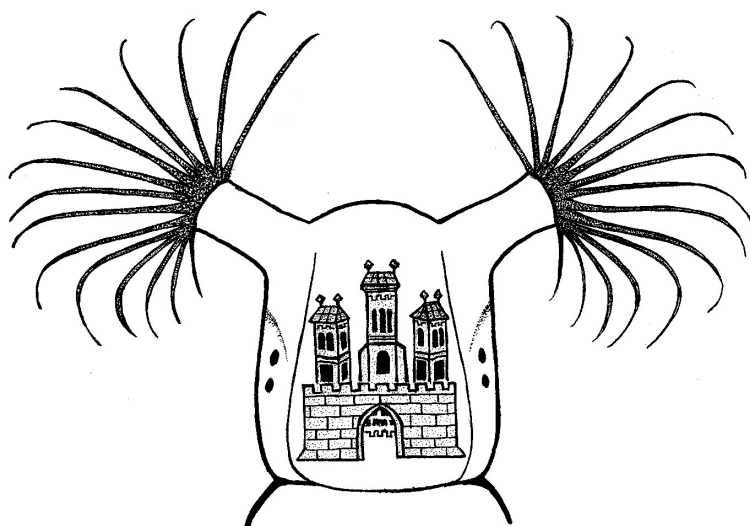

The British Simuliid Group Bulletin

Number 39

January 2013



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THE BRITISH SIMULIID GROUP BULLETIN

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CONTENTS

From the Editor.....	1
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FORTHCOMING MEETINGS

Tenth Annual Meeting of the North American Black Fly Association (NABFA)	2
--	---

MEETING REPORT

5th International Simuliidae Symposium in Bratislava.....	3
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SCIENTIFIC PAPER

On the geography of <i>Simulium morsitans</i> in Britain Roger W. Crosskey & Jonathon A.B. Bass	10
--	----

End Pages

The British Simuliid Group
The British Simuliid Group Bulletin
Notes for contributors

Cover Image:

The logo of the 5th International Simuliid Symposium. The coat of arms of Bratislava superimposed on the head of a simuliid larva. Designed and drawn by Tatiana Brúderová.

From the Editor

In this issue we have an account of the highly successful 5th International Simuliid Symposium which included the 32th Meeting of the British Simuliid Group held in Bratislava, Slovakia, from September 3rd – 7th, 2012. The organising committee of Matúš Kúdela, Viera Stloukalová, and Tatiana Brúderová are to be congratulated for organising the event so well. The account includes a description of some of the activities outside the conference room, a group photograph, the programme with list of presentations. Abstracts have been posted on the web in the same location as the *Bulletin* at URL www.blackfly.org.uk/recentbulls.htm.

We also have a paper on the geography of *Simulium morsitans* in Britain by Roger Crosskey and Jon Bass

Your Editor is quite surprised by the number of times the *Bulletin* files on blackfly.org.uk are visited. For example, from its publication in July 2012 until the end of December 2012, the file for *Bulletin* No. 38 (July 2012) was read on-line 199 times and downloaded 92 times. Even accepting that some readers may have accessed the file more than once this shows an impressive level of interest. I am also surprised how frequently the earlier numbers of the *Bulletin* are visited. To my mind this fully justifies publication on-line.

John Davies

MEETINGS

North American Black Fly Association (NABFA) 11th Annual Meeting Georgia February 9-10 2013

Chair: John Walz
Vice Chair: Elmer Gray

Greetings NABFA Members, Friends and Colleagues,

The eleventh annual North American Black Fly Association (NABFA) meeting will be held February 9-10, 2013 at the Georgia Center for Continuing Education on the University of Georgia campus in Athens, Georgia. The meeting will start at 9:00 am on Saturday morning, February 9th and end around 5:00 pm on Sunday, February 10th. We hope you can attend!

For **registration and lodging** information click here: <http://www.georgiacenter.uga.edu/uga-hotel/conferences-events/register/black-fly>

Visit our website at www.nabfa-blackfly.org for future updates about the meeting.

As always, feel free to contact me or Elmer Gray with any questions or concerns. I look forward to a great turnout.

Thanks!

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5th International Simuliid Symposium including the 32th Meeting of the British Simuliid Group Bratislava, Slovakia, September 3 – 7, 2012

Organising committee:

Matúš Kúdela, Viera Stloukalová, Tatiana Brúderová

Editors of the book of abstracts:

Matúš Kúdela & Viera Stloukalová

Sponsors:

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NATRIX

The symposium was held in the Faculty of Natural Sciences, Comenius University in Bratislava, Slovakia from September 3rd to the 7th, 2012. The first day was for registration and this was followed by a welcome party in the Hotel Fairway.

Unfortunately three persons on the list of participants were unable to attend:– Sergey Aybulatov, Atefeh Khazeni and Andrej Štangler.

The daily programme and list of presentations is given below, and there follows an account of the social and cultural activities. The full set of abstracts will be posted with reports of previous symposia on the www.blackfly.org.uk website.

