1♀ 25 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus auricula* Curtis, 1834**

ARMAGH: Oxford Island Nature Reserve, Lough Neagh (J0561), 1♂ 7 May 2022, light-trap, P. Thomlinson.

WESTMEATH: Lough Owel, shore north-west of car park (N4158), 1♂ 19 April 2022, H. Feeley.

***Limnephilus binotatus* Curtis, 1834**

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 3 June 2022, light-trap, T. Bryant.

***Limnephilus centralis* Curtis, 1834**

ANTRIM: Craigagh Wood, Cushendun (D2232), 2♂♂ 17 September 2022, light-trap, C. McNaughton.

***Limnephilus decipiens* (Kolenati, 1848)**

KILDARE: Pollardstown Fen (N7715), adult 22 October 2021, D. de Paor, determined J. P. O'Connor from photograph (NBDC, 2022).

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 2♂♂3♀♀ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus elegans* Curtis, 1834 New to County Limerick (Fig. 4)**

KERRY: Knockreer House, Killarney National Park (V9591), adult 24 June 2017, m. v. light-trap, K. G. M. Bond, determined C. McNaughton (NBDC, 2022).

LIMERICK: Lough Gay, Mullaghareirk (R2720), adult, 29 May 2022, light-trap on bogland, K. G. M. Bond (D. Murray, pers. comm.)

***Limnephilus flavicornis* (Fabricius, 1787)**

CLARE: Bell Harbour (M2808), adult 9 June 2021, R. Mc Kenna, determined C, McNaughton (NBDC, 2022).

CORK: Fota Wildlife Park (W7871), 1♀ 19-25 July 2021, Rothamsted Insect Survey light-trap, per A. Riley.

MONAGHAN: Ballybay (H7120), adult 20 June 2022, F. Duffy (NBDC, 2023)

WATERFORD: Carrickavrantry Reservoir (S5402), 1♀ 18 July 2022, light-trap, T. Bryant. Glen Road, Tramore (S5803), 2♀♀ 26 July 2022, light-trap, T. Bryant.

WESTMEATH: Athlone Canal, Athlone (N0242), 1♀ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus ignavus* McLachlan, 1865**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 3♂♂6♀♀ 21 August 2022, light, C. McNaughton.

WATERFORD: Fenor Bog (S5301), 1♀ 29 September 2022, T. Bryant.

***Limnephilus lunatus* Curtis, 1834**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 13♂♂14♀♀ 21 August 2022, light, C. McNaughton.

CAVAN: Crover Public Quay, Lough Sheelin (N4786), 2♂♂1♀ 8 September 2021, light-trap, C. McNaughton.

DUBLIN: Carrickmines (O2224), 2 adults 17 October 2021, H. Gallagher (NBDC, 2022).

KERRY: Killarney National Park (V9690), adult 1 October 2020, K. Ahearne (NBDC, 2022).

OFFALY: Rathgibbon near Birr (N1407), adult 26 June 2021, R. Mc Kenna, determined C. McNaughton (NBDC, 2022).

WATERFORD: Sapperton North near the River Bride (X0493), adult 6 October 2021, K. G. M. Bond, determined C. McNaughton (NBDC, 2022).

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 5♂♂5♀♀ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus marmoratus* Curtis, 1834**

CLARE: Dromore Woods (R3486), adult 15 September 2022, G. Nee (NBDC, 2023).

DONEGAL: Ardara (G7292), 2 adults 12 August 2022, L. Gillespie (NBDC, 2023).

DOWN: Castlewellan Forest Park (J3338), 2♂♂ 31 August 2022, light-trap, P. Thomlinson.

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 16 July 2022, 1♂1♀ 29 July 2022 & 1♂ 29 September 2022, light-trap, T. Bryant. Carrickavrantry Reservoir (S5402), 1♂ 18 July 2022, light-trap, T. Bryant

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 3♂♂ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus nigriceps* (Zetterstedt, 1840)**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 6♂♂ 21 August 2022, light, C. McNaughton.

CAVAN: Chambers Bay, Lough Sheelin (N4285), 1♂ 20 September 2021, light-trap, C. McNaughton.

WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 4♂♂ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus rhombicus* (Linnaeus, 1758)**

CORK: Lee Road, Cork City (W6571), adult 13 May 2021, S. Waheed, determined C. McNaughton from photograph (NBDC, 2022).

***Limnephilus sparsus* Curtis, 1834**

ANTRIM: Lough na Trosk, Garron Plateau (D2719), 1♀ 8 August 2022, (D2720), 1♂ 21 August 2022, light, C. McNaughton.

CAVAN: River Annalee, New Grove Bridge (H6210), 1♀ 22 August 2022, H. Feeley.
LEITRIM: Lough Allen, Spenser Dock (G9321), 1♂ 26 May 2022, H. Feeley.
OFFALY: near Birr (N1407), adult 6 June 2021, R. Mc Kenna, determined C. McNaughton from photograph (NBDC, 2022).

***Limnephilus stigma* Curtis, 1834**

WATERFORD: Ballyscanlan Lake (S5302), 1♀ 13 June 2022 & 1♂ 25 September 2022, light-trap, T. Bryant. Glen Road, Tramore (S5803), 1♀ 26 July 2022, light-trap, T. Bryant. Tramore saltmarsh (S6000), 1♀ 28 July 2022, light-trap, T. Bryant.
WESTMEATH: Golden Mile, River Shannon, Athlone (N0342), 1♂ 18 September 2022, J. P. O'Connor & M. A. O'Connor.

***Limnephilus vittatus* (Fabricius, 1798)**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 2♂♂ 21 August 2022, light, C. McNaughton.

***Halesus digitatus* (Schrank, 1781) New to County Offaly**

DUBLIN: Carrickmines (O224243), adult 17 October 2021, H. Gallagher (NBDC, 2022).
OFFALY: Rathgibbon near Birr (N143077), adult 9 October 2021 & adult 16 October 2021, R. Mc Kenna, determined C. McNaughton (NBDC, 2022).
TIPPERARY: Cabragh Wetlands (S1055), adult 28 September 2022, photographed and determined by L. Garcia (NBDC, 2023). Near Ballybeg (S1316), adult 23 October 2021, L. Garcia (NBDC, 2022).
WATERFORD: Sapperton North near the River Bride (X0493), adult 6 October 2021, K. G. M. Bond, determined C. McNaughton (NBDC, 2022).

***Halesus radiatus* (Curtis, 1834)**

CAVAN: Crover Public Quay, Lough Sheelin (N4786), 1♂ 8 September 2021, light-trap, C. McNaughton.
DUBLIN: Carrickmines (O2224), adult 17 October 2021, H. Gallagher (NBDC, 2022). Naul (O1461), adult 25 September 2021, J. Curtis (NBDC, 2022).
OFFALY: near Rathgibbon, Birr (N1407), adult 25 September 2021 & adult 9 October 2021, R. Mc Kenna, determined C. McNaughton (NBDC, 2022).

***Potamophylax cingulatus* (Stephens, 1837)**

CAVAN: stream, Lady's Lake, Dún an Rí Forest Park (N7897), 1♂ 7 August 2022, near Cabra River, Dún an Rí Forest Park (N7897), 1♂ 7 August 2022, in spider's web in an outbuilding, J. P. O'Connor & M. A. O'Connor.
WATERFORD: Ballyscanlan Lake (S5302), 1♂ 20 July 2022, light-trap, T. Bryant.

***Potamophylax latipennis* (Curtis, 1834)**
CAVAN: Crover Public Quay, Lough Sheelin (N4786), 3♀♀ 8 September 2021, light-trap, C. McNaughton.
***Stenophylax permistus* McLachlan, 1895 New to County Down**
DOWN: Castlewellan Forest Park (J3338), light-trap 1♀ 31 August 2022, P. Thomlinson.
WATERFORD: Ballyscanlan Lake (S5302) 2♀♀ 2 July 2022, 1♀ 3 July 2022 & 1♀ 19 September 2022, light-trap T. Bryant.

