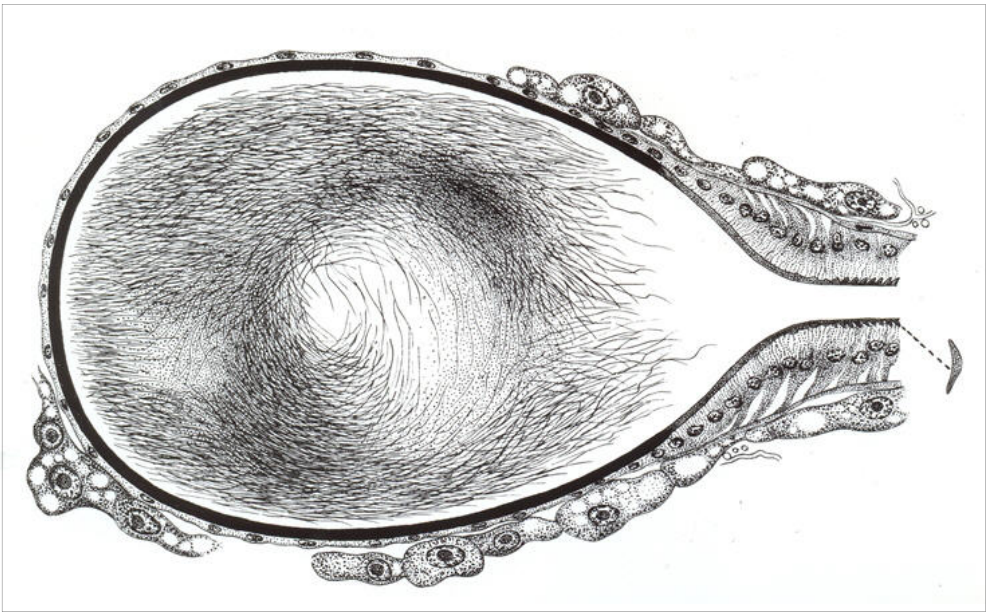
The British Simuliid Group Bulletin

Number 33 February 2010



NATURAL HISTORY MUSEUM

The British Simuliid Group Bulletin

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The British Simuliid Group Bulletin is an informal publication intended to disseminate information about the Simuliidae. It is published twice each year and is distributed free to all members of the British Simuliid Group.

Content covers papers presented at the Group's Annual Meeting, which is usually held in September, short research notes, notices and accounts of meetings, and articles of anecdotal or general interest that would not normally be found in international journals. Geographical cover is world-wide, and is not restricted to the British Isles. Reports of research carried out by graduates, young scientists and newcomers to the subject are particularly encouraged. It is an ideal medium for offering new ideas and stimulating discussion because of the very short interval between acceptance and publication.

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THE BRITISH SIMULIID GROUP

The British Simuliid Group (BSG) is an informal gathering of scientists of any discipline, from many countries, who have an interest in the Simuliidae. The group's members include entomologists, parasitologists, environmentalists, ecologists and medics, with interests in ecology, bionomics, taxonomy, cytotaxonomy, disease transmission, freshwater biology etc. Our aim is to assemble as diverse a group as possible in order to encourage a wide interchange of ideas and information.

At present the BSG has about 130 members in the UK, Europe, Africa, Australia, New Zealand and the Americas. Membership is FREE - if you are not already a member of the BSG all you have to do is give us your name and postal and e-mail addresses. Annual meetings have been held at different locations in the UK since 1978. Abstracts of papers presented are published in our Bulletin which is sent to all members of the group.

The Group also runs an electronic news list with the name "Simuliidae" which is now on JISCmail. To join "Simuliidae" send the following command as one line of text in an e-mail message without subject heading- **join Simuliidae your-firstname lastname** to: jiscmail@jiscmail.ac.uk. Membership of "Simuliidae" does not automatically make you a member of the BSG. You have to join each separately. The Simuliidae list owner is the Editor of the Bulletin. Recent back numbers of the Bulletin can be viewed on the World Wide Web at URL:

http://www.blackfly.org.uk.

Inquiries about the Group and its activities should be made to John Davies: address inside front cover and e-mail daviesjb@liverpool.ac.uk

Notes for Contributors

To avoid copy-typing, the editor (address above) would prefer to receive contributions on disc or by e-mail, or typewritten. Details as follows:-

1. Via conventional mail on CDRom or IBM PC formatted 720Kb or 1.4Mb 3.5 inch diskettes, as unmodified word processor files (most common DOS or Windows word processor formats are acceptable) or as RTF, PDF, ASCII or DOS text files (We usually have to change pagination and heading format, anyway). Mark the disc with the format, word processor name and file name(s). Complicated tables and figures can be accepted as separate graphics files (not OLE embedded, please!) but we may ask for a hard copy as a check that all detail has been retained. Remember that figures should have legends and small detail drawn large enough to be visible when reduced to 100mm by 70mm. Diskettes will be returned on request.
2. By electronic mail via the Internet. Send your file in MSWord .DOC or in .RTF or .PDF format or as an ASCII file (also known as DOS or txt File), and e-mail it either as part of the message or preferably as an attachment to: daviesjb@liverpool.ac.uk.