Wine cellar and Castle visit

On Tuesday after the presentations finished, at approximately 16:30 we took a couple of group photographs in front of the entrance of the Faculty of Natural Sciences before boarding a coach to visit the 50 km distant Červený kameň (Red Stone) Castle. On the way to the hill with the castle we passed along the Gidra – a small stream with one of the few abundant *Simulium degrangei* populations in the Carpathian Mountains. In the castle we took a one hour long tour of the collections – interiors of noble residences from the end of the 15th until the beginning of the 20th centuries, castle pharmacy, exhibition of historical weapons, cellars and the fortification system from the 16th century. More details on the castle are available at: <http://www.hradcervenykamen.sk/?page=main&language=en>

Then we drove to the nearby village of Častá, and its 500-year old wine cellar (Fuggerov dom), where we tasted six samples of local wines and dined on traditional roast duck. We left the cellar at approximately 21:30 for the return journey.

Field trip

On Wednesday morning at 8:30 we started the field excursion in the harbour of Bratislava located in the old town. The first part of the trip was aboard the excursion boat *Martin*. We cruised the Danube river upstream. The river scenery very quickly changed from the city to the wilderness of river islands, divided channels and floodplain forests. After 12 km we reached the small village of Devín – here the Danube rapidly flows through a gorge in the most southwestern spur of the Carpathian Mountains and the river Morava joins the Danube. At this place we crossed the state border and entered Austria and at the same time also the Danube Floodplains National Park. We continued a further 4 km along gravel banks and finally we stopped in the harbour of the small town of Hainburg an der Donau. Here we changed from the boat to a coach which took us first to the adjacent Braunsberg hill with excellent view to the river, the national park and Bratislava in the background. Thereafter we went to the small village of Schönau. Here we made a one hour long walk through the floodplain to the river bank. At this place the main habitat types of the Danube Floodplains National Park changed quickly – we crossed hardwood floodplain forest, oxbow lakes, dynamic distributaries with new gravel banks, softwood floodplain forests and finally the main river bed with fast water flow. This area has a rich blackfly fauna (about 20 species), because mountain as well as lowland species find suitable habitats here, however, we could not find any immature stages because of the large water level fluctuations during the days before.

For the lunch we returned back to Slovakia, to the most northwestern border of Bratislava city. After the lunch we walked directly from the restaurant to the neighbouring Morava river floodplains, covered with wet meadows and numerous small oxbow lakes. Our last trip finished at the river bank – in contrast to the close Danube with alpine character and average water discharge of $2000 \text{ m}^3\text{s}^{-1}$, the Morava river is a slowly flowing lowland river with average water discharge of $100 \text{ m}^3\text{s}^{-1}$.

Farewell Dinner

The symposium was concluded by a dinner on Thursday evening. From the symposium venue we moved to the several hundred meter distant Riviera Restaurant. In the restaurant they prepared samples of the traditional local dishes of the area of the former Austrian-Hungarian empire – Bratislava was approximately in the centre of the monarchy. Because the meeting was held during the period of wine maturing, the “burčiak” (stormy wine – beverage that is produced when the wine fermentation is stopped prematurely) was served to accompany the dishes and it found several new followers. With the eating, drinking and talking the dinner lasted for more than three hours, up to 22:30.

Matúš Kúdela



Group Photograph

from the left sitting:

Ignacio Ruiz Arrondo, Ángela Martínez Gavín, Rooschanak Foroutan Saravi, Robert Cheke, Simone Ciadamidaro, Marija Ivković, Doreen Werner, Vera Rodkina, Serenella Marchetti, Aleksandra Čupina, Elias Papadopoulos.

from the left standing:

Elmer Gray, John McCreadie, Yerbol Issakayev, Aisulu Tailakova, Irina Budaeva, Ludmila Khitsova, Antonio Torrell, Patricia Valle Trujillo, Gunther Seitz, Abdullah Inci, Arif Ciloglu, Peter Adler, Alparslan Yildirim, Deniz Busra Inci, Heiko Kotter, Frank Walsh, Brenda Walsh, Rory Post, Adrian Pont, Judith Coles, Viera Stloukalová, Christine Kowal Post, Liudmila Petrozhitskaya, Matúš Kúdela, Ladislav Jedlička, Rolf Meyer, Csaba Deák, Bruno Maiolini, Tatiana Brúderová

PROGRAMME

Monday 3 September

from 16:00 Registration (Hotel Fairway)

19:00 – 21:00 Welcome party (Hotel Fairway)

Tuesday 4 September

8:30 – 9:00 Registration (Faculty of Natural Sciences, Comenius University)

9:00 – 9:30 opening of the Symposium

9:30 – 13:10 presentations

13:10 – 15:00 lunch break

15:00 – 16:00 presentations

16:30 – 22:00 Visit to the Červený kameň castle and the wine cellar Fuggerov dom in the village of Častá, dinner

Wednesday 5 September

whole day field trip

departure of the boat 8:30

arrival with bus circa 20:00

Thursday 6 September

9:00 – 13:10 presentations

13:10 – 15:00 lunch break

15:00 – 18:00 presentations

19:30 gala dinner

ORAL PRESENTATIONS

(Presenting author underlined)

Tuesday 4 September

9:30 – 10:10 Peter H. Adler: ***Biodiversity, ancient DNA barcodes, and symbiotic surprises in the Simuliidae***

10:10 – 10:30 Matúš Kúdela, Ladislav Jedlička, Tatiana Brúderová & Rasa Bernotiene: ***Simulium reptans, Simulium galeratum* and similar species in Europe**

10:30 – 10:50 Tatiana Brúderová, Matúš Kúdela: ***Morphological and genetic variability of Simulium colombaschense* – the type species of the genus Simulium**