SERICOSTOMATIDAE

***Sericostoma personatum* (Spence, 1826)**
DUBLIN: River Liffey, War Memorial Park (O1234), 1♀ 24 July 2022, near Chapelizod (O1134), 2♀♀ 24 July 2022, J. P. O'Connor & M. A. O'Connor.
GALWAY: Lough Corrib (M2739), adult 30 May 2021, R. O'Callaghan, determined C. McNaughton (NBDC, 2022).
MEATH: Slane (N9673), adult 17 May 2021, H. Grogan.
WICKLOW: Deer Park (T2487), 1♂ 1 July 2021, C. Bushe (NBDC, 2022). Lemonstown River, bridge east of Athgreen (N9303), 1♂ 7 June 2022, H. Feeley.

BERAEIDAE

***Beraea pullata* (Curtis, 1834) New to County Leitrim**
LEITRIM: Lough Allen, Spenser Dock (G9321), 1♀ 26 May 2022, H. Feeley.

ODONTOCERIDAE

***Odontocerum albicorne* (Scopoli, 1763)**
ANTRIM: Lough na Trosk (D2719), 1♂ 8 August 2022, C. McNaughton.
CORK: Coolnagearagh (W4373), adult 20 August 2022, M. O'Sullivan, confirmed C. McNaughton from photograph (NBDC, 2023).

MOLANNIDAE

***Molanna albicans* (Zetterstedt, 1840)**
ROSCOMMON: Lough Key, Lough Key Forest Park (G8504), 1♂ 24 May 2022, H. Feeley.

LEPTOCERIDAE

***Adicella reducta* (McLachlan, 1865)**
WATERFORD: Ballyscanlan Lake (S5402), 1♀ 21 April 2022, light-trap, T. Bryant.

WICKLOW: River Dodder, upstream of Piperstown (O0823), 2♂♂1♀ 20 June 2022, H. Feeley. River Liffey, Ballymore Eustace Bridge (N9209), 2♂♂ 7 June 2022, H. Feeley

***Athripsodes albifrons* (Linnaeus, 1758) New to County Longford**

CARLOW: Borris weir, River Barrow (S7149), adult 1 August 2015, K. Finch (NBDC, 2022).

CORK: Ballyhilty (W1136), adult 5 July 2022, photographed and determined A. Haigh (NBDC, 2023). Reacarrigeen (W4345), adult 24 July 2021, determined J. Deasy, confirmed H. Feeley from photograph (NBDC, 2023).

GALWAY: Galway city near River Corrib (M2725), adult 30 August 2021, C. Peppiatt (NBDC, 2022).

LONGFORD: Ballymulvey (N1757), adult 21 July 2022, photographed and determined L. Cloake (NBDC, 2023).

TIPPERARY: Cahir, River Suir (S0424), adult 16 July 2021, L. Garcia (NBDC, 2022).

***Athripsodes aterrimus* (Stephens, 1836)**

ANTRIM: Lough Natullig (D2521), 5♂♂ 22 July 2022, C. McNaughton.

MEATH: River Boyne, Ramparts, Navan (N8767), 1♀ 14 August 2022, dead in a spider's web, J. P. O'Connor & M. A. O'Connor.

WATERFORD: Ballinlough Lake, near Kill (S4403), larvae 3 December 2014, collected by kayak and determined P. Sweeney.

WESTMEATH: Lough Lene (N5368), 5♂♂3♀♀ 31 July 2022, J. P. O'Connor & M. A. O'Connor.

***Athripsodes cinereus* (Curtis, 1834)**

DUBLIN: River Liffey, War Memorial Park (O1234), 1♀ 24 July 2022, near Chapelizod (O1134), 1♂1♀, 24 July 2022, J. P. O'Connor & M. A. O'Connor.

MEATH: River Boyne, Ramparts, Navan (N8767), 1♀ 14 August 2022, J. P. O'Connor & M. A. O'Connor.

***Ceraclea albimacula* (Rambur, 1842)**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 2♀♀ 21 August 2022, light, C. McNaughton.

***Leptocerus tineiformis* Curtis, 1834 New to County Antrim**

ANTRIM: Lough na Trosk, Garron Plateau (D2720), 6♂♂4♀♀ 21 August 2022, light, C. McNaughton.

LIMERICK: Adare Manor pond (R4744), 1 larva 13 June 2022, L. Williams.

***Mystacides azurea* (Linnaeus, 1761) New to County Louth**

ANTRIM: Lough Fad, Garron Plateau (D2519), 2♂♂ 22 August 2022, C. McNaughton. Lough Natullig (D2521), 1♂ 22 July 2022, C. McNaughton.

CAVAN: Lady's Lake, Dún an Rí Forest Park (N7897), 1♂ 7 August 2022, J. P. O'Connor & M. A. O'Connor.
CORK: Coolnagearagh (W4373), adult 20 May 2022, photographed and identified by M. O'Sullivan, confirmed C. McNaughton.
DUBLIN: River Liffey, War Memorial Park (O1234), 4♂♂3♀♀ 24 July 2022 & 1♀ 5 September 2022; near Chapelizod (O1134), 2♂♂ 24 July 2022, J. P. O'Connor & M. A. O'Connor. Tymon Park (O0129), adult 11 July 2021, J. Brophy.
GALWAY: Kylemore Abbey, Pollacappul (L7558), adult 1 June 2022, anon., determined J. P. O'Connor from photograph (NBDC, 2023).
LOUTH: Donore (O0071), adult 19 June 2022, photographed and determined by G. Nee (NBDC, 2023).
MEATH: Donore (O0272), adult 25 June 2022 , photographed and determined by J. Madan-Mayers. River Boyne, Ramparts, Navan (N8767) 1♂ 14 August 2022, same locality (N8868), 4♂♂ 14 August 2022, J. P. O'Connor & M. A. O'Connor.
MONAGHAN: Ballybay (H7120), adult 21 May 2022, Photographed and determined F. Duffy (NBDC, 2023).
OFFALY: Cranberry Bog (N1121), adult 8 August 2021, R. Mc Kenna (NBDC, 2022).
ROSCOMMON: Lough Key, Lough Key Forest Park (G8504), 2♂♂ 24 May 2022, H. Feeley.

***Mystacides longicornis* (Linnaeus, 1758)**

ANTRIM: Mossley (J3284), adult 14 August 2022, photographed and determined D. Craig (NBDC, 2023).
CAVAN: Crover Public Quay, Lough Sheelin (N4786), 2♂♂2♀♀ 8 September 2021, light-trap, C. McNaughton. Lady's Lake, Dún an Rí Forest Park (N7897), 1♂ 7 August 2022, J. P. O'Connor & M. A. O'Connor.
DUBLIN: Corbawn Close, Shankill (O260221), adult 7 June 2021, F. Marnell, determined C. McNaughton (NBDC, 2022).
WATERFORD: Ballinlough Lake, near Kill (S4403), larvae 3 December 2014, collected by kayak and determined P. Sweeney.
WESTMEATH: Cullionmore, Lough Owel (N4256), 3♂♂2♀♀ 25 September 2022, J. P. O'Connor & M. A. O'Connor.

***Oecetis furva* (Rambur, 1842)**

WATERFORD: Carrickavrantry Reservoir (S5402), 1♂ 18 July 2022, light-trap, T. Bryant.

***Oecetis lacustris* (Pictet, 1834)**

ANTRIM: Lough Natullig (D2521), 1♂1♀ 22 July 2022 & 2♂♂ 28 July 2022, C. McNaughton.
WATERFORD: Ballyscanlan Lake (S5302), 1♀ 29 July 2022, light-trap, T. Bryant.

WESTMEATH: Lough Lene (N5368), 1♀ 31 July 2022, J. P. O'Connor & M. A. O'Connor.

***Oecetis ochracea* (Curtis, 1825) New to County Sligo**

ANTRIM: Lough Natullig (D2521), 1♀ 22 July 2022, C. McNaughton.

CAVAN: Crover Public Quay, Lough Sheelin (N4786), 1♂3♀♀ 8 September 2021, light-trap, C. McNaughton.

OFFALY: Pallas Lake (N2719), adult, 22 June 2022, photographed and determined R. Mc Kenna (NBDC, 2023).

SLIGO: Ballygalway Lough, Car Park (G6928), 1♂ 24 May 2022, H. Feeley.

***Triaenodes bicolor* (Curtis, 1834)**

DUBLIN: River Liffey, near Chapelizod (O1134), 1♀ 24 July 2022, J. P. O'Connor & M. A. O'Connor.