If neither of the above methods are available, then post to me printed copy on A4 paper (210x297 mm), single spaced, ready for scanning. Heading styles as in the Bulletin. Format for References is flexible. Please refer to the Bulletin for the form appropriate to your article. Scientific Communications should quote the full title and journal name, but Notes and Abstracts may optionally omit titles and show only the abbreviated journal name.

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Cover Image *Spermathaeca of* Simulium (Wilhelmia) lineatum. *Fig. 233 in Jobling, B. "Anotomical drawings of biting flies" Natural History Museum and Wellcome Trust (1987) 119pp.*

FROM THE EDITOR

In this number of the Bulletin we have the advance notice of the 4th International Simuliidae Symposium, which will be held in Antalia, Turkey in October 2010, and a report on the last 30th Annual Meeting of the British Simuliid Group, held at the Natural History Museum, South Kensington, London in September 2009, together with abstracts of some of the presentations.

Another Simuliid Site and more mini-biographies of the people behind simuliid names. What diverse characters they were!

Concurrent with this number is a supplement containing an index to Bulletins Numbers 21 to 32, provided by Roger Crosskey.

John B. Davies

MEETINGS

4th INTERNATIONAL SIMULIIDAE SYMPOSIUM
Advance Notice

The 4th International Simuliidae Symposium incorporating the 31st Annual Meeting of the British Simuliid Group will be held at Antalia, Turkey, sometime between the 5th and 15th October 2010.

The final date and details are yet to be announced. For information contact:

Kaharaman Ipekdal
Hacettepe University
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Ankara, Turkey

Email: kipekdal@gmail.com

30th ANNUAL MEETING 2009

The British Simuliid Group 30th Annual Meeting was held in the De La Beche room of the Natural History Museum, South Kensington, London on Friday 18th September 2009.

As usual, those members who were in the London area the evening before met for an informal dinner, this time at the Haadi Restaurant, Cheval Place, Kinghtsbridge. About 20 members, consorts and friends turned up, and it was a fine opportunity to meet old friends and to catch up with news while partaking of an East African slant on Indian cuisine.

At 10.00 am on the Friday we gathered outside the new entrance to the Natural History Museum on Exhibition Road (not the grand archway on Cromwell Road that we were all familiar with). This was previously the entrance to the Geological Museum which under the recent refurbishment, completed only a few days before, had been combined with Natural History. Once through the inevitable security checks we were ushered into a lift which steadfastly refused to stop at the requisite floor for the meeting room. Finally, our guide discovered that a special key was needed before the lift would stop at our floor which was in an area not open to the public.

The meeting was hosted by Rory Post, who also acted as chairman. After a few words of welcome, the meeting got down to the scientific presentations as follows:

The blackfly genome/transcription project – Charles Brockhouse
Wolbachia in Simuliidae – Rory Post
The all-British blackflies DNA barcoding project – John Day
The blackflies of Central London – Lee Craney
The Uganda Oncho Elimination Project – Frank Walsh
Elimination of Onchocerciasis Vectors. A film by APOC – Introduced by Rory Post
Simulium Cell Culture – Hannah Enloe
The larval attachment proteome – Brianna Brei
Simulium morsitans at Cors Caron nature reserve – Jon Bass
The Joint European and BSG meeting in 2010 – John Davies

For lunch, members dispersed into the side streets of South Kensington and the many French and other European bistros typical of the area.

Fifteen members were present, amongst whom we were very pleased to welcome from USA Charles Brockhouse and his two colleagues Hannah Enlowe

and Brianna Brei. The latter two only just making it to the meeting after their flight had been delayed for 12 hours. We also welcomed José Martínez de La Puente from Spain.