10:50 – 11:10 Matúš Kúdela, Ladislav Jedlička & Rasa Bernotiene: ***Status of Simulium (Wilhelmia) lineatum and Simulium (Wilhelmia) balcanicum* according to analysis of mtDNA COI gene**

11:10 – 11:30 **COFFEE BREAK**

11:30 – 11:50 Peter H. Adler, Abdullah Inci, Alparslan Yildirim, Gunther Seitz & Onder Duzlu: ***Chromosomal insights into the pest status of the subgenus Wilhelmia in Turkey***

11:50 – 12:10 Abdullah Inci, Alparslan Yildirim, Onder Duzlu, Peter H. Adler, Zuhul Biskin, Arif Ciloglu, Hakan Yesiloz, Ahmet Demircioglu & Gunther Seitz: ***Molecular characterization of blackflies (Diptera: Simuliidae) collected from Kizilirmak River in Nevsehir province of Turkey***

12:10 – 12:30 Rooschanak Foroutan Saravi & Norbert Becker: ***The Simuliidae fauna of South West Germany***

12:30 – 12:50 Marija Ivković, Marijana Kesić & Zlatko Mihaljević: ***Temporal and spatial variations in phenology patterns of blackflies (Diptera: Simuliidae) and their longitudinal distribution along oligotrophic freshwater system***

12:50 – 13:10 John W. McCreadie & Peter H. Adler: ***A metacommunity view of black fly species assemblages***

13:10 – 15:00 **LUNCH BREAK**

15:00 – 15:20 Irina Budaeva & Ludmila Khitsova: ***The species composition and altitude distribution of black flies (Diptera, Simuliidae) of the North-West Caucasus streams***

15:20 – 15:40 Matúš Kúdela, Aleksandra Ignjatović Čupina, Tatiana Brúderová & Dušan Petrić: ***The blackfly fauna (Diptera, Simuliidae) of the Iron Gate area (eastern Serbia, southwestern Romania) in the past and present***

15:40 – 16:00 Ljudmila Petroshtskaya & Vera Rodkina: ***Zonal and latitudinal distribution of blackflies (Diptera, Simuliidae) in the West Siberia***

Thursday 6 September

- 9:00 – 9:55 Rory Post: **Entomology and the elimination of onchocerciasis by community directed treatment with Ivermectin in Africa**
- 9:55 – 10:15 Poppy H.L. Lamberton, Robert A. Cheke, Osei-Atweneboana, M.Y., Winskill, P., Rory J. Post, Tetteh-Kumah, A., Shew, K.J.S., Wilson, M.D. & Maria-Gloria Basáñez: ***Simulium damnosum* complex geographical distribution and host choice in Ghana where onchocerciasis transmission is under ivermectin control**
- 10:15 – 10:35 Elmer W. Gray, Joseph P. Iburg, Roger D. Wyatt, Robert A. Fusco & Raymond Noblet: **The effect of seston on larval black fly mortality after exposure to a *Bacillus thuringiensis* subsp. *israelensis* based larvicide**
- 10:35 – 11:05 **COFFEE BREAK**
- 11:05 – 11:25 Charles Brockhouse, Soochin Cho, Alexie Papanicolaou, Rory Post, Daniel Boakye, Michael Pfreder & John K. Colbourne (Simulium Genomics Consortium): **Progress in the Simulium Genomics Project**
- 11:25 – 12:45 Inaki Tirados, Evans Muki, Pierre Baleguel, Graham A. Matthews & Robert A. Cheke: **How do blackflies identify their hosts? Results of a preliminary study of visual and olfactory responses of *Simulium squamosum* B in Southern Cameroon**
- 11:45 – 12:05 Ruiz-Arondo I., Martinez E., Kotter H., Figueras L., Muñoz A., Delacour-Estrella S., Alarcón-Elbal P. M., Pinal R. & Lucientes J.: **Blackfly outbreak in Zaragoza in 2011. Spread of blackflies in the Middle Ebro Valley in northeast Spain**
- 12:05 – 12:25 Rasa Bernotiene & Milda Zygtiene: **The pause in blackfly control in Lithuania**
- 12:30 – 13:15 **poster session**
- 13:15 – 15:00 **LUNCH BREAK**
- 15:00 – 15:20 Robert A. Cheke, Tetteh-Kumah, A., Rory J. Post, Poppy H. L. Lamberton & Maria-Gloria Basáñez: **Compact discs for sampling immature stages of members of the *Simulium damnosum* complex**
- 15:20 – 15:40 Doreen Werner & Adrian Pont: **New results on Diptera predators in the black fly plague areas of South Africa**
- 15:40 – 16:00 Aleksandra Ignjatović Čupina, Dušan Petrić, Elias Papadopoulos, Sokratis Ptochos, Domenico Otranto, Filipe Dantas-Torres, Yassen Mutafchiev & Odile Bain: **Notes on blackfly fauna in Western Thrace (northeastern Greece)**

16:00 – 16:20 Simone Ciadamidaro: **Preliminary notes on black fly fauna in Piedmont region, northern Italy**

16:20 – 16:40 **COFFEE BREAK**

16:40 – 17:00 Csaba Deák & Krisztián Kovács: **First records of *Simulium (Hellichella) latipes* (Meigen, 1804) (Diptera: Simuliidae) in Hungary**

