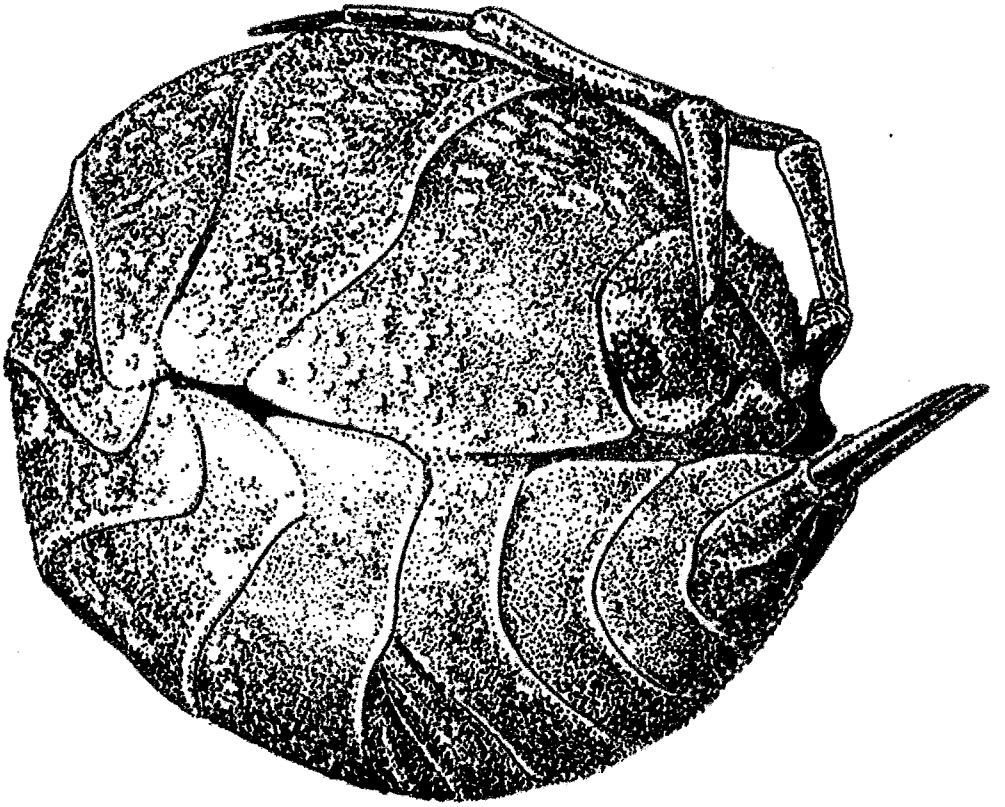
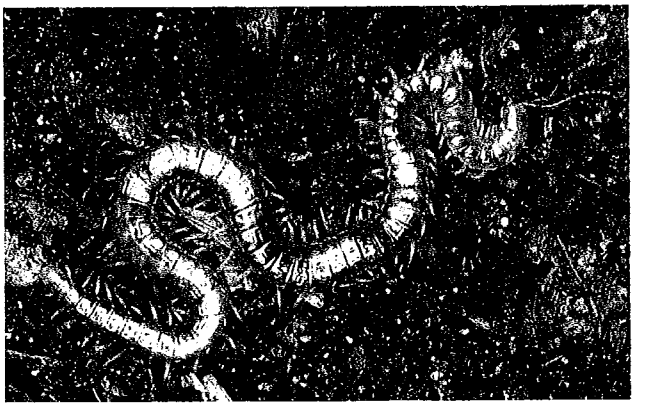
ISSN 1475 1739

Bulletin of the BRITISH MYRIAPOD and ISOPOD GROUP





Volume 22 (2007)

CONTENTS

Editorial	1
Obituary: S.P. Hopkin – H.J. Read	2
The BMIG specimen collection – John Harper	9
On *Cryptops doriae* Pocock, from the wet tropical biome of the Eden project, Cornwall (Chilopoda, Scolopendromorpha, Cryptopidae) – J.G.E. Lewis	12
A comparison of the growth patterns in British and Iberian populations of *Lithobius variegatus* Leach (Chilopoda, Lithobiomorpha) – J.G.E. Lewis	17
Charles Rawcliffe's discovery of the alien woodlouse *Styloniscus mauritiensis* (Barnard 1936) – G.M. Collis & P.T. Harding	20
An indexed bibliography of the first published records of British and Irish millipedes (Diplopoda) – P.T. Harding	22
List of papers on Myriapoda published by F.A. Turk – H.J. Read	30
List of papers on Myriapoda published by S.W. Rolfe – H.J. Read	31
Report on the 2006 BMIG meeting in Ayrshire – G.M. Collis	32
Street Safari: Recording Myriapods and Isopods as part of a community project in Sheffield – Peter Clegg & Paul Richards	36
Book review: Atlas of the Millipedes (Diplopoda) of Britain and Ireland by P. Lee – G.B. Corbet	44
Short communications: Observations *Cylindroiulus londinensis* and *C. caeruleocinctus* at Westonbirt, Gloucestershire – John Harper	45
Short communications: Notices Paperback re-issue of the Biology of Centipedes by J.G.E. Lewis	46
Miscellanea	46
Instructions for authors	47

Cover photograph of *Geophilus carpophagus* © Dick Jones
Cover illustration of *Cylisticus convexus* © Paul Richards

Editors:
Helen J. Read, A.D. Barber & S.J. Gregory
c/o Helen J. Read, 2 Egypt Wood Cottages, Egypt Lane, Farnham Common, Bucks. SL2 3LE. UK.

ISSN 1475 1739

EDITORIAL

Since the last Bulletin our community has been shocked and saddened by the untimely death of our Chairman, Steve Hopkin. Steve was not only an active and productive researcher himself, but he also encouraged the younger generation through his influence as a lecturer at Reading University. During the course of his career he worked on our three major groups, woodlice, millipedes and centipedes and was also interested in the lesser known Pauropods and Symphyla. His memory will continue to be kept fresh for many more years through his excellent photographs and his accessible publications such as the woodlouse AIDGAP key.

A notable milestone for the BMIG was reached during the last year with the publication of the millipede atlas for Britain and Ireland. As well as the maps this book includes an up to date checklist of species, species accounts including comments on habitats and some lovely colour photographs. A full review of this book is to be found in the Bulletin but there have already been spin offs, including the list of first published records of British species as compiled by Paul Harding in this volume.