The following summaries of their presentations have been provided by the authors:

Abstracts of Presentations

Progress in the *Simulium* Genomics Project

CHARLES BROCKHOUSE[1], JOHN KENNETH COLBOURNE[2] AND RORY POST[3]

1*Biology Department, Creighton University, Omaha, NE, 68178, USA,* 2*Center for Genomics and Bioinformatic, Indiana Univeristy, Bloomington, IN, 47405-7005, USA,* 3*Entomology Department, Natural History Museum, London, SW7 5BD, UK.*

For the past 6 months, the *Simulium* Genomics Project has focused on the transcriptome of the laboratory-colonized species *Simulium vittatum* Zett. *s.str.* Total RNA from 7 developmental stages was isolated, and used for cDNA projection. Balanced cDNA libraries were prepared for further analysis in massively parallel sequencing (454 technology). Almost 0.5 million EST sequences were obtained. From these over 41,000 contigs were constructed, with an average size of 911 bp, leaving 35,000 "singletons". A significant proportion of the contigs are over 1,000 bp. The average coverage is 7.2 times.

Preliminary analysis shows excellent coverage, with only 10 "conserved orthologous sequences" undetected out of the standard arthropod set of 714. The transcriptome is marked by large numbers of transposon and retrotransposon-related cDNAs. A significant proportion of the ESTs can be found in other insect genomes, but the majority have sufficiently diverged sequences that they are not readily detectable in the genome databanks. Preliminary proteomic studies using *S. tribulatum* protein sequences (a sibling species of *S. vittatum*) indicates significant divergence between the two species.

We are preparing grant proposals for the full genome sequence of *S. vittatum* and *S. squamosum*. Colleagues who wish to participate and have ideas for using the transcriptome and genome data are urged to contact us.

The Simuliid larval attachment proteome

BRIANNA BREI[1], GARY XIAO[2] AND CHARLES BROCKHOUSE[1]

1 *Biology Department, and* 2 *Osteoporosis Research Unit, CUMC, Creighton University, Omaha, NE, 68178, USA*

The salivary glands of late-instar black fly larvae produce copious amounts of three unique proteins. All three have multiple isoforms with differing isolectric points (pI). Using 2 dimension gel electrophoresis, we have isolated several isoforms, generated peptides and analysed the peptides with mass spectrometry. The peptides are being used to search the *S. vittatum* transcriptome database in order to obtain the cDNA sequences of the corresponding genes.

The isoelectric points and molecular weights vary among species, leading us to suspect that the structure is related to larval habitat. We have initiated an "ecological structure-function" study of the proteins in species inhabiting different water velocity regimes.

Cell cultures from *Simulium vittatum* Zett. *s. str.*

HANNAH ELOE AND CHARLES BROCKHOUSE

Biology Department, Creighton University, Omaha, NE., 68178, USA

Molecular and biochemical research involving blackflies has been limited due to the difficulty of breeding simuliids in the laboratory, and the lack of cell cultures to provide axenic material. Our laboratory has developed methods for culturing the embryonic cells of the blackfly, *Simulium vitattum* Zett. Standard protocols have been adapted for successfully culturing embryonic cells of different developmental stages and the tracking of these cultures through microscopy. Fluorescent and bright field microscopic analysis has proven cultures viable. In addition, cryopreservation has been successful with cultures of varying incubation periods. Currently we have over 20 viable cultures from, both, germ-band and pro-larval stages cryopreserved in the lab. The use of these laboratory cultures will enable future research with multidisciplinary approaches.

The blackflies of Central London

J.L. CRAINEY AND R.J. POST

London School of Hygiene & Tropical Medicine and Natural History Museum

Urbanisation has left the centre of London devoid of natural blackfly breeding sites. In a survey of artificial breeding sites within central London, three species of aquatic-stage blackfly were found breeding within a 10 km^2 survey zone. Larval and pupal stages of *Simulium noelleri* were discovered in the artificial water features of Regent's Park, Holland Park, Hyde Park and Buckingham Palace. *Simulium ornatum* larvae and pupae were also found in Regent's Park and Hyde Park and *S. angustipes* pupae were found in Regent's Park and Holland Park. These are the first records of blackflies breeding in central London.

Simulium morsitans Edwards 1915 – a candidate for conservation in a UK context

JOHN BASS

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A proposed river restoration scheme in SW Wales may divert a canalised section of the Afon Teifi through some of its former (now abandoned) meanders. There is potential for direct impact upon the blackfly *Simulium morsitans* Edwards 1915. The Cors Caron National Nature Reserve appears to support the only currently known UK population of *morsitans*. Earlier records are from Yorkshire, Gloucestershire, Cambridgeshire, Hampshire and the Scottish lowlands, but no specimens have been recorded in these areas in the last decade Hence *morsitans* has been identified by the Countryside Council for Wales (CCW) as a 'Qualifying Feature' of the Reserve. The proposed river restoration will have at least a short-term impact upon the *morsitans* population, riparian habitat, water quality and velocity patterns in the Teifi.