17:00 – 17:20 Bruno Maiolini, Sonia Endrizzi & M. Cristina Bruno: **Blackflies as indicators of ecological stress in two Alpine streams with different land use in the catchment**

17:20 – 17:40 Alexey Yankovsky, Yerbol Issakayev, Daria Khassanova & Aisulu Tailakova: **New blackfly species in the genus *Montisimulium* from the north-eastern Kazakhstan**

17:40 – 18:00 Rasa Bernotiene, Irina Budaeva, Erbol Issakaev & Liudmila Petrozhitskaya: **Comparison of *Simulium maculatum* Mg. biology in different parts of Palaearctic**

POSTER PRESENTATIONS

Simone Ciadamidaro, Dušan Petrić, Aleksandra Ignjatović-Čupina & Matúš Kúdela: **Black fly species succession from Alps to lowland rivers in Piedmont, north-western Italy**

Gunter Seitz: **The Blackfly Fauna (Diptera: Simuliidae) of the Gesäuse National Park in Austria**

Hakan Yesiloz, Alparslan Yildirim, Peter H. Adler, Abdullah Inci, Onder Duzlu, Arif Ciloglu & Zuhal Biskin: **Molecular classification of some simuliid larvae collected from Central Basin of Kizilirmak River based on the sequence analyses of mt-COI and ITS-2 gene regions**

SCIENTIFIC PAPERS

On the geography of *Simulium morsitans* in Britain

ROGER W. CROSSKEY¹ & JONATHON A.B. BASS²

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²24 Martel Close, Broadmayne, Dorchester, Dorset DT2 8PL, UK

Recently in this Bulletin, together with our colleague Doreen Werner, we gave an account of the geography of *Simulium posticum* in Britain. This was based on collation and evaluation of sources known to us and included a revised distribution map (Crosskey et al. 2007). Here we do the same for *Simulium morsitans*, a species for which (presently) there is only one reliably known UK population. This is in the Teifi river of mid-Wales (Bass, 2010). However there is a spread of former records, some of them valid but others either definitely not or dubious. Our purpose here is to assess the available records, based as far as possible on material we have seen, and to provide new distribution maps in this light.

1. New or verified records based on examined material

Type series recognition

Edwards (1915a) described *Simulium morsitans* from both sexes of the adult, the aquatic stages being unknown at that time. He designated an adult male as 'Type', hence providing valid designation of a holotype in modern terms. His practice, when describing new species, was to restrict type terms to the type itself, thus other specimens seen by him at the time of description were not referred to as paratypes or by any other type terminology. However, in a section subheaded 'Distribution' he listed the sites of the material he had seen, specifying the places and the collectors; the latter were indicated just by appending the initial letter of their surname but the full initials and surnames were given in the introductory part (p. 23) of the paper. The combination of locality and collector enables these specimens to be correlated with Edwards' publication, e.g. 'Christchurch (Y.)' shows collection at the locality by Lt.Col. J.W. Yerbury. Together with the holotype the specimens form the type series and under the *International Code of Zoological Nomenclature* can be recognized as having paratype status -as noted for these specimens in 1995 by John Chainey (JEC) when he was curating the type specimens of Diptera in the Natural History Museum (BMNH). Each paratype was accordingly labelled by him and provided with a serial number in the general form used in the collection, e.g. 'BMNH(E) 236582' [E = Entomology]. Two additional paratypes were found (RWC) and have been placed within the serial numbering system,

suffixed with an 'A'. Edwards' original records are for specimens from seven places, Christchurch (holotype locality), Aviemore, Cambridge, Enslow, Fakenham, Lymington and New Forest (paratypes). Details of their data are given below. The Fakenham and Aviemore specimens (paratypes) have not been found and are apparently lost.

Specimen record data

The material seen and listed here is in the BMNH collection. The data are presented in the same style as for our previous paper dealing with *Simulium posticatum* (Crosskey et al., 2007). Except for three slides relating to the sampling site of Lewis Davies in Wales none of the specimens was provided with its O.S. grid reference. However, to enhance the value of the available record data we have determined grid positions as nearly as practicable, citing these in the data and labelling the specimens as required. Life stages of specimens are shown by F (adult female), L (larva), M (adult male), P (pupa).

ENGLAND

Cambridgeshire: Cambridge (TL4658), in garden, 18.viii.1903 (F. Jenkinson) (IF) [Paratype 236581, BM1915-20, see Note 1]. Cambridge (TL4658), in garden, 22.v.1912 (F. Jenkinson) (IM) (no paratype status, BM1915-20, see Note 2]. Hauxton, Granta (= Cam) River (TL4352), 5.vii.1915 (F.W. Edwards) (IM) [BM1915-261, see Note 3].

Dorset: Christchurch (SZ1593), 23.v.1897 (J.W. Yerbury) (IF, 1M) [Holotype M 236573 and paratype F236574, see Note 4].