Another recent achievement is the compilation of a BMIG reference collection which should help those people new to the groups to identify unknown species, as well as providing comparative material for more experienced researchers. The aims and objectives of this collection are outlined here by John Harper who has worked hard to get the project 'off the ground'.

The number of species in Britain continues to rise and the latest to be reported here is a centipede from the extensive 'biomes' of the Eden project in Cornwall (no doubt there will be more new species to the country from here to fill the pages of future Bulletins). Also reported is a reminder about the finding of an exotic woodlouse from Edinburgh Botanic Gardens which seems to have been over looked in recent publications.

This volume sees a return to the production method of the Bulletin of several years ago. Despite positive comments about the appearance of the last few issues we have noticed a downturn in sales which appears to be related to the increased cost that was inevitably associated with the more lavish production. In the interests of trying to ensure that the Bulletin reaches more people we have decided that a more 'cheap and cheerful' version is better; apologies to those readers preferring the alternative approach.

OBITUARY
STEVE HOPKIN
18 January 1956 – 19th May 2006

Steve had so many talents that it is difficult to know where to start in writing about him. Accomplished researcher, author, lecturer and supervisor he was also an excellent photographer, especially of invertebrates, and, in addition, was interested in art and music.

Born in Leigh, Lancashire, Steve lived his childhood years in Buckinghamshire and was educated at Dr Challoner's Grammar School before reading Zoology at Bristol University. After graduating he moved to Bangor to undertake research for a PhD on crab physiology before moving back to Bristol for a post doctoral position and then being offered a lectureship at Reading University. By the time he moved to Cornwall he was Senior lecturer.

I first met Steve in Amsterdam in 1984 and for both of us it was our first International Myriapod Congress. The other British delegates were much more distinguished than us and were staying in much more expensive hotels so we found ourselves at the equivalent of Fawlty Towers – a chaotic tall thin Dutch hotel, Steve in the basement and myself in the attic! Along with the Norwegian Åge Simonsen we travelled to the Congress together daily and generally 'got on well'. I have a lot to be thankful to Steve for, as subsequent to that first meeting he gave me lifts to myriapod field meetings, told me about a PhD studentship in Bristol that he was to have supervised (but got his lectureship in Reading as it started) and three years later he was my external examiner for that same PhD. My viva was on Christmas Eve and several of his comments on my thesis (in pencil!) had a decidedly light hearted Christmas theme.

Steve's appearance (casual and always in jeans) gave him an air of approachability, he never seemed remote to beginners and was always willing to help new people at field meetings. Despite this he had clear priorities and resisted the temptation to be drawn into projects that he was not interested in. Perhaps this was one of the reasons that he was so productive – I could never quite understand how he achieved so much in a normal working day. He was also very strict over ensuring his home life was not compromised by work and his family was always a high priority for him.

Many of his scientific publications have broken new ground, contributing greatly to our knowledge of ecotoxicology and biology of invertebrates. His books and identification keys will continue to be essential reading for many years to come. His ability to make these accessible to all, including beginners, by including occasional light hearted touches such as the 'famous five' woodlice I am sure has added to their appeal.

Steve's strong passion for taxonomy and basic natural history re-directed his work in recent years from more applied pollution related studies to lesser-known groups such as Collembola. Through this he was instrumental in encouraging many under graduates to become interested in 'real animals' for example through his spider course. Steve also contributed greatly to zoology by supervising students for higher degrees.

It is particularly sad that just as Steve had started to find a new life in Cornwall and once again was a regular attender at field meetings and had agreed to become Chairman of the British Myriapod and Isopod Group that he should be taken from us.

In reflecting on the times we spent together I am reminded of two incidents in particular that illustrate his sense of fun. First, in a café in Vittorio Veneto (Italy), during a break from the formal

Myriapod conference proceedings, a few of us had gone for a drink. Steve and Wolfgang Dohle from Germany egged each other on until they both ordered gigantic iced coffees complete with more cream and ice cream than you can imagine. Then they sat like a couple of school boys eating them with long spoons and enjoying every minute.

Later during the same conference we had an excursion into the mountains. Over a picnic someone began an impromptu concert of 'National Songs' from the many countries represented. While the British contingent dithered over what our 'National' Song was Steve stepped forward and gave a rendition of 'Side by side' the song about a newly married couple going to bed on their wedding night when the husband discovers that his new wife has … a wooden leg, a wig, false teeth etc., and ends 'I sat on the chair as there was more of her there!'. We were all astounded as we hadn't realised Steve could sing as well as write books!

In the years that I knew Steve his appearance never changed regardless of the event or situation and he never seemed to age. As we grow older each year Steve will remain in our minds forever young.

I and my colleagues extend our sympathies to Steve's widow, son and parents.

Helen Read

Steve Hopkin at an exhibition of photography during the Ento'03 conference at Reading University
Photograph by Amanda Callaghan

CHRONOLOGICAL BIBLIOGRAPHY OF PUBLICATIONS BY STEVE P. HOPKIN

www.stevehopkin.co.uk/publications

1979 HOPKIN, S.P. & NOTT, J.A. Some observations on concentrically structured, intracellular granules in the hepatopancreas of the shore crab *Carcinus maenas* (L.). *Journal of the Marine Biological Association of the United Kingdom* **59**: 867-877.

1980 HOPKIN, S.P. *The structure and function of the hepatopancreas of the shore crab* Carcinus maenas (L.)*: A study by electron microscopy and X-ray microanalysis*. Unpublished PhD Thesis, University College of North Wales.

1980 HOPKIN, S.P. & NOTT, J.A. Studies on the digestive cycle of the shore crab *Carcinus maenas* (L.) with special reference to the B cells in the hepatopancreas. *Journal of the Marine Biological Association of the United Kingdom* **60**: 891-907.

1982 HOPKIN, S.P. & MARTIN, M.H. The distribution of zinc, cadmium, lead and copper within the hepatopancreas of a woodlouse. *Tissue and Cell* **14**: 703-715.

1982 HOPKIN, S.P. & MARTIN, M.H. The distribution of zinc, cadmium, lead and copper within the woodlouse *Oniscus asellus* (Crustacea, Isopoda). *Oecologia* **54**: 227-232.