On this basis, CCW commissioned a survey to establish *morsitans* distribution within the Reserve and the requirements of all life stages. Informed by earlier

records, European data on *morsitans* and closely related simuliids the survey included sampling of submerged and emergent vegetation, river sediments, the bankside soil and open water. Larvae and pupae of *morsitans* were found at nine locations over a distance of 2.57km alongside common blackfly species, typically on submerged vegetation in fast flow. Adult *morsitans* were only obtained from mature pupae, no flies were captured or observed on the wing, and no eggs or oviposition sites were discovered. The aquatic stages of *morsitans* were the most abundant simuliids found in July 2008, other taxa recorded (in order of decreasing abundance) were *S. reptans* (Linnaeus), *S. equinum* (Linnaeus), *S. ornatum* (Meigen) spp complex and a single larva of either *S. argyreatum* (Meigen) or *S. variegatum* (Meigen).

This localised population of *S. morsitans* on the Cors Caron NNR extends both upstream and downstream of the proposed river restoration project, with three or six upstream locations (over a distance of 1.75km and 2.15km respectively) depending upon the scope of the restoration. Whilst short-term losses to both the population and habitat quality are inevitable, there should be no long-term changes provided that the upstream component of the *morsitans* population remains unaffected. The degradation of the species' preferred habitats and its resilience to intermittent pollution events have been considered in the context of extinction risk.

Whilst long-term river restoration impacts may be few, there are likely to be short-term effects. The release of fine organic and inorganic sediment particles could disrupt larval filter-feeding behaviour, cause the fouling of attachment surfaces used by larvae and pupae (also, possibly oviposition surfaces) and clog up pupal respiratory gill filaments. The removal of semi-liquid peat deposits prior to re-opening old meander channels presents a challenge which may be solved by pumping it on to land dominated by *Juncus* spp adjacent to the river. Channel excavation and bank re-profiling will expose compacted clay surfaces which will not be suitable as attachment surfaces for simuliid larvae and pupae, and will also be unsuitable for the quick re-establishment of riverine aquatic plants. Potential oviposition sites would be greatly restricted until riparian grasses such as *Phalaris arundinacea* became established. A lack of submerged macrophytes typical of flowing waters would result in the absence of the main surfaces used for attachment by simuliid larvae and pupae.

Afon Teifi - Submerged vegetation providing suitable *S. morsitans* habitat.

Afon Teifi – Slow and deep channel unsuitable for *S. morsitans.*

To an extent the creation of natural bank and riverbed features can be designed

and incorporated in newly-cut channels, but where old channels are reconnected the former banks may have slumped in the absence of erosion/deposition processes and large quantities of peat particles may have accumulated. Whilst natural high flow events will re-establish vertical banks, re-sort bed sediments, generate gravel shoals and create fine sediment deposits, the timescale for such changes will probably extend to several years and impose localised effects on the biota. Providing these more long-term effects remain localised (within restored river reaches), the flora and fauna will persist in adjacent reaches and eventually colonise restored reaches.

Acknowledgements: I would like to thank Dr Mike Howe (CCW Project Officer) and Dr Rory Post (NHM) for their enthusiastic interest which resulted in the survey, a contract report and this brief account to the BSG.

SCIENTIFIC PAPER

Simulium angustipes (Diptera:Simuliidae) found in the tidal region of a stream in Cornwall

JOHN C. DAY

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On the 3rd September 2006 the author examined a small stream discharging into the sea in West Cornwall (1 km north of Bude) for the presence of blackfly pupae and larvae. Despite the presence of suitable substrates, including submerged vegetation and rocks, no material was found at a point approximately 100 m from the shore (SS 203086). Downstream of this site where the South West Coast path crosses the stream, at the point that it debouches onto the beach, stones in the stream were examined for the presence of blackflies (Fig. 1) (SS 202085). This second site was clear of algae, possibly as a result of surges in tidal water. The water here, however, was not tested for salinity and such affects can only be speculated. Four pupae and three larvae were collected from large submerged stones close to the footbridge. A large amount of algal growth was evident in the

stream but near the shore stones were clear of algae suggesting this region is partially tidal, the salinity preventing growth. One adult was reared from a mature pupa and the remaining specimens preserved in 100% ethanol. The adult, based upon adult genitalia, was identified as *Simulium* (*Eusimulium*) *angustipes* by Rory Post at the Natural History Museum, London. Two pupae and two larvae were later identified as *S. angustipes* using DNA sequence analysis of the mitochondrial cyctochrome c oxidase I gene.