Hampshire: New Forest, Lyndhurst (SU2907), 1.vi.1894 (J.W. Yerbury) (2F) [Paratypes 236582 and 236582A, BM[18]94-77, see Note 5]. New Forest, Lyndhurst (SU2907), 4.v.1897 (J.W. Yerbury) (IF) [Paratype 236583, see Note 6]. New Forest, Lyndhurst Road (SU3309), 21.iv.1894 (J.W. Yerbury) (IF) [Paratype 236583A, BM[18]94-77, see Note 7]. Lymington River, between 1 and 2 miles above Lymington (SZ3298), 25.v.1913 (L.W. Sambon) (2F, one on slide) [paratypes 236580 and 236580A, see Note 8]. New Forest, Lymington River, near Brockenhurst Bridge (SU3003), 2-10.v.1920 (F.W. Edwards) (3F, 3M, all with pupal exuviae, 5L) [BM1920-163, see Note 9]. New Forest (no other locality, ? grid reference), vii.1902 (C.G. Lamb) (6F) [BMNH(E) 1995-264, ex London School of Hygiene and Tropical Medicine, see Note 10].

Oxfordshire: Enslow (SP4818) [on Cherwell River], 30.v.1908 (A.H. Hamm) (3F, 1M) [Paratypes 236575-236578, BM1915-54, see Note 11].

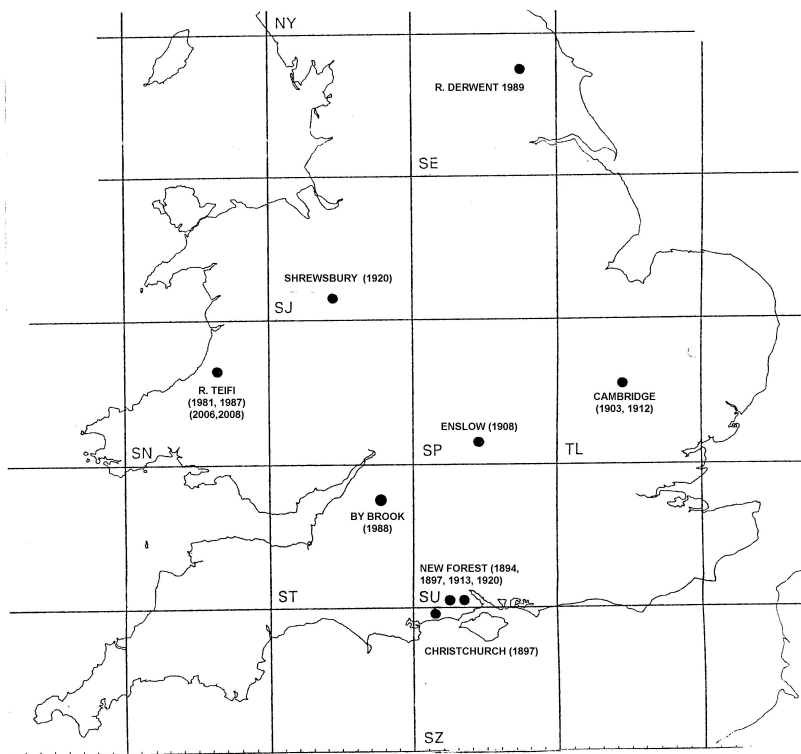


Figure 1: Record sites considered valid for *Simulium morsitans* in England and Wales

Shropshire: Shrewsbury (SJ4912), 21. vii .1920 (F. W. Edwards) (IF) [1920-277, see Note 12].

WALES

Ceredigion: near Tregaron, Teifi river, Cors Caron Nature Reserve (SN687630), 22.vii.1961 (L. Davies) (F, M and L, only some parts on slides) [BM1983-382, see Note 14]. Near Tregaron, Teifi river, Cors Caron Nature Reserve (SN687633/688634) 31.vii.2006 (R.J. Post) (20P, 28L) [BMNH].

[In addition to this material we record that *Simulium morsitans* aquatic stages

were abundant in parts of the Afon Teifi when the river was investigated by one of us (JABB) in July 2008 (Bass, 2010.)

SCOTLAND

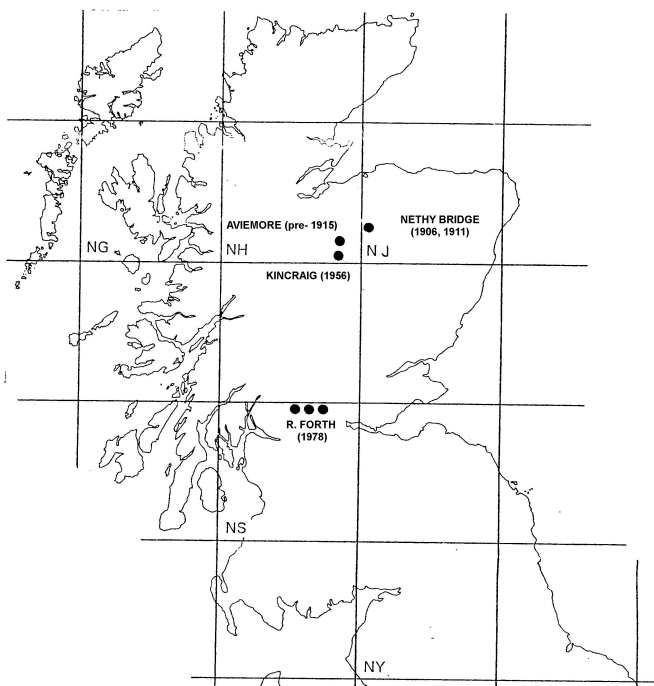


Figure 2: Record sites considered valid for *Simulium morsitans* in Scotland

Highland: Kincaig (NH8305), at light, ix.1956, (C.B.Williams) (6M, 1 on 4.ix, 2. on 5.ix.1956, 3 on 8.ix.1956) [BM1960-187]. Nethy Bridge (NJ0020), [several dates as here specified] (J.J.F.X. King) (2F on 2.vii.1906, 1M on 3.vii.1906, 1F on 11.vii.1906, 2F on 21.viii.1906, 5F on 30.vi.1911, 1M on 19.vii.1911) [BM1938-52, see Note 13].