1983 AVERY, R.A., WHITE, A.S., MARTIN, M.H. & HOPKIN, S.P. Concentrations of heavy metals in common lizards (*Lacerta vivipara*) and their food and environment. *Amphibia-Reptilia* **4**: 205-213.

1983 HOPKIN, S.P. & MARTIN, M.H. Heavy metals in the centipede *Lithobius variegatus* (Chilopoda). *Environmental Pollution* **6B**: 309-318.

1984 HOPKIN, S.P. & MARTIN, M.H. Heavy metals in woodlice. In: *The Biology of Terrestrial Isopods*, S.L. SUTTON & D.M. HOLDICH (Eds.). *Symposia of the Zoological Society of London* **53**: 143-166.

1984 HOPKIN, S.P. & MARTIN, M.H. The assimilation of zinc, cadmium, lead and copper by the centipede *Lithobius variegatus* (Chilopoda). *Journal of Applied Ecology* **21**: 535-546.

1985 HOPKIN, S.P., WATSON, K., MARTIN, M.H. & MOULD, M.L. The assimilation of heavy metals by *Lithobius variegatus* and *Glomeris marginata* (Chilopoda; Diplopoda). Proceedings of the 6th International Congress of Myriapodology, Amsterdam, 12-17 April 1984. *Bijdragen tot de Dierkunde* **55**: 88-94.

1985 HOPKIN, S.P. & MARTIN, M.H. Transfer of heavy metals from leaf litter to terrestrial invertebrates. *Journal of the Science of Food and Agriculture* **36**: 538-539.

1985 HOPKIN, S.P. & MARTIN, M.H. Assimilation of zinc, cadmium, lead, copper and iron by the spider *Dysdera crocata*, a predator of woodlice. *Bulletin of Environmental Contamination and Toxicology* **34**: 183-187.

1985 HOPKIN, S.P., MARTIN, M.H. & MOSS, S.M. Heavy metals in isopods from the supra-littoral zone on the southern shore of the Severn Estuary, U.K. *Environmental Pollution* **9B**: 239-254.

1986 HOPKIN, S.P. Ecophysiological strategies of terrestrial arthropods for surviving heavy metal pollution. In: H.H.W. VELTHUIS (Ed.) *Proceedings of the Third European Congress of Entomology*, Amsterdam, August 1986. Nederlandse Entomologische Vereniging, pp. 263-266.

1986 COLLOFF, M.J. & HOPKIN, S.P. The ecology, morphology and behaviour of *Bakerdania elliptica* (Acari: Prostigmata: Pygmephoridae), a mite associated with terrestrial isopods. *Journal of Zoology* **208A**: 109-123..

1986 HOPKIN, S.P., HARDISTY, G. & MARTIN, M.H. The woodlouse *Porcellio scaber* as a 'biological indicator' of zinc, cadmium, lead and copper pollution. *Environmental Pollution* **11B**: 271-290.

1987 COLLOFF, M.J. & HOPKIN, S.P. On the male of *Bakerdania elliptica* (Krczal, 1959) with a redescription of the female (Acari: Pygmephoridae). *Acarologia* **28**: 323-330.

1989 HOPKIN, S.P. *Ecophysiology of Metals in Terrestrial Invertebrates*. Elsevier Applied Science, 366pp.

1989 HOPKIN, S.P., HAMES, C.A.C. & DRAY, A. X-ray microanalytical mapping of the intracellular distribution of pollutant metals. *Microscopy and Analysis* **14**: 23-27.

1989 HAMES, C.A.C. & HOPKIN, S.P. The structure and function of the digestive system of terrestrial isopods. *Journal of Zoology* **217**: 599-627.

1989 HOPKIN, S.P., HAMES, C.A.C. & BRAGG, Terrestrial isopods as biological indicators of zinc pollution in the Reading area, south-east England. Proceedings of the Second International Symposium on the Biology of Terrestrial Isopods, Urbino, Italy, September 1986. *Monitore Zoologico Italiano (New Series), Monografia* **4**: 477-488.

1990 HOPKIN, S.P. Critical concentrations, pathways of detoxification and cellular ecotoxicology of metals in terrestrial arthropods. *Functional Ecology* **4**: 321-327.

1990 HOPKIN, S.P. Species-specific differences in the net assimilation of zinc, cadmium, lead, copper and iron by the terrestrial isopods *Oniscus asellus* and *Porcellio scaber*. *Journal of Applied Ecology* **27**: 460-474.

1990 HOPKIN, S.P., GAYWOOD, M.J., VINCENT, J.F.V. & MAYES-HARRIS, E.L.V. Defensive secretion of proteinaceous glues by *Henia (Chaetechelyne) vesuviana* (Chilopoda, Geophilomorpha). In: A. MINELLI (Ed.), *Proceedings of the 7th International Congress of Myriapodology*, Vittorio Veneto, Italy, July 1987. E.J. Brill, Leiden, pp. 175-181.

1991 HOPKIN, S.P. *A Key to the Woodlice of Britain and Ireland*. AIDGAP (Aids to the Identification of Difficult Groups of Animals and Plants) Field Studies Council Publication No. 204. 52pp. + 16 colour plates (reprinted from *Field Studies* **7**: 1-52).

1991 HAMES, C.A.C. & HOPKIN, S.P. A daily cycle of apocrine secretion by the B cells of the hepatopancreas of terrestrial isopods. *Canadian Journal of Zoology* **69**:1931-1937.

1991 HAMES, C.A.C. & HOPKIN, S.P. Assimilation and loss of ^{109}Cd and ^{65}Zn by the terrestrial isopods *Oniscus asellus* and *Porcellio scaber*. *Bulletin of Environmental Contamination and Toxicology* **47**: 440-447.

1991 JONES, D.T. & HOPKIN, S.P. Biological monitoring of metal pollution in terrestrial ecosystems. In: O. RAVERA (Ed.), *Terrestrial and Aquatic Ecosystems: Perturbation and Recovery*. Ellis Horwood, Chichester, pp. 148-152.