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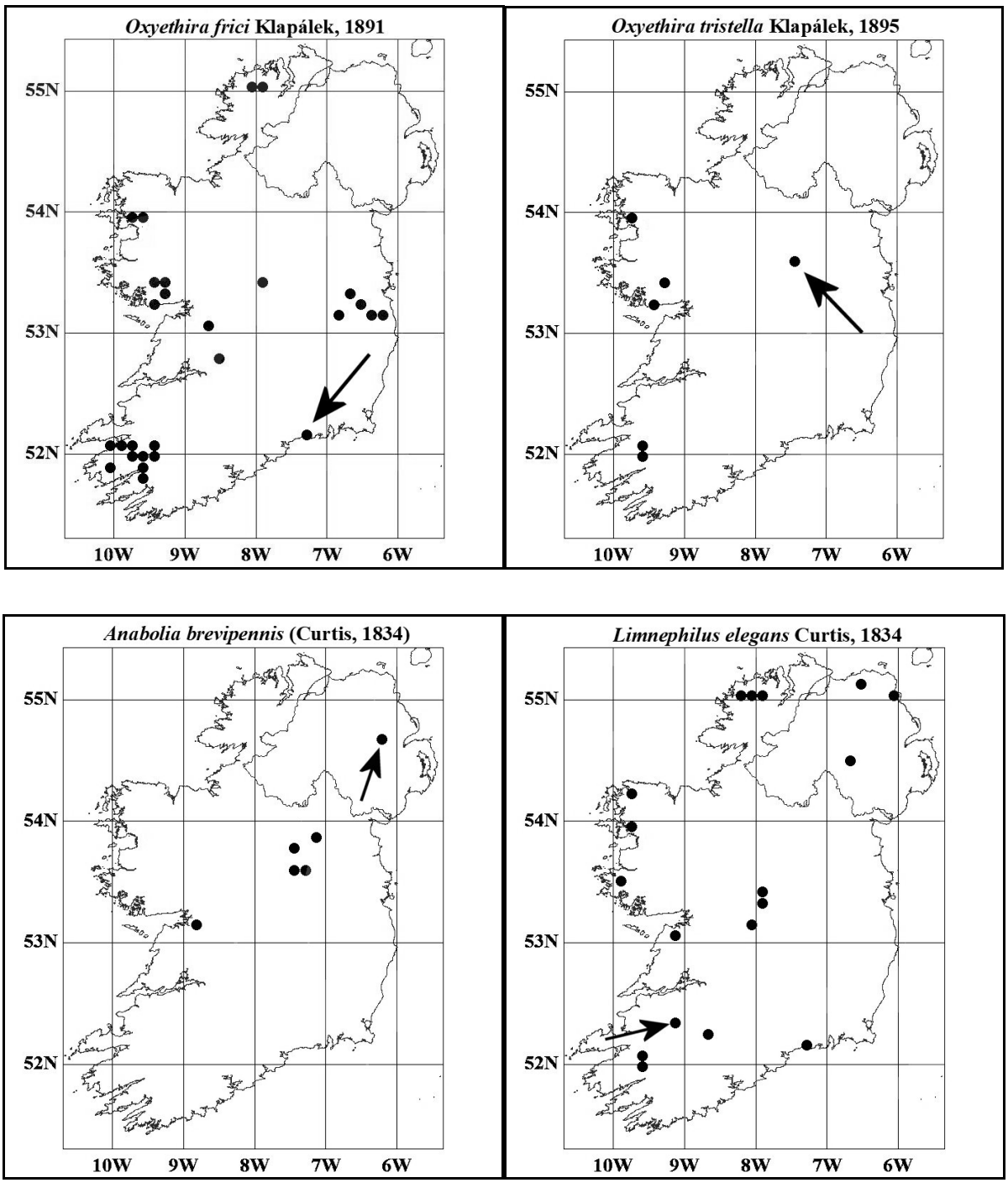

FIGURES 1-4. The known Irish distributions of *Oxyethira frici* Klapálek, 1891, *O. tristella* Klapálek, 1895, *Anabolia brevipennis* (Curtis, 1834) and *Limnephilus elegans* Curtis, 1834. New county records are indicated by arrows.

PLATE 1. Golden Mile, Athlone, River Shannon, County Westmeath, 18 September 2022. Photograph: M. A. O'Connor.

PLATE 2. The Sluice House and the Royal Canal Supply from Lough Owel, County Westmeath, 25 September 2022. *Oxyethira tristella* was taken on this stretch. Photograph: J. P. O'Connor.

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RECENT RECORDS OF CHIRONOMIDAE (INSECTA: DIPTERA) IN IRELAND FROM COUNTIES DUBLIN, KILDARE AND MEATH AND A BRIEF NUMERICAL UPDATE OF THE IRISH CHECKLIST

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Abstract

Records are given for 31 species of Chironomidae (Insecta: Diptera) from Counties Dublin, Kildare and Meath in Hydrometric Areas (HAs) 7, 8 and 9. *Zavrelimyia* (*Zavrelimyia*) *melanura* (Meigen, 1804) is reported for the first time in Counties Dublin, Meath and HA9 and *Zavrelimyia* (*Z.*) *nubila* (Meigen, 1830) is new for Kildare and HA9. *Acricotopus lucens* (Zetterstedt, 1815) is new for Dublin, *Tevetnia verralli* (Edwards, 1929) is new for HA8. *Chironomus* (*Chironomus*) *luridus* Strenzke, 1959 is new for Kildare and *Chironomus* (*C.*) *riparius* Meigen, 1804 is new for HA8. *Glyptotendipes* (*Glyptotendipes*) *barbipes* and *Cladotanytarsus pallidus* Kieffer, 1922 are new for Dublin and HA9. An update of the number of species currently known to occur in these Counties and HAs and in Ireland is given.
Key words: Chironomidae, Diptera, county records, Hydrometric Area, distribution, Ireland.

Introduction

Examination of Chironomidae obtained in occasional collections in Counties Dublin, Kildare and Meath in Hydrometric Areas 7, 8 and 9, during the year 2022 and up to April 2023, yielded records of 31 species that are reported here. This new data augments the comprehensive distribution records of Chironomidae in Ireland given by Murray *et al.* (2013, 2014, 2015, 2018), Murray and O'Connor (2018), Murray (2019a,b, 2020, 2021) and the recently published findings from studies on Clare Island and west Mayo (Murray, 2022).

A collection from the upper reaches of the River Poddle, in the grounds of the Church of the Holy Spirit at Kimmage Manor, Templeogue, in the suburbs of Dublin, was made on the day of the funeral service there of our late colleague Patrick Ashe on 22 June 2022. This paper is dedicated to the memory of Paddy, a dear friend and colleague.

Abbreviations

Abbreviations used: HA(s) - Hydrometric Area(s); Pe - pupal exuviae; Im♂ - adult male; Im♀ adult female.

Methods

Pupal exuviae and occasionally "drowned" adults were obtained in fine mesh skim net sweeps from surface waters of artificial ponds and in foam accumulations on two lotic water bodies, one each in Dublin and Meath. Other collections were made by hand picking floating exuviae from the water surface of exposed rainwater filled barrels, buckets and an animal drinking trough. Identifications of pupal exuviae are primarily based on Langton and Visser (2003). Records are given by county and hydrometric area (Murray *et al*., 2013; also <www.epa.ie> for details of hydrometric areas in Ireland), along with collection site information, six figure Irish Grid Reference and date of collection.

Results

Records are given for four species in the subfamily Tanypodinae, two in the Diamesinae, thirteen Orthocladiinae and twelve Chironominae (eight in the Tribe Chironomini and four in the Tribe Tanytarsini). The Tanypodine species *Zavrelimyia* (*Zavrelimyia*) *melanura* (Meigen, 1804) is reported for the first time in Counties Dublin, Meath and HA9 and *Zavrelimyia* (*Zavrelimyia*) *nubila* (Meigen, 1830) is documented for the first time from Kildare and HA9. The Orthocladiinae species *Acricotopus lucens* (Zetterstedt, 1815) is new for Dublin and *Tevetnia verralli* (Edwards, 1929) is new for HA8. Within the subfamily Chironominae, *Chironomus* (*Chironomus*) *luridus* Strenzke, 1959 is new for Kildare, *Chironomus* (*C.*) *riparius* Meigen, 1804 is recorded for the first time in HA8 while *Glyptotendipes* (*Glyptotendipes*) *barbipes* (Staeger, 1839) and *Cladotanytarsus (Cladotanytrsus*) *pallidus* Kieffer, 1922 are new for Dublin and HA9.