Notes

The numbers refer to those given in square brackets with the specimen data listed above.

1. Edwards's identification as *S. morsitans* is accepted as correct but hind legs and terminalia are now missing. Recorded by Edwards (1915a: 33) as 'Cambridge (J. [= Jenkinson])' with repetition of the locality (Edwards 1915b)

2. Edwards (1915a: 33) stated that he had 'females only' from Jenkinson in Cambridge so this specimen does not have paratype status. It is a valuable specimen inasmuch as Edwards's preparation of the genitalia is present in a balsam droplet on a celluloid mount with the specimen.

3. Edwards (1920: 232) had two reared males from Hauxton but only one has been found in BMNH. The abdomen of this specimen was removed by Edwards for preparation of the genitalia, which (as undissected hypopygium), are present with the specimen in a balsam droplet on a celluloid mount. Edwards (op. cit.) recorded 'in the river Granta at Hauxton' but only the village name is given on the data label of the specimen.

4. The holotype is in good condition. The abdomen was removed by Edwards for preparation of the genitalia, which (as undissected hypopygium), are present with the specimen in a balsam droplet on a celluloid mount. The Christchurch paratype, recorded by Edwards simply as 'Christchurch (Y.)' is a blood-fed fly, badly rubbed and lacking antennae, right wing, parts of the legs, and the terminalia. The label locality is 'Christchurch, Hants' this county being correct for the specimen at the time of collection. The type locality, formerly Hampshire, is now in Dorset.

5. Each of these females has an additional pencilled label reading "'This fly bites and annoys one in the Forest" (collector's note) '. Paratype 236582 has the terminalia and the left mid/hind legs on two separate slides, and lacks the left wing and right hind leg. A paratype was overlooked by Chainey when the type series was labelled up and to this has been assigned the number 236582A (RWC). It was in bad state, stuck to a small crumbling celluloid mount, and has been transferred for safekeeping into the alcohol collection, after floating it free and softening with 10% KOH; one fore leg is slide-mounted. (Spirit preservation enables the ovipositor notch to be easily observed.) The specimens were implicitly recorded by Edwards (1915a: 33) under the broad statement 'New Forest (Y. [= Yerbury])' and by Edwards (1915b: 308) under 'New Forest district'.

6. In addition to the usual rectangular data label the specimen has a circular label reading 'Lynd-hurst 4/5/97 [= 1897] Col Y [= Yerbury] '. Right wing damaged, thorax crushed, otherwise condition fair; terminalia parts on slide (RWC). The specimen was implicitly recorded by Edwards (1915a: 33) under the broad statement 'New Forest (Y.)' and by Edwards (1915b: 308) under 'New Forest district'.

7. This specimen was overlooked by Chainey when he labelled up the type serie. It has been labelled and assigned as para type number 236583A

(RWC). The condition good except for loss of right mid and hind legs; terminalia parts on slide (RWC). The specimen was implicitly recorded by Edwards (1915a: 33) under the broad statement 'New Forest (Y. [= Yerbury])' and by Edwards (1915b: 308) under 'New Forest district'.

8. The BMNH contains two females collected by Sambon from the Lymington River, one pinned and the other in the slide collection. The pinned specimen, paratype 236580, lacks the head, hind legs and left mid leg, and the abdomen except that the terminalia are slide-mounted (RWC). The second specimen is in parts on two slides made and labelled by Edwards, one with all the legs and the other with an antenna, the mouthparts and the abdominal terminalia; Edwards's identical labelling of the slides as *S. morsitans* from 'Lymington River Hants, Dr.L.W. Sambon.' clearly correlates the slides with each other as representing a single specimen; this has paratype status, has been labelled accordingly, and is assigned here the number 236580A.

9. These six specimens collected and reared by Edwards have special importance. They are the first to associate adults with early stages and the only reared *S. morsitans* in the BMNH (or apparently any other) collection. The pupal exuviae and cocoon of each adult is gummed to the same celluloid mount. One of the females lacks head and abdomen. The printed data labels show the locality 'Brockenhurst, New Forest' but in publication Edwards (1920: 233) gave it more precisely as 'Lymington River, near Brockenhurst Bridge'. The five larvae comprise four in alcohol (one without abdominal tip) with Edwards's ink label 'Simulium morsitans. Edw. R.W. Brockenhurst Bridge New Forest. 2.v.1920 F. W. Edwards. 1920.163.' and one in separated parts on a slide. The slide, labelled 'Simulium morsitans Edw. Brockenhurst R., New Forest. 2.v.1920. F.W.E. 1920.163', has the head fans and mouthparts, head capsule, posterior circlet, anal sclerite, and pharate pupal gills; the last show the eight gill filaments characteristic for the species (compare six in *S. posticum*).