1992 HOPKIN, S.P. & READ, H.J. *The Biology of Millipedes*. Oxford University Press, 223pp.

1992 HOPKIN, S.P. & ANGER, H.S. On the structure and function of the glue-secreting glands of *Henia vesuviana* (Newport 1845) (CHILOPODA: GEOPHILOMORPHA). In: E. MEYER, K. THALER & W. SCHEDL (Eds.) Proceedings of the 8th International Congress of Myriapodology, Innsbruck, Austria, July 1990. *Berichte des Naturwissenschaftenlich Medizinischen Vereins in Innsbruck, Supplementum* **10**: 71-79.

1993 HOPKIN, S.P., JONES, D.T. & DIETRICH, D. The isopod *Porcellio scaber* as a monitor of the bioavailability of metals in terrestrial ecosystems: towards a global 'woodlouse watch' scheme. *Science of the Total Environment* **1993S**: 357-365.

1993 HOPKIN, S.P. Ecological implications of '95% protection levels' for metals in soil. *Oikos* **66**: 137-141.

1993 HOPKIN, S.P. Deficiency and excess of copper in terrestrial isopods. In: R. DALLINGER & P.S. RAINBOW (Eds.) *Ecotoxicology of Metals in Invertebrates*. Lewis, Boca Raton, pp. 359-382.

1993 HOPKIN, S.P. *In situ* biological monitoring of pollution in terrestrial and aquatic ecosystems. Chapter 20 in P. CALOW (Ed.) *Handbook of Ecotoxicology*, Volume 1. Blackwell Scientific, Oxford, pp. 397-427.

1994 DROBNE, D. & HOPKIN, S.P. An ecotoxicological laboratory test for assessing the effects of chemicals on terrestrial isopods. *Bulletin of Environmental Contamination and Toxicology* **53**: 390-397.

1994 JONES, D.T. & HOPKIN, S.P. Monitoring the accumulation of cadmium released from industrial sources. In: B. WIDIANARKO, K. VINK & N.M. VAN STRAALEN (Eds.). *Environmental Toxicology in South East Asia*. Free University Press, Amsterdam, pp. 315-321.

1994 JONES, D.T. & HOPKIN, S.P. Effects of metals on the size of terrestrial isopods in an industrially polluted area. In: B. WIDIANARKO, K. VINK & N.M. VAN STRAALEN (Eds.). *Environmental Toxicology in South East Asia*. Free University Press, Amsterdam, pp. 191-197.

1994 SPURGEON, D.J., HOPKIN, S.P. & JONES, D.T. Effects of cadmium, copper, lead and zinc on growth, reproduction and survival of the earthworm *Eisenia fetida* (Savigny) : assessing the environmental impact of point-source metal contamination in terrestrial ecosystems. *Environmental Pollution* **84**: 123-130.

1994 HOPKIN, S.P. Effects of metal pollutants on decomposition processes in terrestrial ecosystems with special reference to fungivorous soil arthropods. In: S.M. ROSS (Ed.) *Toxic Metals in Soil-Plant Systems*. John Wiley, Chichester, 303-326.

1994 HOPKIN, S.P. & HAMES, C.A.C. Zinc, among a 'cocktail' of metal pollutants, is responsible for the absence of the terrestrial isopod *Porcellio scaber* from the vicinity of a primary smelting works. *Ecotoxicology* **2**: 68-78.

1995 DEPLEDGE, M.H. & HOPKIN, S.P. Methods to assess effects on brackish, estuarine, and near-coastal water organisms. In: R.A. LINTHURST, P. BOURDEAU & R.G. TARDIFF (Eds.) *Methods to Assess the Effects of Chemicals on Ecosystems*. John Wiley, London. pp. 125-149.

1995 DROBNE, D. & HOPKIN, S.P. The toxicity of zinc to terrestrial isopods in a standard laboratory test. *Ecotoxicology and Environmental Safety* **31**: 1-6.

1995 SPURGEON, D.J. & HOPKIN, S.P. Extrapolation of the laboratory-based OECD earthworm toxicity test to metal-contaminated field sites. *Ecotoxicology* **4**: 190-205.

1995 HOPKIN, S.P. Deficiency and excess of essential and non-essential metals in terrestrial insects. In: R. HARRINGTON & N.E. STORK (Eds.) *Insects in a Changing Environment*. *Symposia of the Royal Entomological Society of London* **17**: 251-270.

1996 JONES, D.T. & HOPKIN, S.P. Reproductive allocation in the terrestrial isopods *Porcellio scaber* and *Oniscus asellus* in a metal polluted environment. *Functional Ecology* **10**: 741-750.

1996 SANDIFER, R.D. & HOPKIN, S.P. Effects of pH on the toxicity of cadmium, copper, lead and zinc to *Folsomia candida* Willem, 1902 (Collembola) in a standard laboratory test system. *Chemosphere* **33**: 2475-2486.

1996 SPURGEON, D.J. & HOPKIN, S.P. Effects of metal-contaminated soils on the growth, sexual development and early cocoon production of the earthworm *Eisenia fetida* with particular reference to zinc. *Ecotoxicology and Environmental Safety* **35**: 86-95.

1996 SPURGEON, D.J. & HOPKIN, S.P. The effects of metal contamination on earthworm populations around a smelting works: quantifying species effects. *Applied Soil Ecology* **4**: 147-160.

1996 LASKOWSKI, R. & HOPKIN, S.P. Effects of Zn, Cu, Pb and Cd on fitness in snails (*Helix aspersa*). *Ecotoxicology and Environmental Safety* **34**: 59-69.

1996 SPURGEON, D.J., SANDIFER, R.D. & HOPKIN, S.P. The use of macro-invertebrates for population and community monitoring of metal contamination : Indicator taxa, effect parameters and the need for a Soil Invertebrate Prediction and Classification Scheme (SIVPACS). In: VAN

STRAALEN, N.M. & KRIVOLUTSKY, D.A. (Eds.) *Bioindicator Systems for Soil Pollution*. Kluwer Academic, Dordrecht. pp. 95-110.

1996 SPURGEON, D.J. & HOPKIN, S.P. Risk assessment of the threat of secondary poisoning by metals to predators of earthworms in the vicinity of a primary smelting works. *Science of the Total Environment* **187**: 167-183.

1996 LASKOWSKI, R. & HOPKIN, S.P. Accumulation of Zn, Cu, Pb and Cd in the garden snail (*Helix aspersa*): implications for predators. *Environmental Pollution* **91**: 289-297.