Subfamily TANYPODINAE

***Conchapelopia* (*Conchapelopia*) *melanops* (Meigen, 1818)**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Im♂ Pe♂♀ 22 June 2022; Artificial water feature, Herbert Park, Ballsbridge (O178324), Pe♂♀ 23 June 2022.

Conchapelopia melanops is widespread in Ireland with records from over 100 locations. There are seven previous records in HA9, one in County Kildare and six in Dublin, the earliest of which was by C. F. Humphries in April, 1947 from the Bohernabreena Reservoir, at the headwaters of the River Dodder (Murray *et al*., 2013).

***Procladius* (*Psilotanypus*) *rufovittatus* (van der Wulp, 1874)**

DUBLIN: HA9 - Artificial water feature, Herbert Park, Ballsbridge (O178324), Im♂♀ Pe♂♀ 23 June 2022.

There are records of *Procladius* (*P.*) *rufovittatus* from 69 locations in Ireland and this is a second site record for the species in Dublin and HA9. The previous record was from collections of pupal exuviae from an artificial pond on the campus of University College Dublin, Belfield, in May 2018 (Murray and O'Connor, 2018).

***Zavrelimyia* (*Zavrelimyia*) *melaura* (Meigen, 1804) New for HA9, County Dublin and County Meath**

DUBLIN: HA9 - Artificial water feature, Herbert Park, Ballsbridge (O178324), Im♂♀ Pe♂ 24 October 2022. **MEATH: HA7 -** St Bridget's Well, Ardsallagh (N897635), Pe♂ Im♂ 21 July 2022 and 18 April 2023.

This species has been documented from ten locations in Ireland (Murray *et al.*, 2013, 2018) but these are the first records in County Dublin, HA9 and County Meath. However, it is already recorded in HA7 from collections in the littoral waters of Lough Cuilcagh, County Cavan, in 1968 (Murray, 1972).

***Zavrelimyia* (*Zavrelimyia*) *nubila* (Meigen, 1830) New for County Kildare and HA9**

KILDARE: HA9 - rainwater accumulation in garden tank, Glen Easton Wood, Leixlip (N987365), Pe♂ 1 September 2022. **MEATH: HA8 -** rainwater in bucket, Meadesbrook, Ashbourne (O040594), Pe♂ 17 and 27 March and 7 April 2023.

Larvae of *Zavrelimyia nubila* typically inhabit standing waters and Fittkau (1962) noted that they frequently occur in artificial man-made ephemeral habitats, such as in those reported here. Until now this species has been documented from only three locations, all in the eastern region of Ireland. It is known from two sites in County Meath, at the present location in HA8 at which it has been documented on 12 occasions since 1968 (Murray, 1972, 2019a; Murray *et al.*, 2013, 2018) and a second site in the adjacent HA8 (Murray, 2016). The third location in Ireland is in HA10 in the artificial lake in the grounds of Powerscourt Demesne, County Wicklow (Murray, 2018). The new record at Leixlip is a fourth location for the species in Ireland and the first record in County Kildare and HA9. Further collections from small standing water ephemeral habitats would likely yield additional knowledge of distribution for this species.

Subfamily DIAMESINAE

***Potthastia gaedii* (Meigen, 1838)**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Pe♂♀ 22 June 2022. Artificial water feature (HA9), Herbert Park, Ballsbridge (O178324), Pe♂ 23 June 2022.

This species has a widespread distribution in Ireland (Murray *et al*., 2013) and, with the addition of the records presented here, it is now known from 195 locations. There are only two previous records in HA9, one in Dublin from the River Dodder in 1946 and one from the River Liffey in Kildare in 1986 (Murray *et al*., 2013).

***Potthastia longimanus* Kieffer, 1922**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Pe♂♀ 22 June 2022.

This is the second record of the species for Dublin and a third location and record for HA9. There is one record in HA10 from a tributary of the Glencullen river (Clabby and Bracken, 1976). In HA9 it is known from the aquaduct adjacent to the Reservoir on the River Dodder at Bohernabreena, from May 1967 (Murray, 1972) and also in HA9 from the River Liffey at Sallins, County Kildare from July 1983 (Hayes, 1991; Murray *et al*., 2013). It is now known from 126 locations in Ireland.

Subfamily ORTHOCLADIINAE

***Acricotopus lucens* (Zetterstedt, 1850) New for Dublin**

DUBLIN: HA9 - Artificial water feature, Herbert Park, Ballsbridge (O178324), Pe♂ 23 June and 24 October 2022.

With this new record for County Dublin there are now records of *Acricotopus lucens* from 38 locations in Ireland. While this is the first documentation of the species for the county there are two previous records from HA9, both in County Kildare, one from studies by C. F. Humphries in 1929 on the River Liffey at Straffan (Humphries and Frost, 1937) and one at Lyons Estate, Celbridge in 1968 (Murray, 1972).

***Brillia bifida* (Kieffer, 1909)**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Pe♂ Im♂♀ 22 June 2022.

There are now records from 140 sites in Ireland and this is the second site record of *Brillia bifida* in HA9 and County Dublin. The previous record was from collections in Bohernabreena reservoir by Reilly (1951) and first published in Murray *et al*. (2014).

MEATH: - Meadesbrook, Stream (HA8), Ashbourne (O038594), Pe♂ 11 January 2022. There are 14 previous records of *B. bifida* at this site where it was first recorded in July 1967 (Murray, 1972).

***Brillia longifurca* Kieffer, 1921**

MEATH: HA8 - Stream, Meadesbrook, Ashbourne (O038594), Pe♂ 21 February 2022.

There are records of this species from 69 sites in Ireland, two previously at Meadesbrook from where it was first recorded in November 2012 (Murray *et al*., 2014) and more recently in

May 2020. Previous records in Ireland are during the months from March to November, with most records between May and September. The presence of pupal exuviae in collections in February 2022 suggests an earlier more prolonged emergence period.

***Cricotopus* (*Isocladius*) *intersectus* (Staeger, 1839)**

DUBLIN: HA9 – Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 25 April 2023.

With the addition of the record of *Cricotopus* (*Isocladius*) *intersectus* at this site, the species is now documented from 48 locations in Ireland. There are two earlier records in HA9 and County Dublin, one from a water fountain in St Stephens Green (Murray and Ashe, 2017) and one from the artificial lake in the campus of University College, Dublin at Belfield (Murray and O'Connor, 2018).

***Cricotopus* (*Isocladius*) *sylvestris* (Fabricius, 1794)**

MEATH: HA7 - Cattle drinking trough, Ardsallagh, Navan (N896635), Pe♂ 27 March 2023.

This species is widely distributed in Ireland, now with records from 108 sites. There are five previous records in HA7, three in County Cavan and two in County Meath and the record at Ardsallagh is an additional site record for Meath and HA7.

***Eukiefferiella claripennis* (Lundbeck, 1898)**

MEATH: HA8 - Stream, Meadesbrook, Ashbourne (O038594), Pe♂ 1 January and 21 February 2022.

This species is very commonly encountered in rivers and streams in Ireland with some 248 records from 149 different locations. There are records from ten sites on 21 occasions in County Meath, nine in HA7 and one in HA6. It has been recorded on seven previous occasions in HA8 at Meadesbrook.

***Limnophyes minimus* (Meigen, 1818)**

MEATH: HA8 - Rainwater tank in yard, Meadesbrook, Ashbourne (O040594), Pe♂ 7April 2023.

There are records of *Limnophyes minimus* from 32 sites in Ireland including four locations in County Meath, two each in HA7 and HA8 including this site at Meadesbrook where adult males were taken on the wing on three occasions, first in 2005 (Murray *et al*., 2015) and more recently in February 2021 (Murray, 2021).

***Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo, 1997**

DUBLIN: HA8 - Naul, Garden (O313607), Im♂ 28 March 2023. **MEATH: HA8 -** Rainwater tank in yard, Meadesbrook, Ashbourne (O040594), Im♂ Pe♂ 17 March, 11 May, 18 June, 2 September, 10 October 2022 and 27 March 2023.