10. Each of these females has labels reading 'NEW FOREST/C.G.LAMB 7.02' [= 1902] (by hand) and 'TUBEROSUM/DET: F.W.EDWARDS' (Edwards's name printed) This is a rare case of misidentification by Edwards, assuming it really was his: the labels are in a style not otherwise seen in Edwards's work and the specimens were perhaps never actually seen by him. Notably, while Edwards (1915a) mentions C.G. Lamb as a collector he does not mention these particular specimens in his 1915a paper or elsewhere.

11. The male paratype (236576) is in good condition and accompanied by Edwards's preparation of the genitalia in a balsam droplet on a celluloid mount. One of the three female paratypes lacks the head but in the slide collection is a preparation by Edwards of an isolated female head labelled as from Enslow; this slide clearly correlates with paratype 236575. Edwards (1915b) repeated the Enslow locality given in the original description.

[Note: Dr Doreen Werner (pers. comm.) prospected the Cherwell River at Enslow at the point SP477184 on 22 July 2003 but only *S. equinum* and *S. erythrocephalum* were present.]

12. The Shrewsbury female was recorded by Edwards (1920: 233) as

Simulium venustum (sensu Edwards) (= *S. posticatum*), but slide preparation (RWC) of the terminalia shows the wide U-shaped or somewhat V-shaped ovipositor notch and the specimen is thus *S. morsitans* and not *S. posticatum*. The hind legs are slide-mounted, separately from the terminalia. The Davies card has been changed to show the revised identification. The 10 km square spot record for SJ41 is now inserted on the map for *S. morsitans* given here and needs to be deleted from the map for *S. posticatum* (as *austeni*) given by Davies (1968: 117).

13. The Nethy Bridge specimens, though collected prior to 1915, were not received at BMNH until 1938 and were unavailable to Edwards when *S. morsitans* was described. The genitalia from one of the two males are slide-mounted (RWC preparation) and the identity of the other male clear from the characteristic styles visible in situ. The identity of associated females appears certain on the basis of external characters and terminalia (some slide-mounted). The specimens from Kincaig are labelled as presented to BMNH by L. Davies.

14. It is unclear what material Davies had available from this site, the only one known in Wales. The BMNH contains three slides of adult and larval parts, each with a pencilled label in Davies's hand reading '61.177' (this indicating the year 1961 and the sample number) and the word 'morsitans'. His punch-card record states 'P + mixed L' but no pupal parts have been found. On the other hand there are adult parts but no mention of adults. These slides have been numbered in red as A-C(RWC). They show the following: A, larval cranium, mouthparts removed; B, larval mouthparts and end of abdomen; C, genitalia of one male (dissected), terminalia of one female, eight legs (two fore and two hind legs of each sex). Evidently a few adults were reared from the Teifi river site.

Other distribution records deemed reliable

The abbreviation CEH refers to the Centre for Ecology and Hydrology of the Natural Environment Research Council (NERC). Initial CEH identifications of larvae relating to CEH records sites were confirmed by JABB).

ENGLAND

North Yorkshire: Derwent river at Norton (SE7971), 1989 (larvae) (CEH).

Wiltshire: By Brook at Slaughterford, c. 6km W of Chippenham (ST8373), 6.iv.1988 (larvae) (CEH). [In July 2003 RWC and JABB independently prospected By Brook near Slaughterford. No trace of *S. morsitans* was found although *S. equinum* and *S. ornatum s.l.* were abundant.]

SCOTLAND

Highland: Aviemore [NH8912], no date but pre-1915 (J.J.F.X. King) (IM, lost).

Note: The male genitalia illustrated in Edwards (1915a: 24, fig. 1d) were from this Aviemore specimen, which would have paratype status but has not been found and is assumed lost. Edwards (1915b) repeated the locality record but without extra information.

Stirling: Forth river at Parks of Garden (NS5997), 1978 (larvae) (CEH). Forth river at Drip Bridge (NS7795), 1978 (larvae) (CEH); Forth river at Gargunnoch Bridge (NS7195), 1978 (larvae) (CEH); Forth river at Kippen Bridge (NS6696), 1978 (larvae) (CEH).

Note: The larvae were mostly too bleached from storage for confirmation of identity but a larva seen from Kippen Bridge was identifiable as *Simulium morsitans*. A sampling at Drip Bridge site in autumn 2003 was negative (Nikki Broad, pers. comm. to JABB), 20/10/03). Further sampling on this river is needed.

Erroneous or dubious records

Unsubstantiated records are detailed here in alphabetical order of place name. Mention of a 'card' in an entry shows that the record discussed is related to the British simuliid record card index of the late Lewis Davies. This is kept in Building DC2, Department of Entomology, The Natural History Museum, London.

(1) Blelham Beck (Cumbria):

Record erroneous. Smart (1944: 53) reported pupae of *S. morsitans* collected by him on 29.vi.1936 from Blelham Beck at Low Wray in Cumbria. Davies entered the data on one of his cards, rightly giving the six-numeral grid reference as 372012; however, he mispositioned the 10 km square relating to Smart's record and placed it in the old 100 km square 34 (= SD) (near Liverpool) instead of in the correct 100 km square 35 (= NY) (Lake District); this is shown both by the grid reference on the card and the positioning related to it on Davies's *morsitans* map. Davies did not mention on his card, apparently not having seen, the five adults reared by Smart from the Blelham Beck pupae which are present in the BMNH; these are labelled as reared from pupae. Examination, including slide preparation of the genitalia of the one male, shows that Smart misidentified the specimens; they are not *S. morsitans* but *S. rostratum* (Lundström) (syn. *sublacustre* Davies), a northern species closely associated with mountain becks and lake outlets. (It was not Smart's practice to preserve pupal exuviae together with the adults reared from them. The misidentification as *morsitans* is curious, considering that this species has an 8-filament gill compared to the 6-filament gill of *rostratum*. However, Smart (1944: 30) maintained that for identification purposes a hand-lens is sufficient, even for seeing details of male genitalia!)