1996 SPURGEON, D.J. & HOPKIN, S.P. Effects of variation of the organic matter content and pH of soils on the availability and toxicity of zinc to the earthworm *Eisenia fetida*. *Pedobiologia* **40**: 80-96.

1996 HOPKIN, S.P. Myriapodology before and after Martin Lister's *'Journey to Paris in the Year 1698'*. In: J.J. GEOFFROY, J.P. MAURIÈS & M. NGUYEN DUY-JACQUEMIN (Eds.) *Acta Myriapodologica* (Proceedings of the 9th International Congress of Myriapodology, Paris, July 1993). *Mémoires du Muséum National d'Histoire Naturelle* **169**: 25-34.

1997 HOPKIN, S.P. *Biology of the Springtails (Insecta : Collembola)*. Oxford University Press. 330pp.

1997 SANDIFER, R.D. & HOPKIN, S.P. Effects of temperature on the relative toxicities of cadmium, copper, lead and zinc to *Folsomia candida* Willem, 1902 (Collembola) in a standard laboratory test system. *Ecotoxicology and Environmental Safety* **37**: 125-130.

1997 HOPKIN, S.P. Ecotoxicology, biodiversity and the species concept with special reference to springtails (Insecta : Collembola). In: VAN STRAALEN, N.M. & LOKKE, H. (Eds.) *Ecological Principles for Risk Assessment of Contaminants in Soil*. Chapman & Hall, London & New York. pp. 73-83.

1997 SPURGEON, D.J., TOMLIN, M.A. & HOPKIN, S.P. Influence of temperature on the toxicity of zinc to the earthworm *Eisenia fetida*. *Bulletin of Environmental Contamination and Toxicology* **58**: 283-290.

1998 WEEKS, J.M., HOPKIN, S.P., WRIGHT, J.F., BLACK, H., EVERSHAM, B.C., ROY, D. & SVENDSEN, C. *A Demonstration of the Feasibility of SOILPACS*. Report for Environment Agency, London, 186pp.

1998 HOPKIN, S.P. Collembola: the most abundant insects on earth. *Antenna* **22**: 117-121.

1998 SCOTT-FORDSMAND, J.J., WEEKS, J.M. & HOPKIN, S.P. Toxicity of nickel to the earthworm and the applicability of the neutral red retention assay. *Ecotoxicology* **7**: 291-295.

1998 HOPKIN, S.P. Laboratory to field extrapolation of 'standard' ecotoxicological tests for soil animals. *Cuadernos de Investigación Biológica (Bilbao)* **20**: 33-36.

1998 JONES, D.T. & HOPKIN, S.P. Reduced survival and body size in the terrestrial isopod *Porcellio scaber* from a metal-polluted environment. *Environmental Pollution* **99**: 215-223.

1999 SPURGEON, D.J. & HOPKIN, S.P. Tolerance to zinc in populations of the earthworm *Lumbricus rubellus* from uncontaminated and metal-contaminated ecosystems. *Archives of Environmental Contamination and Toxicology* **37**: 332-337.

1999 SPURGEON, D.J. & HOPKIN, S.P. Comparisons of metal accumulation and excretion kinetics in earthworms (*Eisenia fetida*) exposed to contaminated field and laboratory soils. *Applied Soil Ecology* **11**: 227-243.

1999 SCOTT-FORDSMAND, J.J., KROGH, P.H. & HOPKIN, S.P. Toxicity of nickel to a soil-dwelling springtail *Folsomia fimetaria* (Collembola: Isotomidae). *Ecotoxicology and Environmental Safety* **43**: 57-61.

1999 SPURGEON, D.J., HOPKIN, S.P. Seasonal variation in the abundance, biomass and biodiversity of earthworms in soils contaminated with metal emissions from a primary smelting works. *Journal of Applied Ecology* **36**: 173-183.

1999 SPURGEON, D.J. & HOPKIN, S.P. Life-history patterns in metal-exposed populations of the earthworm *Lumbricus rubellus*. *Ecotoxicology* **8**: 133-141.

2000 SPURGEON, D.J., SVENDSEN, C., RIMMER, V.K., HOPKIN, S.P. & WEEKS, J.M. Relative sensitivity of life-cycle and biomarker responses in four earthworm species exposed to zinc: *Environmental Toxicology and Chemistry* **19**: 1800-1808.

2000 SCOTT-FORDSMAND, J.J., WEEKS, J.M. & HOPKIN, S.P. Importance of contamination history for understanding toxicity of copper to earthworm *Eisenia fetida* (Oligochaeta: Annelida), using the neutral-red retention assay. *Environmental Toxicology and Chemistry* **19**: 1774-1780.

2000 SPURGEON, D.J. & HOPKIN, S.P. The development of genetically inherited resistance to zinc in laboratory selected generations of the earthworm *Eisenia fetida*. *Environmental Pollution* **109**: 193-201.

2001 RAINBOW, P.S., HOPKIN, S.P. & CRANE, M. (Eds.) *Forecasting the Environmental Fate and Effects of Chemicals.* John Wiley, Chichester, pp. 221.

2001 FRAMPTON, G. & HOPKIN, S.P. Springtails - in search of Britain's most abundant insects. *British Wildlife* **12**: 402-410.

2001 HOPKIN, S.P. & SPURGEON, D.J. Forecasting the environmental effects of zinc, the metal of benign neglect in soil ecotoxicology. In : RAINBOW, P.S., HOPKIN, S.P. & CRANE, M. (Eds.) *Forecasting the Fate and Effects of Toxic Chemicals*, John Wiley, Chichester pp. 91-96.

2001 FOUNTAIN, M.T. & HOPKIN, S.P. Continuous monitoring of *Folsomia candida* (Insecta: Collembola) in a metal exposure test. *Ecotoxicology and Environmental Safety* **48**: 275-286.

2002 HOPKIN, S.P. Collembola. In: R. LAL (Ed.) *Encyclopaedia of Soil Science*. Marcel Dekker, New York pp. 207-210.

2003 HOPKIN, S.P. *The Woodlouse Name Trail: a Key to Common Woodlice.* Field Studies Council (Identification chart).

2003 HOPKIN, S.P. Photographing insects. *Antenna* **27**: 152-158.

2003 HOPKIN, S.P. Woodlice, chiselbobs and sow-bugs. *British Wildlife* **14**: 381-387.

2004 HOPKIN, S.P. Millipedes. *British Wildlife* **16**: 77-84.

2004 FOUNTAIN, M. & HOPKIN, S.P. A comparative study of the effects of metal contamination in Collembola in the field and in the laboratory. *Ecotoxicology* **13**: 573-587.