This record is based on determination from a photograph, in which the distinct thoracic chaetotaxy of this species is clearly visible, posted on the social media Facebook/Meta page *Insects / Invertebrates of Ireland,* by Mr Joe Curtis. This is a second record of the species for

County Dublin. The earlier record is based on pupal exuviae collected from an exposed rain-filled tank on the roof of the Science building at University College Dublin, Belfield (Murray, 2013). There are now records from 14 locations of this recent immigrant species to Ireland that was first collected in HA7 in County Meath in 2012 (Murray, 2012).

***Psectrocladius* (*Psectrocladius*) *limbatellus* (Holmgren, 1869)**

DUBLIN: HA9 - Artificial water feature, Herbert Park, Ballsbridge (O178324), Pe♂ 23 June 2022. **MEATH: HA7 -** Cattle drinking trough, Ardsallagh, Navan (N896635), Pe♂ 6 June 2022 and Pe♂ 27 March 2023; **HA8 -** Meadesbrook, Ashbourne, Rainwater tank in yard (O040594), Pe♂ 30 March 2023.

There are now 62 records of this species from 50 sites in Ireland. There are five previous records from five sites in Dublin and HA9 while in Meath there are three previous records in HA7 from the drinking trough at Ardsallagh (Murray, 2021) and eight in HA8 at Meadesbrook (Murray, 2020).

***Psectrocladius* (*Psectrocladius*) *sordidellus* (Zetterstedt, 1838)**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 23 June 2022.

This species is commonly found in littoral regions of lakes and frequently in small ponds. There are now 113 records of *Psectrocladius* (*Psectrocladius*) *sordidellus* from 95 locations in Ireland but just one previous record in Dublin and HA9, from the artificial pond at the public Library at Dun Laoghaire, reported by Murray and Ashe (2017).

***Tvetenia calvescens* (Edwards, 1929)**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Pe♂♀ 22 June 2022.

Tvetenia calvescens is one of the most common species of Orthocadiinae encountered in Irish rivers and streams. With the addition of this new record from the River Poddle, at Kimmage Manor, there are now 417 records of the species from 271 locations in Ireland. It was previously reported from nine locations in HA9, two in County Kildare on the River Liffey and seven from the River Dodder in County Dublin (Murray *et al*., 2014).

***Tvetenia discoloripes* (Goetghebuer and Thienemann, 1936)**

MEATH: HA8 - Stream, Meadesbrook, Ashbourne (O038594), Pe♂♀ 1, 11 January and 2 February 2022.

This species is widely distributed in Irish flowing waters and is known from 65 locations (Murray *et al*., 2018). There are 15 previous records of *Tvetenia discoloripes* from the stream at Meadesbrook from where it was first recorded in July 1974 (Murray *et al*., 2014).

***Tvetenia verralli* (Edwards, 1929) New for HA8**

MEATH: HA8 - Stream, Meadesbrook, Ashbourne (O038594), Pe♂ 23 February 2023.

This is the first record from HA8 but *Tvetenia verralli* has been previously recorded in the adjoining HA7 from the Rivers Boyne and Blackwater in the vicinity of Navan (Murray *et al*., 2014) and more recently from the River Dee, County Louth (Murray, 2019). *T. verralli* is widely distributed in rivers and streams and there are now records of the species from 123 locations in Ireland.

Subfamily CHIRONOMINAE
Tribe Chironomini

***Chironomus* (*Chironomus*) *luridus* Strenzke, 1959 New for County Kildare**

KILDARE: HA9 - Rainwater tank in garden, Glen Easton, Leixlip (N987365), Im♂Pe♂♀ 1 September 2022. **MEATH: HA8 -** Meadesbrook, Ashbourne, Rainwater tank in yard (O040594), Pe ♂ 27 March 2023.

There are records of *Chironomus* (*Chironomus*) *luridus* from 28 locations in Ireland, the majority from rain filled outdoor containers, tanks and barrels but also from ponds and slow flowing waters. It is known from three locations in HA9 in Dublin, two on the campus of University College Dublin - one by the author in a collection made in 1966 from the artificial lake on the campus and one by the late Patrick Ashe in 1981 from an exposed tank on the flat roof of the Science building (Murray *et al*., 2015). The third location in Dublin is from a garden tank at Castleknock (Murray and O'Connor, 2018). The recent record from Leixlip is a fourth location in HA9 but it is the first record from County Kildare. In County Meath, there are records from two locations, it has been collected previously on 13 occasions at Meadesbrook in HA8 and there is one record in HA7, from a rainwater filled barrel (Murray, 2016).

***Chironomus (Chironomus) plumosus* (Linnaeus, 1758)**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 25 April 2023.

This species has a widespread distribution in Ireland. The record at Herbert Park is a third record for HA9 and a second in County Dublin. It was first collected in HA9 in 1986 from collections the River Liffey at Straffan, County Kildare (Hayes, 1991; Murray *et al*., 2015), The previous record in County Dublin was from the main pond in St Stephens Green (Murray and Ashe, 2017)

***Chironomus* (*Chironomus*) *riparius* Meigen, 1804 New for HA8**

MEATH: HA8 - On wing in garden, Meadesbrook, Ashbourne (O040594), Im♂ 31 March 2022.

Records of *Chironomus riparius* are documented from 22 locations in 16 HAs but this is the first record of the species in HA8. It is already known in County Meath from collections at three locations in the adjacent HA7.

***Dicrotendipes nervosus* (Staeger, 1839)**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 25 April 2023.

This is the only the second record of *Dicrotendipes nervosus* in HA9 and Dublin. The earlier record was from the main lake in the Zoological Gardens in July 1987. Larvae of *D. nervosus* are characteristic of ponds, ditches and slow-flowing waters.

***Endochironomus albipennis* (Meigen, 1830)**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 25 April 2023.

There is only one previous record of *Endochironomus albipennis* in HA9 and Dublin in a collection from the Royal Canal at Ashtown in 1968 (Murray, 1972). However, this species is widespread in Ireland, now on record from 160 locations, 158 cited in Murray *et al.* (2018) and an additional location given in Murray and O'Connor (2018).

***Glyptotendipes* (*Glyptotendipes*) *barbipes* (Staeger, 1839) New for Dublin and HA9**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 25 April 2023.

With this new record in Dublin and HA9 there are now records of the species from 28 locations in Ireland.

***Glyptotendipes* (*Glyptotendipes*) *pallens* (Meigen, 1804)**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge, (O178324), Pe♂ 25 April 2023.

This is the third record of *Glyptotendipes* (*Glyptotendipes*) *pallens* in HA9 and Dublin. It was first recorded from the artificial lake in the Zoological Gardens in 1987 (Murray *et al*., 2015) and more recently from the artificial lake in the campus of University College, Dublin at Belfield (Murray and O'Connor, 2018). There are now records of the species from 71 locations in Ireland.

***Polypedilum* (*Polypedilum*) *nubeculosum* (Meigen, 1804)**

MEATH: HA7 - Cattle drinking trough, Ardsallagh, Navan (N896635), Pe♂ 27 March 2023.

There are records of *Polypedilum* (*Polypedilum*) *nubeculosum* from 81 locations in Ireland, eight in HA7 in County Meath, including at the present location where it was first collected in May 2021 (Murray, 2021).

Tribe Tanytarsini

***Cladotanytarsus* (*Cladotanytarsus*) *pallidus* Kieffer, 1922 New for Dublin and HA9**

DUBLIN: HA9 - Artificial pond, Herbert Park, Ballsbridge (O178324), Pe♂ 25 April 2023.

This is the first record of this small species from County Dublin and HA9 and it is now known from 45 locations in Ireland where the majority of records are from sites in southern, western and northern regions. There is one record in the midlands from pupal exuviae collected along the shore of Lough Lene in HA7 in County Westmeath (Murray *et al*., 2015). Larvae of

Cladotanytarsus (*Cladotanytarsus*) *pallidus* are typical denizens of habitats in lentic or stagnant waters in ditches, ponds, pools and the littoral zone of lakes.

***Micropsectra atrofasciata* (Kieffer, 1911)**

MEATH: HA8 - Stream, Meadesbrook, Ashbourne (O038594), Im♂Pe♂ 11 January and 2 February 2022; cobweb, house window (O040594), Im♂ 14 November 2022.

This is a rather common species with records from 146 locations in Ireland, including 18 in County Meath - one in HA6, 15 in HA7 and two in HA8. There have been eleven previous records at Meadesbrook from where adult males were first collected in 1968 (Murray, 1972; Murray *et al*., 2015). Although regarded as multivoltine, thus far there are no records of *Micropsectra atrofasciata* at Meadesbrook between the months of July and September.