(2) Box Hill (Surrey):

Record erroneous. A card for *morsitans* applies to two adult females collected

by F. van Emden at Box Hill (Surrey, grid reference '51175516') on 9.v.1950 and relates to the 10 km square spot record for TQ15 on the Davies (1968) *morsitans* map. The two specimens are on a single mount in the BMNH pinned collection. They are not *S. morsitans*, however, but *S. posticum*, as established earlier (Crosskey & Crosskey, 2002: 29).

(3) Fakenham (Suffolk):

Record dubious. Edwards (1915a, original description): Edwards recorded females collected at the Suffolk (not the Norfolk) Fakenham [TL9176] by C.G. Nurse but none of these specimens (paratypes) has been located. The identification as *S. morsitans* might have been correct, but it is more likely that these females were actually *S. posticum*. Edwards (1915b) repeated the locality.

(4) Gairloch and Kinlochewe (Highland, Wester Ross):

Records dubious. Two record cards apply to specimens collected by the Canadian blackfly specialist Douglas M. Davies when visiting Wester Ross in the western Scottish Highlands, viz. a pupa and two pupal exuviae at Gairloch (NG801773) 20.viii.1958 and one pupal exuviae near Kinlochewe (NH023597) 19.viii.1958. The specimens were originally in the D.M. Davies collection at the Department of Biology, McMaster University, Hamilton, Ontario, as recorded on the cards, but they cannot now be found and are presumed lost. The simuliid collection at McMaster University was transferred many years ago to the Canadian National Collection, Ottawa, but a search for the D.M. Davies specimens from Scotland identified as *S. morsitans* made in November 2003 proved negative (D.M. Wood, pers. comm.). In the absence of the material the records are dubious and the cards have been marked accordingly.

(5) Langwathby (Cumbria):

Record dubious. A card applies to two pupae collected by Davies on 17.v.1961 from the Eden river at Langwathby in Cumbria (grid '35570335'). These pupae are absent from the Davies material, but the BMNH pinned collection contains an adult male with identical data and the correct serial sample number ('61/91'). A pencilled label in Davies's hand on this adult reads 'morsit ?' The specimen is evidently the basis of the 10 km square spot record for NY53 on the Davies (1968) *morsitans* map. The identification of the male adult is, in fact, an error as a slide of the genitalia shows it to be *Simulium reptans* (Linnaeus). The missing pupae might have been *morsitans* even though the available male from the site is *reptans*; hence the Langwathby record is here considered dubious rather than erroneous.

(6) Melkinthorpe (Cumbria):

Record dubious. A card denotes an adult of unstated sex collected by H. Britten at Melkinthorpe (Cumbria, grid '35557251') on 13.vii.1920. This specimen, recorded on the card as in the BMNH, is certainly the basis of the 10 km square spot record for NY52 on the Davies (1968) *morsitans* map. The

specimen is not present now in the BMNH and in its absence the record remains dubious. Absence from the card of a sex symbol against the entry 'ad.' (= adult) and absence of his name on the 'DET.' (= determination) line suggest that Davies did not himself see the specimen; his source for the record data is unknown.

Summary of the British distribution of *Simulium morsitans*

Simulium morsitans is rare and seldom encountered in routine prospections. It is not an 'easy' species simply to go out and find! There is no obvious reason for this, given that the breeding sites are mainly in small or medium-sized rivers occupied in abundance by other species. Bass (2010: 7, upper photo) has illustrated a suitable *S. morsitans* habitat in Wales (Afon Teifi). In the 100-plus years since the species was described from southern England (1897) there have been strikingly few distribution records and not all of them have proved reliable. The records have, however, shown *S. morsitans* to be (or have been) widely scattered in Britain and to occur here and there in England, Scotland and (the Teifi river record) Wales. It is unknown (? absent) from Ireland. Notably, the species was never found in the prospections of Crosskey & Crosskey (2002), when data were gathered (1961-2001) from 800 simuliid-positive sites located in South East England.

The first (until now only) distribution map for *Simulium morsitans* in Britain was published by Davies (1968: 116, map 25)) using the National Grid 10km square system - a black dot representing at least one record per square. We have used the same system for the two accompanying distribution maps, which show the dispositions of the verified records for England and Wales (Figure 1) and for Scotland (Figure 2). Together our maps mark a total of 15 positive squares as compared to 14 on the Davies map. However, despite this close similarity there is little real coincidence between the record squares because whereas we have 8 sites additional to those in Davies, his map had 6 sites not duplicated by us. The discrepancies have differing causes, such as loss of voucher material or incorrect identification (e.g. the Box Hill specimens which are actually *Simulium posticum*, see above).

In summary, *S. morsitans* can be described as rare and of widely scattered occurrence in Britain and possibly a candidate species for conservation (Bass, 2010).

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