2004 FOUNTAIN, M. & HOPKIN, S.P. Biodiversity of Collembola in urban soils and the use of *Folsomia candida* to assess soil 'quality'. *Ecotoxicology* **13**: 555-572.

2005 FOUNTAIN, M.T. & HOPKIN, S.P. *Folsomia candida* (Collembola): a 'standard' soil arthropod. *Annual Review of Entomology* **50**: 201-222.

2006 WALKER, C.H., HOPKIN, S.P., SIBLY, R.M. & PEAKALL, D.B. *Principles of Ecotoxicology*. Taylor & Francis, 321pp. 3rd edition.

2006 HOPKIN, S.P. Centipedes. *British Wildlife* **18**: 000-000.

2007 HOPKIN, S.P. *A Key to the Springtails (Insecta: Collembola) of Britain and Ireland*. Field Studies Council (AIDGAP Project).

2007 NOEL, H.L., HOPKIN, S.P., HUTCHINSON, T.H., WILLIAMS, T.D. & SIBLY, R.M. Population growth rate and carrying capacity for springtails *Folsomia candida* exposed to ivermectin. *Ecological Applications.*

2007 NOEL, H.L., HOPKIN, S.P., HUTCHINSON, T.H., WILLIAMS, T.D. & SIBLY, R.M. Towards a population ecology of stressed environments: the effects of zinc on the springtail *Folsomia candida*. *Journal of Applied Ecology.*

THE BMIG SPECIMEN COLLECTION

John Harper

4 Fairhome, Gilwern, Abergavenny, NP7 0BA

INTRODUCTION

On becoming affiliated to the British Entomological and Natural History Society, the British Myriapod and Isopod Group was invited to add a specimen collection of woodlice, millipedes and centipedes to the extensive insect collection housed at the Society's Headquarters at Dinton Pastures Country Park, Reading. This is just off the M4 motorway in central southern England and has convenient parking - a contrast to the inconvenience and expense of cities for most people travelling by car nowadays. John Harper volunteered to kick start the collection and, the initial phase having been completed, it has been transferred to BMIG - of which the Curator and Librarian is Steve Gregory - contact details below.

Likely contributors were contacted via a request in the BMIG newsletter no. 9 (Autumn 2004) and individually. Specimens have been received, with grateful thanks, from the following (in order of samples contributed): Ian Morgan, John Harper, Eric Philp, Adrian Fowles, Arthur Chater, Mike Kilner, Roy Anderson, Greg Jones, Helen Read, Peter Smithers, Simon Warmingham. Particular thanks go to Ian Morgan who contributed nearly 300 of the approx. 635 samples.

STRUCTURE AND PURPOSES OF THE COLLECTION

1. **Basic Collection** - aimed at providing quick and simple access for beginners to check initial determinations or just to familiarise themselves with the species. There is one bottle for each species, and the bottles (106 at present) are in list order with the screw top of each named. Microscope slides of relevant parts for identification (e.g. legs and secondary sexual structures for small woodlice and some millipedes) have been prepared for some species.

   The basic collection could be extended to include species found in Europe, or even further afield, if time and space permit. With the extensive trade in containerised plants and commodities generally, more overseas species are bound to turn up in the British Isles and reference material and literature would be invaluable to help identify them.

2. **Research Collection** - this comprises approx. 530 samples at present. Some species which are rare or difficult to find are represented by just one tube, while widespread species are represented by many tubes; we aim to acquire one sample per species from each vice county, as a minimum.

The aims of the research collection are to acquire material for future study which may include:

a) Study of interspecific variation - aim for an extensive spread of localities if species are known to vary or intergrade; for example variation in the *Brachychaeteuma bagnalli* / *bradeae* complex.

b) A resource for studying intraspecific / geographic variation, whether or not presently recognised, for example regional variation of subspecies ratios in the *Oniscus asellus* aggregate.

c) Voucher specimens if a species is new to Britain; or separately - England, Wales, Scotland, Ireland.

d) Having material available in case a potential cryptic species is found in British populations - e.g. the occurrence of *Haplophthalmus montivagus* found among *H. mengii* collections.

e) A repository for voucher specimens for any species, or whole collections, referred to in a published article; for example, Ian Morgan's paper on south Wales myriapods, (Morgan, 1988).

f) Collections of someone who moves on to other fields and wishes to safeguard his/her collection for posterity and make it available to other researchers; this situation has arisen with the generous donation of his collection by Ian Morgan, which also qualifies under e) above.

g) A repository for collections (not bequeathed to a museum) so they are not lost through indecisiveness.

h) Extending the collection as a source for the study of European species.

DOCUMENTATION AND ANALYSIS OF THE COLLECTION TO DATE

Details of all samples have been entered onto a Microsoft Access database to aid search and analysis. Fields have been provided for all the usual and likely collection data, including UTM co-ordinates, features of special importance, attributes of the sample or locality, published references, etc. Selections of the data can be made from the database and printed or sent as email attachments.

The tables below have been compiled to give some indication of species representation and geographic distribution of samples as the collection stands at end 2006. Clearly there is ample scope for further species to be added. Also there is a great geographic imbalance with 77% of the 635 samples coming from Wales; this helps to explain the considerable imbalance in the number of tubes for each species as those uncommon outside south Wales are relatively poorly represented.

Table 1: Number of Species on British List and number represented in the BMIG Collection

Taxa	Species on List	Species Represented
Woodlice	54	29
Millipedes	60	46
Centipedes	54	31

Table 2: Distribution of Samples by Region

Region	No. of Samples
Southern England	122
Northern England	10
Wales	493
Scotland	4
Ireland	6

ADDITIONS AND ACCESS TO THE COLLECTION

Steve Gregory (BMIG's Curator and Librarian) would welcome samples from anywhere - particularly: i) voucher specimens from a noteworthy record or study; ii) those that help the geographic balance of the collection; iii) specimens from remote areas; iv) local species; v) species known to show intraspecific variation; or vi) species difficult to find. Before sending any samples, please contact Steve to check up-to-date arrangements.