Blackflies are generally considered not to inhabit brackish waters of coastal estuaries and marshes (Crosskey, 1990). However, a few reports indicate otherwise. An extensive survey of the tidal regions of Afon Aber in Wales revealed the presence of blackfly larvae (Williams & Williams, 1998). These observations may be a result of recent drift and not necessarily indicative of survival for any extended length of time. Similarly, in a survey of blackflies of the Republic of Cameroon *Simulium adersi* was collected from brackish water near Victoria in the South West Province (Crosskey, 1961). Pupae were found attached to herbage on piles of a wharf at the point where a small stream discharges into the sea. Crosskey considered this not to be a natural habitat as the pupae were fixed to freshwater vegetation which had accidentally been caught upon the piles. In his survey of blackflies of the Cuckmere valley Post (2007) collected *Simulium erythrocephalum* from a region of the river Cuckmere that is tidal. However, Post noted that this does not necessarily mean raised salinity in this region of the river due to the proximity of the estuary to this region of the river and the backing-up of freshwater in front of surge of seawater.

Simulium salinum, a nominal member of the *S. aureum* group, was collected by Rubtsov (1956) from a small stream with exceptionally high salt content in eastern Siberia. The collection of mature *S. angustipes* pupae from Bude suggests saline tolerance in members of the *Eusimulium*. The site was sufficiently proximal to the shore to be brackish at high tides and with the immature stages attached to rocks it is unlikely material drifted downstream. Although drift cannot be completely excluded as an explanation for the presence of *S. angustipes* in such close proximity to the shore, a certain degree of saline tolerance may have enabled them to survive long enough to pupate. A similar situation was noted in *S. cryophilum* in Fife (Day, 2006). Others members of the *S. aureum* group have also been associated with saline environments, *S. aureum* in Ireland and *S. petricolum* in Madeira, both occurring in cliff streams vulnerable to salt-spray (Crosskey, 1990).

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Day, J.C. 2006 *Simulium* (*Nevermannia*) *cryophilum* (Rubtsov, 1959) (Diptera: Simuliidae) discovered at high tide mark in Fife. *Entomologist's Record* **118**:224-224.

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Rubtsov, I. A. 1956 Blackflies (Fam. Simuliidae). *Fauna of the USSR*. Second edition. No. 64, Insects, Diptera **6**(6). 859 pp. Akademii Nauk SSSR, Moscow & Leningrad [In Russian].

Williams, D.D. & Williams, N. E. 1998 Aquatic insects in an estuarine environment: densities, distribution and salinity tolerance. *Freshwater Biology* **39**: 411-421.

Fig 1. Collection site of *S. angustipes* at Bude, Cornwall (SS 202085).

CORRIGENDUM

To the Editor's dismay it was found that the last two lines of the caption to the group pictured on page 16 of Bulletin No. 32 were cut off during the final printing process. This was not found until too late to make any changes. The group photograph and its full caption are reproduced below. Our apologies to Stephen M. Smith.

BLACK-FLY CONFERENCE 1962 - Wildlife Research Station, Algonquin Park, Ontario, Canada

1st row (sitting) from left to right: David Lewis, Douglas Marr, I.E. Kamitakahara, Helen Györkös, Kathryn Sommerman, Doug Peterson, Guy Shewell; Alan Stone, Arni Arnason.

2nd row (kneeling): Max Ovazza, René Le Berre, Gene DeFoliart, Mallampalli Rao, Harold Welch, Hugo Jamnback, Al West, Don Oliver, Steve Smith.

3rd row (standing): Hartley Fredeen, Klaus Rothfels, Doug Davies, Bob Dunbar, John Anderson, Anthony Downes, Murray Fallis, Monty Wood, Philip Corbet, Bob Peterson, Fred Ide, Ron Pilfrey.

Missing from the photograph are: Gordon Bennett, Dave Pengelly and E.F. Bond.

MEMBERSHIP NOTICES

There are currently 133 members

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Simuliid Sites

[Image provided by AWR McCrae, presumably from the 1957 Annual Report of the Uganda Electricity Board.]

The Owen Falls Dam and Hydroelectric power station (now called Nalubaale Power Station) near Jinja on the Victoria Nile in Uganda which submerged the Owen and Ripon Falls. Between Lake Victoria (top) and Lake Kyoga downstream, lies a 70 km series of rapids which is the type locality of the *Simulium damnosum* complex. Between 1951 and 1973 intermittent short duration applications of DDT via the spillway or turbine exhausts resulted in the apparent elimination of *S. damnosum* from this area.

References

Davies, JB. *Annu. Rev. Entomol.* 1994. **39**: 23-45.
Walsh, JF. *Acta Leiden* 1990. **59**(1&2): 61-78.

WHO WAS…?