***Micropsectra junci* (Meigen, 1818)**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Pe♂♀ 22 June 2022. **MEATH: HA7 -** St Bridget's Well, Ardsallagh (N897635), Pe♂ 18 April 2023.

Micropsectra junci is now known from 33 locations in Ireland. This is a third location in HA7 in County Meath and the second record from County Dublin and HA9 from where it was first recorded in HA9 from the River Dodder in 1967 as *M. subviridis* (Murray, 1972; Murray *et al*., 2015).

***Tanytarsus mendax* Kieffer, 1925**

DUBLIN: HA9 - River Poddle, Kimmage Manor, Templeogue (O126299), Pe♂♀ 22 June 2022.

This species has now been recorded at 24 locations in Ireland, this being a second location for the species in Dublin and HA9. The previous record is from examination of pupal exuviae in formalin preserved bulk collections of littoral Cladocera made by Duigan (1989) from the Bohernabreena Reservoir at the headwaters of the River Dodder (Murray, 2018).

Update of distribution records

The new county and Hydrometric area records presented here, combined with existing data (Murray, 2020, 2021), give revised totals for the number of species now on record in County Dublin as 157 (formerly 151), in County Kildare as 71 (formerly 69) and in County Meath as 213 (formerly 209). The number of species on record for HA7 is now 229 (was 228), for HA8 is now 91 (was 86) and for HA9 is now 196 (was 192).

A summary of the occurrence, by county and HA, of the 520 positively identified species of Chironomidae on record in Ireland up to December 2017 was given by Murray *et al*. (2018). The addition of two species new to the Irish fauna (Langton and Ruse, 2018; Murray and Langton, 2019) gave a revised total of 522 species for Ireland (Murray, 2019b). An additional species has recently been added from net collections of Diptera made by Adam Mantell in July

2022 at Muckross, in the Killarney National Park, County Kerry that captured an adult male of *Chironomus* (*Chaetolabis*) *macani* Freeman, 1948, the first record of a species in the subgenus *Chaetolabis* in Ireland (Langton *et al*., 2023). With the addition of that species the total number of Chironomidae is now 319 species in County Kerry and 285 in HA22. There are now records of 523 species of Chironomidae in Ireland. However, an additional 20 species-level taxa are known to occur, 14 recognised as morphotypes of distinct pupal exuviae not yet associated with described adults, and six undescribed species. Thus an overall total of 543 species level taxa of Chironomidae are documented from the Irish fauna at the end of April 2023.

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Bulletin of the Irish Biogeographical Society **Number 46** (2023)

FIRST RECORD OF *CHIRONOMUS* (*CHAETOLABIS*) *MACANI* FREEMAN, 1948 (DIPTERA: CHIRONOMIDAE) IN IRELAND FROM KILLARNEY, COUNTY KERRY

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Abstract

Chironomus (*Chaetolabis*) *macani* Freeman, 1948 (Insecta: Diptera, Chironomidae, Chironominae) is reported as new to the Irish fauna from net collections in July 2022 at Muckross, Killarney, County Kerry, Southwest Ireland.

Key words: Chironomidae, *Chironomus*, *Chaetolabis*, *macani* Freeman, first record, distribution, Ireland.

Introduction

The genus *Chironomus* Meigen (1830) has several hundred species worldwide (Epler *et al*., 2013). Three subgenera are currently recognised - the nominal subgenus *Chironomus* (Meigen, 1830), the subgenus *Chaetolabis* (Townes, 1945) and the subgenus *Lobochironomus* Ryser, Wulker and Scholl, 1985. In the western Palaearctic Region, approximately 85 species are recognised in the genus *Chironomus*, of which twenty-four are documented in Ireland, twenty three in the subgenus *Chironomus*, Meigen 1803 and one in the subgenus *Lobochironomus* (Murray *et al*., 2015, 2018). Until now there are no records in Ireland of *Chaetolabis.*

Seven species of *Chironomus s. str*. are known from County Kerry (Murray *et al*., 2015) in Hydrometric Area 22 (HA22 - see <www.epa.ie> for details of the 40 hydrometric areas of Ireland). The capture of an adult male *Chironomus* (*Chaetolabis*) *macani* Freeman, 1948 by net collection in July 2022 at Muckross, Killarney, County Kerry, constitutes the first record of a species in the subgenus *Chaetolabis* in Ireland.

Five species of *Chironomus* (*Chaetolabis*) are known. The subgenus was established by Townes (1945) for two Nearctic species, *C.* (*C.*) *atroviridis* (Townes, 1945) and *C.* (*C.*) *ochreatus* (Townes, 1945) known only from Canada and the U.S.A. (Martin, 2014). A third species, *C.* (*C.*) *bitumineus* Langton and Vallenduuk, 2013, has a Holarctic distribution with Palaearctic records from Finland and Sweden and Nearctic records from Canada (Langton and Vallenduuk, 2013). A fourth species, *C.* (*C.*). *globulus* Filinkova and Belyanina, 1993 is known only from the Ural Mountains in West Siberia, Russia (Filinkova and Belyanina, 1993). The fifth species *C.* (*C.*) *macani* Freeman, 1948, described from England (Freeman, 1948), is now confirmed for Ireland. It has a Palaearctic distribution and is already known from Belgium, Finland, Germany, Great Britain, Japan, Netherlands, Norway, Russia, Sweden and Ukraine.

New record for Ireland in County Kerry and HA22

***Chironomus* (*Chaetolabis*) *macani* Freeman, 1948**

KERRY: HA22 - Parkland**,** Muckross, Killarney National Park (V977868), ♂Im, July 2022, leg. A. Mantell, det. P. H. Langton. A voucher specimen will be deposited in the National Museum of Ireland, Natural History, Dublin.

The adult male of *Chironomus* (*Chaetolabis*) *macani* was captured in flight by net in a parkland area with adjoining trees grading into flower-rich scrub and semi improved agricultural land. Larvae of *C.* (*C.*) *macani* live among the roots of wet *Sphagnum* moss in and adjacent to the littoral zone of lakes and ponds. With the record of this species in the Killarney National Park there are now 319 species of Chironomidae known from County Kerry, 285 species in Hydrometric Area 22 and records of a total of 523 species of Chironomidae are documented from Ireland.

Acknowledgement

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THE GREEN-JAWED TUBE SPIDER *SEGESTRIA FLORENTINA* (ROSSI) (ARANEAE: SEGESTRIIDAE) IS ESTABLISHED IN IRELAND

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Abstract

Segestria florentina (Rossi) was previously recorded from Ireland only as a single specimen found in association with imported bananas. The species has been treated since then as a non-established introduction. A large, seemingly localised population of the spider has been found in a suburban area of Limerick city and the species can now be added to the list of established Irish spiders. The spider has been known to, very occasionally, inflict defensive bites and, while the effects thereof are generally mild, its venom is thus of medical and biological interest. It is a large and robust animal and bites are usually physically painful rather than causing a symptomatic reaction. The neurotoxin can very occasionally lead to more persistent symptoms in individuals and in combination with the spider's large size and dramatic feeding behaviour, this has incited some rather sensational headlines in media outlets.

Key words: *Segestria florentina*, Segestriidae, established in Ireland, Limerick, urban, synanthropic, houses, walls, venom, bite, media.

Introduction

The first Irish record of *Segestria florentina* (Rossi, 1790) was from *circa* September 2005 when a single female specimen was collected from a box of bananas in a retail store in Dublin city (Nolan, 2008). It was possible to establish the route the shipment of fruit had taken from point of origin in South America, through the port of Foynes, County Limerick and to a storage facility in County Dublin. It was not possible to ascertain at which point the spider may have entered the box of bananas, so the species was noted as a non-established introduction (Nolan, 2008). On the 8 August 2022, MN was contacted by JD who thought that some spiders found in the vicinity of their house in July 2022 might be specimens of *S. florentina*. An image of a desiccated specimen found indoors, sent to the senior author on the 14 August 2022 clearly showed the chelicerae to have a green colouration and thus *S. florentina* was almost certainly

involved. MN then proposed to visit the location in August 2022 in order to try and collect some adult specimens.