Anyone is welcome to examine the collections. However as the basic collection may be used for demonstration at meetings, or parts of the research collection may be on loan, it would be strongly advisable to contact the Curator before any intended visit to Dinton Pastures, in order to check the current situation, and obtain up-to-date access arrangements. Also requests for data and specimen availability should be directed to Steve.

DATA ON BMIG WEBSITE

More detailed information on the collection and tables of species coverage are viewable on BMIG's website: www.bmig.org.uk

ACKNOWLEDGEMENTS

The generous donation (donors listed above) of samples has allowed the collection to be established. For Bijou bottles, tubes and slide boxes thanks go to Steve Gregory, Helen Read, Valerie Standen and to those people who sent their specimens already tubed. To Steve Gregory (woodlice), Paul Lee (millipedes) and Tony Barber (centipedes) thanks are due for providing up-to-date taxonomic lists for their respective groups. Keith Alexander, Steve Gregory, Helen Read and others have provided helpful ideas and discussion.

REFERENCE

Morgan, I.K. (1988) Recent records of Myriapods in South-West Wales. *Bull. Br. Myriapod & Isopod Gp*. **5:** 11-23

CONTACT DETAILS FOR THE COLLECTION

Curator: Steve Gregory
Telephone: 01865 409409
Email: steve.gregory@northmoortrust.co.uk
Address: Northmoor Trust, Hill Farm, Little Wittenham, Oxon, OX14 4QZ

ON *CRYPTOPS DORIAE* POCOCK, FROM THE WET TROPICAL BIOME OF THE EDEN PROJECT, CORNWALL (CHILOPODA, SCOLOPENDROMORPHA, CRYPTOPIDAE)

John G. E. Lewis

Somerset County Museum, Taunton Castle, Castle Green, Taunton, Somerset TA1 4AA and Entomology Department, The Natural History Museum, Cromwell Road, London SW7 5BD.

Address for Correspondence: Manor Mill Farm, Halse, Taunton, Somerset TA4 3AQ. E-mail: johngelewis@realemail.co.uk

INTRODUCTION

Tony Barber sent me eight specimens of *Cryptops* collected by hand sorting and Tullgren funnelling in May 2005 from five sites in the wet tropical biome at the Eden Project in Cornwall. As might be expected, they are not a British species. They belong to a group of species characterised by the absence of a transverse suture (*Ringfurche*) on tergite 1 and with one or more saw teeth on the femora of the ultimate legs of which Attems (1930) listed 13 species (subsequently a further 18 species have been described). They fall within the diagnosis of *C. (C.) doriae* Pocock 1891 given by Lewis (1999) and are here regarded as that species. The species has been recorded from Burma [Myanmar], Nepal, India, Indonesia (Java), Papua New Guinea, Vietnam and (Lewis, unpublished) the Seychelles.

The specimens have been numbered using the number of the site and of the individual e.g. 8.1, 8.2 etc. and have been deposited in the Natural History Museum London. The terminology used is that recommended by Lewis, Edgecombe and Shelley (2005); Spm is used as an abbreviation for specimen and T for tergite.

Cryptops (Cryptops) doriae Pocock
Cryptops doriae Pocock, 1891: 421.
C. (C.) doriae: Attems, 1930: 214.
C. (C.) doriae: Lewis, 1999:20, figs 10-13, 14-35 & 51-53.

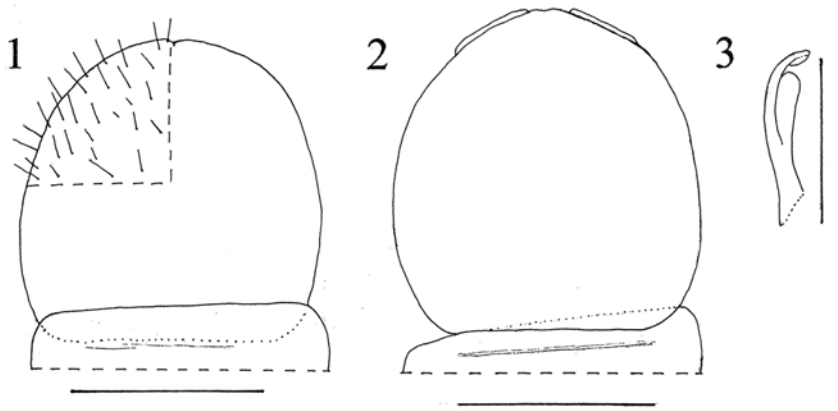
Material examined: Eden project, Cornwall, Humid tropical Biome, 11.05.2005, coll. ADB, ML. Site 4: spms 4.1 ♂ 11 mm and 4.2 ♂ 10.5 mm (broken and lacks ultimate legs), Site 6: spm 6.1 ♀ 12 mm (broken), Site 8: spm 8.1 ♂ 13mm, 8.2 ♂ 11mm, 8.3 ♂ 12.5 mm, Site 9: spm 9.1 ♂ 11.5 mm. NB a single specimen from site 5 is a very small immature *Cryptops* and has not been identified.

Colour: light brown, brown or (spm 4.2) brownish orange. Specimens lack black subcutaneous pigment but in specimen 8.1 brown subcutaneous pigment is clear beneath tergites 3 to 6 and 19 and 20 and in specimen 4.1 brownish orange pigment is present beneath tergites 3 to 6 and 17 to 20.

Antennomeres 17, except where damaged or regenerated when there are fewer. Antennomere 1 with long and a few shorter setae. An increase in shorter setae on antennomeres 2 and 3, 4-14 with dense covering of short fine setae with basal whorl of long setae.