Honorific names: some more mini-biographies

In this number of the Bulletin I have included another batch of mini-biographies relating to honorific names. These have been prepared by Roger Crosskey and are again associated with species of *Simulium* from the Afrotropical region. References have been limited to a single most easily accessed source per person (this is often an obituary). **John Davies** (editor)

alcocki Pomeroy (1922), **arnoldi** Gibbins (1937), **blacklocki** De Meillon (1930), **bequaerti** Gibbins (1936) **berghei** Fain (1949), **duboisi** Fain (1950), **dukei** Lewis, Disney & Crosskey (1969), **henrardi** Gibbins (1941), **loveridgei** Crosskey (1965), **mcmahoni** De Meillon (1940), **neavei** Roubaud (1915), **rodhaini** Fain (1950).

alcocki Pomeroy (1922) – *Simulium*

Named (implicit) for Alfred William Alcock (1859-1933), British medical doctor and zoologist, born in India. Son of a sea captain who fell on hard financial times, Alcock was schooled in England but at age seventeen packed off to an Indian coffee plantation. A stint schoolmastering in Darjeeling turned his mind to natural history and he then entered Aberdeen University where he graduated in medicine (1885). Now qualified, he joined the Indian Medical Service, then linked to the Indian Army. Finding life in a regimental hospital stultifying he seized the chance to become Surgeon Naturalist with the Indian Marine Survey, a role that led to him becoming Professor of Zoology at the Medical College of Bengal (1893) and to his reorganization of the Indian Museum in Calcutta. Retiring from India in 1907, and a fan of Manson, he became Professor of Medical Zoology in the new London School of Tropical Medicine, where he was the first to teach medical entomology and helped found the *Tropical Diseases Bulletin*. His classic *Entomology for Medical Officers* appeared in 1902. He retired from teaching in 1924. **Reference**: *Nature* 131: 573-575 (1933).

arnoldi Gibbins (1937) – *Simulium*

Named (explicit) for George Arnold (1881-1962), British entomologist, born in Hong Kong. He was educated in England, France and Germany and became a City of London clerk before graduating from the Royal College of Science. After a period in cancer research at Liverpool University he was appointed (1911) curator of the tiny Rhodesia Museum in Bulawayo. Here he worked for a decade (1915-1925) entirely alone, building collections and preparing exhibits for what would become the National Museum of Southern Rhodesia (Zimbabwe). Arnold's heart was mainly in entomology, to which he contributed much, especially on the Hymenoptera, and for which he was made an Honorary Fellow of the Royal Entomological Society of London. In December 1914 he collected the original material of *Simulium arnoldi* at Victoria Falls. **Reference**: *Occasional Papers of the National Museum of Southern Rhodesia* 26B: 913-914, portrait (1962).

bequaerti Gibbins (1936) – *Simulium*

Named (implicit) for Joseph Charles Corneille Bequaert (1886-1982), entomologist and parasitologist, born and educated in Ghent, Belgium. Completing his education in Ghent he obtained his doctorate at the University there in 1908. During the First World War he emigrated to the United States, receiving American citizenship five years later (in 1921). Starting in America as a Research Associate at the American Museum of Natural History in New York (1916-1922) he was appointed in 1923 to Harvard University, where he spent over thirty years of his life, first as Assistant Professor of Tropical Medicine and subsequently at the Museum of Comparative Zoology (1945-1951) and as Agassiz Professor of Zoology (1951 until retirement in 1956). A prolific writer on Diptera, Bequaert was a specialist authority on many families, including the little-studied Hippoboscidae. In the simuliid field he is remembered for publications resulting from his participation in the Harvard University onchocerciasis research expeditions of the 1930s to the Belgian Congo and Guatemala. Apart from Diptera, his varied scientific output includes works on mosses (botany was a major interest), ticks, and Hymenoptera, especially the social wasps. **Reference**: *Sphecos* 6: 24-25 (1982).

berghei Fain (1949) – *Simulium*

Named (explicit) for Louis Samuel Gustave Adolphe Van den Berghe (1906-1979), Belgian parasitologist, born in Ghent. His father was a physician and, following in his senior's footsteps, Van den Berghe took medical qualifications at Ghent University before joining (1932) the Institute of Tropical Medicine at Antwerp. From here he undertook studies on onchocerciasis in the Belgian Congo and became (until 1947), professor of parasitology. In that year he founded (and was appointed director of) the Institut pour la Recherche Scientifique en Afrique Central, the major Belgian centre for biomedical research in the Congo. He wrote extensively on the relation of man to tropical diseases. Devoted to horses, he retired after 1961 to raise thoroughbreds on a farm in Kenya. **Reference**: Kitzmiller, *Anopheline Names*: 71-72 (1982).