Records

LIMERICK: Dooradoyle, Limerick, County Limerick (Irish grid reference R5653). Up to the 30 August 2022 specimens were observed and/or collected by JD: in late June a web was noticed on a wall in a large hole immediately adjacent to a front-door bell; a large occupying spider was occasionally observed and this was later identified as *Segestria florentina*. At the end of July, the desiccated husk of an immature specimen was seen on the back of a curtain at a patio door. This was the first specimen (noted above) on which the green chelicerae were observed. One immature, seen at the end of July in the house, was collected and photographed. Three small immatures, *circa* 14 August, were noted moving around on the walls and window-frames of the house in the evening. One immature, mid-August (possibly 17th), also in the house, was collected and kept alive (taken for microscope examination and preservation by MN on 31 August).

31 August 2022 (specimens observed and collected by JD and MN); numerous (>20) webs seen on the house and garden walls of a single domicile, about 10 of which (the most accessible) were examined. A number seemed to have no occupant. One adult ♀ and one immature specimen enticed from their retreat by dragging a cable-tie across the radii of the emergent web. Two adults ♀♀ were pushed from the retreat onto the platform of radii surrounding the mouth by inserting a cable-tie through a retreat from behind. The large specimen at the doorbell was seen again but could not be extricated.

Webs were established in various locations on the outside surface of the house: behind metal struts fixed flat against a wall (mortar pointing providing a concave recess behind the strut where webs could be established), in cavities in mortar, at the meeting point of an eave and wall, within the structure of an aluminium sliding door, under a wooden window-frame, in gaps between wooden planks of a door etc. In JD's experience of 'fishing' for specimens, when some webs were revisited, they were occasionally found to be no longer occupied, suggesting specimens were relocating with some frequency.

Identification, webs and habits

Segestria florentina is a large spider with adult female specimens sometimes attaining 22mm in length. The largest specimen collected in Limerick measured 15mm (17.5mm including the prognathous jaws) (Plate 1). With the legs out-stretched specimens can easily exceed 40mm in length from claws of leg I to claws of leg IV. The first two pairs of legs are long and very robust – far more so than legs III and IV – and this gives the spider a rather imposing appearance when

it shows itself at the mouth of its webs. It can emerge with great rapidity and provoke a startled response (possibly terrifying in the unsuspected) even in the experienced arachnologist (Moore, 2003), something to which I can attest. The legs and abdomen are very dark in adult specimens and immatures can be slightly paler. In contrast *S. senoculata* (L.), the only other segestriid spider found in Ireland, usually has a clear, dark foliate pattern on its pale abdomen (Plate 1). The webs of *Segestria* species are distinctive and are usually are set into a hole or deep recess in the form of silken tubes. A series of lines of silk are constructed radiating from the mouth of the web like spokes on a wheel (Plate 2). These can be quite faint against a pale surface and in the few observations noted here seemed to be less frequently as regularly constructed than in *S. senoculata* (Plate 2). Observations show that *S. florentina* builds a tube which is curled back on itself with the spider remaining in the rebated section during the day (Chase, 1965).

It can be difficult to perceive the green sheen of the chelicerae unless in bright sunlight and even if persuaded to the web's mouth the spider tends to retreat into its roost very quickly if prey is not detected. A close-up photograph of a trapped specimen seems to pick up the green sheen even in relatively dull conditions. The spider is most frequently seen sitting at the web-mouth at night and careful deployment of a mobile phone with flash or in conjunction with torch-light might capture the colour of the jaws which are diagnostic of the species.

If the spider leaves the area of the retreat it runs around very rapidly, in a panicked manner, looking for another bolt-hole. This was the experience while collecting specimens on the 31 August and they can be difficult to catch in this circumstance. A specimen was noted to 'jump' from its web's mouth when there was no possibility of retreating (Moore, 2003). Moore (1976) notes how the spider's agitation (which could be perceived as aggression) seems to persist for some time after capture.

The spider is a generalist predator, taking most prey available, however it seems to completely avoid woodlice (Chase, 1965). A prey animal usually signals its presence by walking across the radial lines of the web; the spider sprints out, grabs and bites the animal and drags it back into the retreat with great rapidity. A slightly widened section in the main tube serves as a feeding area and the spider carefully discards all food remnants, dropping them from the mouth of the web (Chase, 1965). A population of the spider that shared a porous wall with a species of solitary bee was studied and their highly active 'hunting' technique characterised (Walters, 2016) with some specimens emerging fully from the web to chase nearby bees. It is possible they could detect the vibrations of the wings through the web trip-lines – a tuning-fork has been recommended by some as a tool to entice the species out. Cooke (1962) and Chase (1965) offer advice on keeping the species in captivity.

Distribution

Segestria florentina is a thermophilous spider with a distribution largely confined to the Mediterranean basin, North Africa, the Levant and more western parts of the Middle-East. In some of these areas it is very common. While in some parts of Europe it is found in natural habitats e.g. on tree trunks under bark, under stones and shingle and in dry grasslands (Nentwig *et al*., 2022), its most usual habitat in northern Europe seems to be holes and crevices in walls in synanthropic situations (Braunstein, 1994; Braud, 2007; Spider Recording Scheme, 2022). *S. florentina* has been established in Britain for many years and was characterised as being usually found in port towns in southern England giving rise to the idea that it was being introduced with freight (Locket and Millidge, 1951). It has spread somewhat in the intervening period and in Britain is now known from nearly 100 hectads, the vast majority of these still in the southern third of England and some from inland locations. It has now been recorded from south Wales and even Scotland (Spider Recording Scheme, 2022) and seems to be spreading north albeit slowly.

It appears to be a relatively recent advent to some northern European countries, first spotted in Germany in 1989 (Braunstein, 1994), in Hungary in 2004 (Kovács and Szinetár, 2004) and Serbia in 2007 (Komnenov and Pavićević, 2008). The latter authors note previous records from the Adriatic coast and that the Serbian record was the first inland record in the Balkans. All German records are strongly southern: Neustadt in 1989 from an insolated, dry-stone wall, subsequently in 1991 from a location about 7km north (Braunstein, 1994) and later from a location near Stuttgart after 2010 (Arachnologische Gesellschaft, 2022).

It is now widely distributed across southern Europe and occurs in a number of more northern countries in eastern and Atlantic zone Europe but is thus far absent from Fennoscandia and Baltic countries (Nentwig *et al*., 2022). Wunderlich questions whether the species' spread may be indicative of climate change, allowing this largely thermophilous species to colonise habitat in increasingly northern latitudes (Wunderlich, 1995), however it does seem to be confined in northern climes to anthropogenic structures, presumably taking advantage of the artificially elevated temperatures.

Venom and bites

There are a small number of records of *Segestria florentina* biting humans. Its venom has been studied and found to contain neurotoxins and insecticide (Usmanov *et al.*, 1985). The effects of the neurotoxin on humans are essentially mild. Biting is so infrequent in the species that it is not mentioned in a number of substantial European websites: Spider Recording Scheme (2022), Nentwig *et al.* (2022) and Arachnologische Gesellschaft (2022). Neither is it alluded to in the recently published *Britain's spiders* (Bee *et al*., 2017).

Savory recounts an instance of his sister being bitten in 1926 (quoting his sister's note within), "One spider showed vigorous resistance, in the course of which 'it gave my finger a fierce bite and made it quite sore.' The soreness lasted for the rest of the day and it is noteworthy that this particular spider was being harried about and was consciously on the defensive" (Savory, 1928). Chase somewhat misrepresents the event, suggesting the spider was simply aggressive and not acknowledging the bite was quite clearly provoked (Chase, 1965). Hopkins notes that "fellow arachnologists…have been bitten by *S. florentina*" but also that they have been bitten by the common, garden-spider *Araneus diadematus* (Clerck, 1757), which is an utterly harmless animal (Hopkins, 1993). It is a simple truth that the more you handle spiders, the more likely you are to be bitten, possibly by the most unlikely of species.