blacklocki De Meillon (1930) – *Simulium*

Named (implicit) for Donald Breadalbane Blacklock (1879-1955), Scottish physician and parasitologist, born in Oban. Blacklock graduated in medicine at Edinburgh University (1902). After a period in practice in South Africa he returned to Britain, taking a position (1911) at the research laboratory of Liverpool School of Tropical Medicine (LSTM) at Runcorn. After serving in the Royal Army Medical Corps through the First World War, the LSTM became the nerve centre for his enormous experience in tropical medicine and for the variety of academic positions that he held, such as lecturer in parasitology and professor of tropical diseases of Africa. He played a major part in creation (1921) of the Sir Lewis Jones Research Laboratory of LSTM at Freetown, being its first research director and spending eight years in Sierra Leone. This period saw his crowning achievement in the eyes of parasitologists - first proof of the transmission of onchocerciasis by *Simulium* (published in 1926 and one of the most cited works in the field of filariasis). He was collector of the original *Simulium blacklocki* material. **Reference**: *British Medical Journal* June 25: 1536-1537 (1955).

duboisi Fain (1950) - *Simulium*

Named (implicit) for Albert Louis Marie Dubois (1888-1977), Belgian

physician, born in Ghent. He received his university training at the Université Catholique de Louvain. His initial scientific interest was in fish, their migrations and population dynamics, and he visited marine laboratories in England. Obliged to choose his future path he opted for medicine and graduated as a doctor in 1910, leaving in 1911, after a time at the School of Tropical Medicine in Brussels, for the Belgian Congo where in early years he worked primarily on sleeping sickness. In the First World War he wanted to serve on the western front but was assigned the role of medical officer for the Bas Uele area of the Congo. Here Rodhain had found an onchocerciasis focus and Dubois soon turned his attention to this disease, studying particularly the relationship to it of genital elephantiasis. Leprosy being common in the Uele this disease became another major interest. Later on, ill health obliged Dubois to return to Belgium and in 1928 he took a post as lecturer at the School of Tropical Medicine, moving to Antwerp when the School became (1933) the Institute of Tropical Medicine "Prince Leopold". In 1947 he was appointed the Institute's director. **Reference**: *International Journal for Parasitology* 19: 581-584, portrait (1989).

dukei Lewis, Disney & Crosskey (1969) – *Simulium*

Named (explicit) for Brian Oliver Lyndhurst Duke (1926-2006), British doctor and parasitologist, born in Kampala, Uganda, his father a doctor. He was educated at Eastbourne College and Cambridge, qualifying in medicine from Guy's Hospital and taking a diploma in tropical medicine (1952). In 1953 Duke joined the Colonial Medical Service and was appointed to head the Helminthiasis Research Unit at Kumba in the Cameroons. Here he focused his research on onchocerciasis, investigating its pathology, epidemiology and vector relations with *Simulium*. He was instigator of the measurement and use of ATP (Annual Transmission Potential), a now widely used parameter in onchocerciasis investigations From 1975 to 1985 he headed the World Health Organization filarial infections unit in Geneva, afterwards joining the US Armed Forces Institute for Pathology until formal retirement in 1991. He played an important part in development of ivermectin for onchocerciasis control, served as medical director of the River Blindness Foundation until 1996 and acted as consultant to the Carter Center until his death. A tall man of

conspicuous presence, Duke was a powerful influence in any professional gathering. **Reference**: *The Times* 29.6.2006.

henrardi Gibbins (1941) - *Simulium* (syn. of *alcocki*)

Named (implicit) for Constant Louis Joseph Ghislain Henrard (1901-1976), Belgian biologist, born at Perwez in Brabant. After receiving the Licentiate in Natural Sciences from Louvain (1924) Henrard joined the Belgian colonial service, obtaining his doctorate from Louvain in 1930. For the next twenty years he served as an entomologist at Leopoldville (Kinshasa) tsetse laboratory, most of this time concurrently with the Princess Astrid Institute of Tropical Medicine. He collaborated with Marcel Wanson in work on onchocerciasis but most of his publications were on trypanosomiasis. He was the first to record microsporidia in Afrotropical simuliids and collected the original *Simulium alcocki* var. *henrardi* material. Obliged to leave the Congo in 1950, following a heart attack, he joined WHO in Geneva where he was mainly engaged in formulating trypanosomiasis control programmes. **Reference**: Kitzmiller, *Anopheline Names*: 244-245 (1982).