A summary of European cases of spider bites noted that "pathological reactions have been attributed to…*Segestria florentina*…" (Maretić, 1975) but Maretić expressed uncertainty about the reliability of the data and gave the spider no specific attention in his summary, so its bite had not provoked any particular attention by that time. A more recent account is given of a small number of bites recorded in Italy where the spider is common (Pepe and Caione, 2006 and references therein). The few bites noted provoked mild symptoms lasting a few hours, though in one case a sore arm and mild headache persisted for a week. The authors summarise other noted bites as showing "light local effects, as for example a blushed skin, a swelling in the bitten part" with two cases showing stronger symptoms including a burning sensation, pain and a loss of sensation for a few hours afterwards (Pepe and Caione, 2006). They summarise that "the bite of *S. florentina* is not dangerous for man." Anticipating a possible increase in Serbian populations, Usmanov *et al.* (1985) suggest that the general public should be informed about the spider and advised what to do in the instance of being bitten. In the same paper, the authors note however that the spider is not dangerous to humans.

The spider has however featured several times in newspapers and other media outlets in Britain under rather lurid headlines because it has occasionally inflicted a bite. Despite the more reasonable tone that eventually emerges in these items, it is usually the headlines, leads or first couple of paragraphs that people read and that determines public reaction. It is probably inevitable that if the spider becomes more widespread in Ireland and gains publicity through media outlets, overblown accounts of its potency and threat-level will appear. Attempting to allay these in advance in this note is probably an exercise in futility.

The tone of commentary appearing in some British media outlets has been distinctly lurid. One headline reads "BEWARE: Green fanged spider with painful bite" and the lead and first paragraphs continue in this vein, "A menacing green-fanged spider with a painful bite has been spotted in a wall outside a shop. The 'cannibal' spider is said to have a 'bite like a deep injection' – and their natural habitat are houses." (Harrow Times, 2018; this story appeared in

numerous other outlets including Metro News, 2019). The rest of the item however undergoes a substantial change of tone, with enthusiastic responses from a spider lover who got to photograph the animal and knowledge-based (!!!) information from a local naturalist who offers reassurances that the spider very rarely bites and only if provoked. A more lurid account of a bite by *S. florentina* appears under the banner "Woman's horror after being bitten on forehead by venomous 'Dracula spider'" in *The Mirror* (20 July 2019). It is not until the fourth paragraph that we are informed "Bites from the spider are often compared to bee stings, and their venom does not have a lasting effect." And finally, a headline in *The Irish Sun* (17 September 2019) reads "FANGTASTIC Skin-crawling moment terrifying black spider with green fangs emerges from hole in a wall" and the lead paragraph continues in the same vein, "A creepy video has captured the moment a green-fanged cannibal spider emerged from a hole in the wall in Wiltshire." As with the item from Harrow above, the tone changes quite rapidly to being reassuring and factual. However, the spider is also referred to as the 'Dracula' spider later in the item, serving to illustrate how easily negative terminology can travel. Other items along similar lines can be found; *inter alia* Kentonline (2020), Express.co.uk (2016). The latter item suggests the spider is called the 'Dracula' spider because it is found in Transylvania. Ho hum!

While there is no point in pretending bites do not occur, most are clearly provoked by humans disturbing the spider. *S. florentina* is a large spider with very sturdy jaws and if sufficiently provoked may well, and quite reasonably, react defensively. Occasionally the bite does provoke more persistent symptoms, however, as with all venoms, this often has more to do with an individual's body chemistry than the potency of the venom.

Observing the species when collecting them suggested strongly to me that the spider becomes panicked when it feels itself exposed and, in this circumstance, a defensive bite is more probable. In the unlikely event of a bite occurring a rule of thumb is to collect or photograph the offender in order to be sure of what inflicted the bite. It has been long known that many bites are attributed to spiders which very probably had another source (Russell and Gertsch, 1982).

Conclusions

Despite several searches within a few kilometres of the known population no other specimens of *Segestria florentina* have been seen. Given the noted population is relatively large it is unlikely that this is the only one in County Limerick or Ireland more generally. It was noted of British populations in 1951 that they are very local, but where they occur "many specimens are often found together within a small radius, inhabiting holes in walls or living under stones" (Locket and Millidge, 1951) and this distribution pattern seems still to be the case (Spider Recording Scheme, 2022).

It is worth noting how small and innocuous were the entrances to some of the spider's

retreats. Others were hidden from plain view by being placed low on a wall or obscured by a small protrusion of mortar. It would be very easy to miss the spider's presence in such circumstances.

If the spider comes to establish itself more commonly in Ireland the possibility of bites occurring is fundamentally very remote. The spider is a cryptic and secretive animal that spends most of its life hidden within its retreat. The most likely bite victims will be arachnologists collecting specimens or individuals examining webs in order to record the species. However, because it is a thermophilous species, and in more northern climates clearly prefers synanthropic situations, it will almost certainly remain confined to built-up areas in Ireland, so occasional encounters with an unsuspecting public might be inevitable.

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PLATE 1. Specimens of *Segestria senoculata* (left) and *S. florentina* (right). *S. senoculata*. collected by Myles Nolan, Killarney National Park, County Kerry, from a yew (*Taxus* trunk), 18 September 1999. Note the clear abdominal pattern in *S. senoculata*. The specimen of *S. florentina* = 17.5mm including the chelicerae. Photograph: Myles Nolan.

PLATE 2. Typical web of *Segestria senoculata* showing the distinctively arranged radiating trip-lines. Glinny, Riverstick, County Cork, 13 June 2006. The web of *S. florentina* can often be less regularly formed. Photograph: Myles Nolan.

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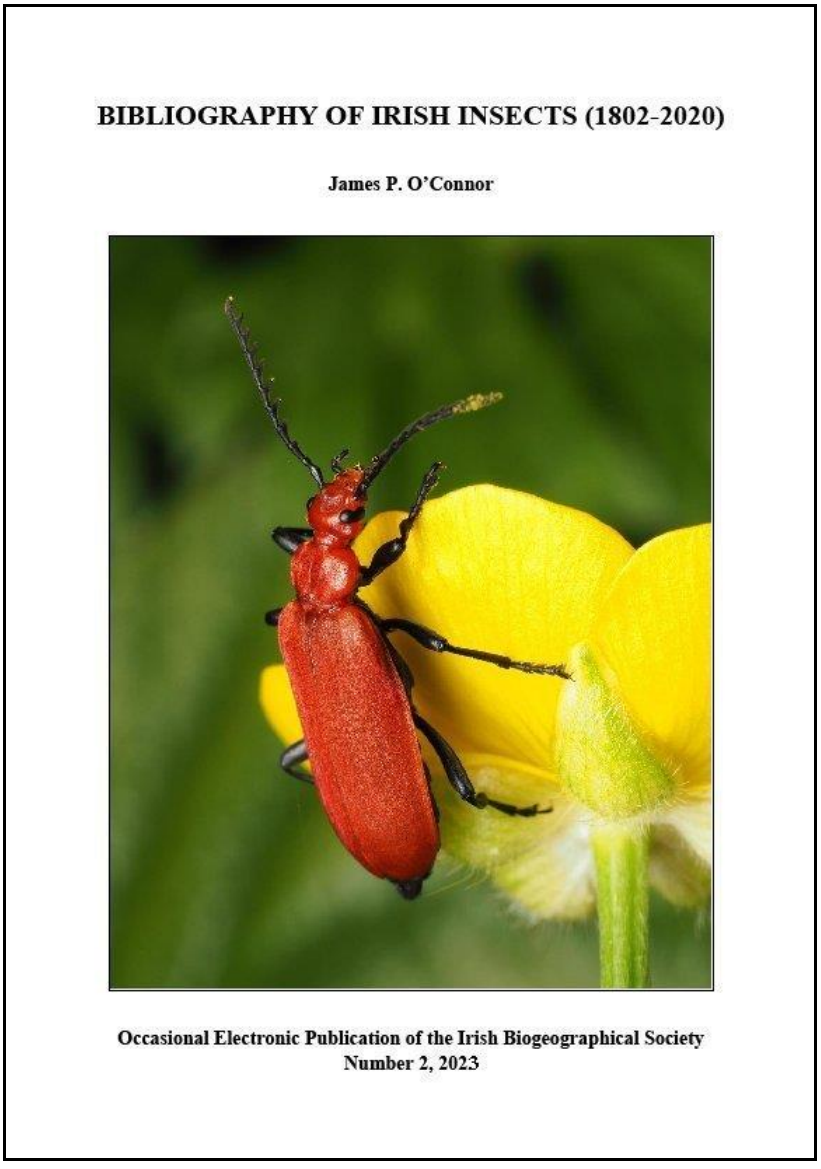

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