loveridgei Crosskey (1965) - *Simulium*

Named (implicit) for Arthur Loveridge (?1895-1980), British herpetologist and museum collector. In 1914 he was appointed curator of the Nairobi Museum (now National Museum of Kenya). On the outbreak of war that year he joined the East African Mounted Rifles and was for a time despatch rider for General Smuts during the campaign against the Germans in East Africa. Collecting for the Nairobi Museum, Loveridge became interested in reptiles and it was as a herpetologist that he became best known. Leaving the National Museum he became a game warden in Tanganyika before (1924) joining the staff of the Museum of Comparative Zoology (MCZ) at Harvard, acting primarily as a specimen collector for that Museum. His broad experience of Africa he used for popular natural history talks that he gave over several years on American radio. In 1957 he retired from the MCZ to the island of St Helena, devoting the last 23 years of his life to collecting its insect fauna. It was he who collected the original material of *Simulium loveridgei*. **Reference**: *East Africa Natural History Society Bulletin*: 58-59 (1980).

mcmahoni De Meillon (1940) - *Simulium*

Named (implicit) for James Patrick McMahon (1904-1983), entomological field officer of Irish descent, born in London. Educated at Westminster Cathedral School, McMahon began work in 1925 as a technician at the London School of Hygiene and Tropical Medicine, remaining there till 1929 before joining the Kenya Medical Service. Here, as a field officer in the Entomology Section (later metamorphosed into the Division of Insect-borne Diseases), he acquired a broad experience of field work on various diseases but especially schistosomiasis. However, it is for his work on onchocerciasis vector control that he is best remembered, as he masterminded the eradication of *Simulium neavei* from Kenya, a major achievement for which he was awarded the O.B.E. Following on formal retirement from Kenya (1960) he was employed for a time in the control of *Simulium damnosum* at the Kainji Dam site in Nigeria and later in attempts at home in Britain to establish laboratory colonies of blackf lies. He lived for *Simulium* and in his last years, with nothing to satisfy him, became (as his obituary records) something of a lost soul. Incidentally, he was collector in Kenya of the original material of *Simulium mcmahoni*. **Reference**: *Annals of Tropical Medicine and Parasitology* 82: 321-323 (1988).

neavei Roubaud (1915) - *Simulium*

Named (implicit) for Sheffield Airey Neave (1879-1961), British entomologist. Born of well-to-do parents, his grandfather a governor of the bank of England, Neave attended Eton and Oxford. As a young man he went on several expeditions to Africa (1904-1914) and brought home a wealth of new species, the material including the original specimens of *Simulium neavei* (one of more than thirty species of Diptera named after him). When the Imperial Bureau (later Commonwealth Institute) of Entomology was born in 1913 Neave became Assistant Director, stepping into Directorship in 1942 until his retirement in 1946. He was an able administrator and businessman and among his credits are foundation of the *Review of Applied Entomology* and ensuring survival of the *Zoological Record* at a difficult period in its existence. Birth of his *Nomenclator Zoologicus* (1936 et seq.), which references every generic and subgeneric name in zoology, was an outstanding achievement, and (familiarly called 'Neave's Nomenclator') remains essential for every zoological taxonomist.

Neave was sometime Secretary of the Zoological and Royal Entomological Societies and wrote the latter's centenary history (1933). **Reference**: *Nomenclator Zoologicus* 6: i-ii (1964). [Neave was the father of Airey Sheffield Neave, intelligence officer and prominent politician murdered at the House of Commons by the IRA in 1979.]

rodhaini Fain (1950) - *Simulium*

Named (implicit) for Alphonse Hubert Jérôme Rodhain (1876-1956), Belgian physician and parasitologist, born in Herselt near Antwerp. He trained in medicine at the Catholic University of Louvain, graduating in 1899 and working until 1903 in bacteriology. Inspired to study tropical medicine, he subsequently spent much of his lifetime in the Belgian Congo where he became responsible for all medical and hygiene programmes. His personal research embraced *Glossina* and trypanosomiasis, the malarial parasites of birds and primates, the ectoparasites of African game animals and many other fields. In the inter-war period he turned his attention to the pathology of African onchocerciasis, including a major study of the onchocercal nodule. In 1925 Rodham took a professorship at the School of Tropical Medicine in Brussels, taking on the directorship of the School in 1929 (four years before its relocation to Antwerp in 1933 and its new identity as the Prince Leopold Institute of Tropical Medicine) He served as permanent secretary of the Belgian Society of Tropical Medicine and in 1933 was elected to honorary fellowship by the Royal Society of Tropical Medicine and Hygiene in Britain. **Reference**: *Annales de la Société Belge de Médecine Tropicale* 36: 521-522 (1956).

Names covered in Bulletin No. 32

berneri Freeman (1954), **buckleyi** De Meillon (1944), **hargreavesi** Gibbins (1934), **hessei** Gibbins (1941), **schwetzi** Wanson (1947) and **vargasi** Grenier & Rageau (1949).

Names covered in Bulletin No. 31

noelleri Friederichs (1920), **tomosvaryi** Enderlein (1921), **schoutedeni** Wanson, 1947, **woodi** De Meillon (1930).