Head plate slightly longer than wide, without sutures. Tergite 1 overlies the posterior edge of the head plate in spms 4.1, 4.2, 6.1, and 8.2 (Figure 1) but in spms 8.1 8.3 and 9.1 the head plate overlies the anterior edge of T1 a little (Figure. 2). Setae arranged as in Figure 1. Clypeus with 2

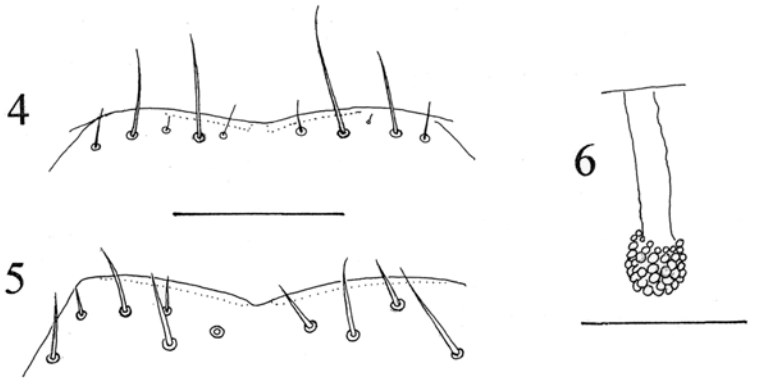
+1+2 +2 setae and a transverse row of 7-9 setae in front of the labrum (spms 4.1 & 2, 6.1). Labral sidepieces not notched. Tarsal claw of second maxillary telopodite bilobed (spm 9.1, Figure 3).



Figures 1-3: *Cryptops doriae* Pocock
(1) Head plate and anterior part of tergite 1 spm 8.1, with area showing arrangement of setae. (2) Head plate and anterior part of tergite 1 spm 8.2. Scale bars = 0.5 mm
(3) Tarsal claw of telopodite of second maxilla spm 9.1. Scale bar = 0.05 mm.

Anterior margin of forcipular coxosternum slightly curved on each side with slight median incision and more or less sclerotised. With two or three long and two or three small to medium setae behind anterior margin (Figures 4 & 5).

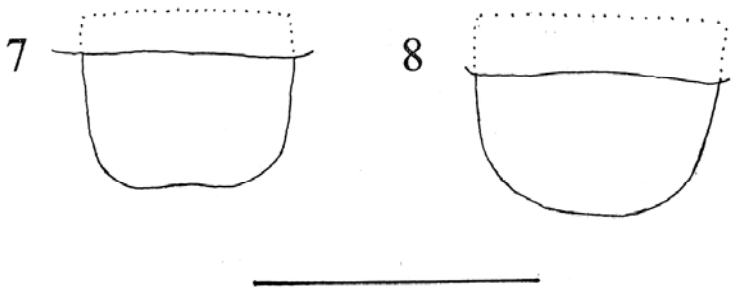
Poison gland (Figure 6) situated in the anterior 20% to 30% of the forcipular trochanteroprefemur.



Figures 4-6: *Cryptops doriae* Pocock
(4) Anterior margin of forcipular coxosternum spm 4.1. (5) Anterior margin of forcipular coxosternum spm 8.1. (6) Calyx and portion of duct of forcipular poison gland spm 8.1. Scale bars = 0.1 mm

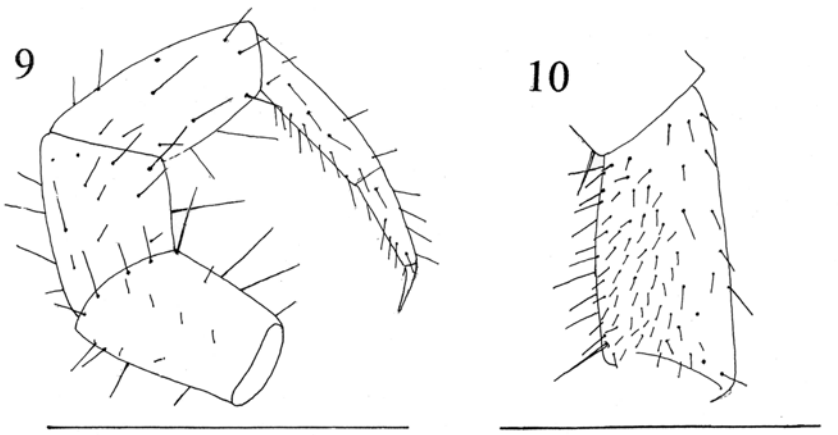
First tergite without sutures but in some specimens cleared in ethylene glycol a fine anterior transverse groove or line, which is easily overlooked, is visible below the cuticle (Figures 1 & 2). It occupies about two-thirds of the width of the tergite. It could possibly be mistaken for a vestigial anterior transverse suture (*Ringfurche*) which it is not. Tergite paramedian sutures very fine and only seen in cleared specimens under high magnification and therefore their exact extent difficult to

determine. In specimen 8.1 very short anterior sutures on T8, anterior 57% and posterior 15% on T19. In specimen 8.2 anterior 60% on T11, anterior 65% and posterior 18% on T12, almost complete on T13, anterior 45% only on T15 and unclear on T20. On first examination not clear in specimen 8.3 but on second examination short anterior sutures on T6, anterior 30% on T7 anterior 50% and posterior 20% on T9, anterior 50% and posterior 10% on 18. Extent of tergite paramedian sulci difficult to determine: incomplete anteriorly on T 7 and 8 present to T16 in specimen 8.1, incomplete posteriorly on T 10, 11 and 12 but very difficult to determine in specimen 9.1 even when the specimen was dry. Median ridge low and extent difficult to determine. Lateral crescentic sulci are much easier to see. Present from T3 to T19 or 20. Poorly developed on T3 and 4 in some specimens. Tergite 21 seen in cleared specimens about as long as wide posterior border triangular with rounded apex. Without median suture but with very shallow median posterior depression.
Sternites (seen by reflected light) punctate. With narrow curved transverse and wide longitudinal sulci on most segments, their extent very difficult to determine. Sternite 21 generally with posterior border straight, or slightly concave (Figure 7) but with broadly rounded corners in spm 8.1 and 9.1 (Figure 8). About as long as wide (variation length to width 1.2:1 in spm 4.2, 0.93:1 in spm 6.1).



Figures 7-8: ***Cryptops doriae*** **Pocock**
(7) Sternite 21 spm 8.1, (8) Sternite 21 spm 4.1. Scale bar = 0.5 mm

Legs 1-19 setose, without spinous setae. Tarsi with faint division from leg 3 (Figure 9). Accessory tarsal spurs two, one longer the shorter second difficult to see. Very variable in length, the longer up to 39% length of tarsal claw. Leg 20 with tarsus clearly divided with relatively dense small setae ventrally on prefemur, femur and tibia in males (Figure 10).

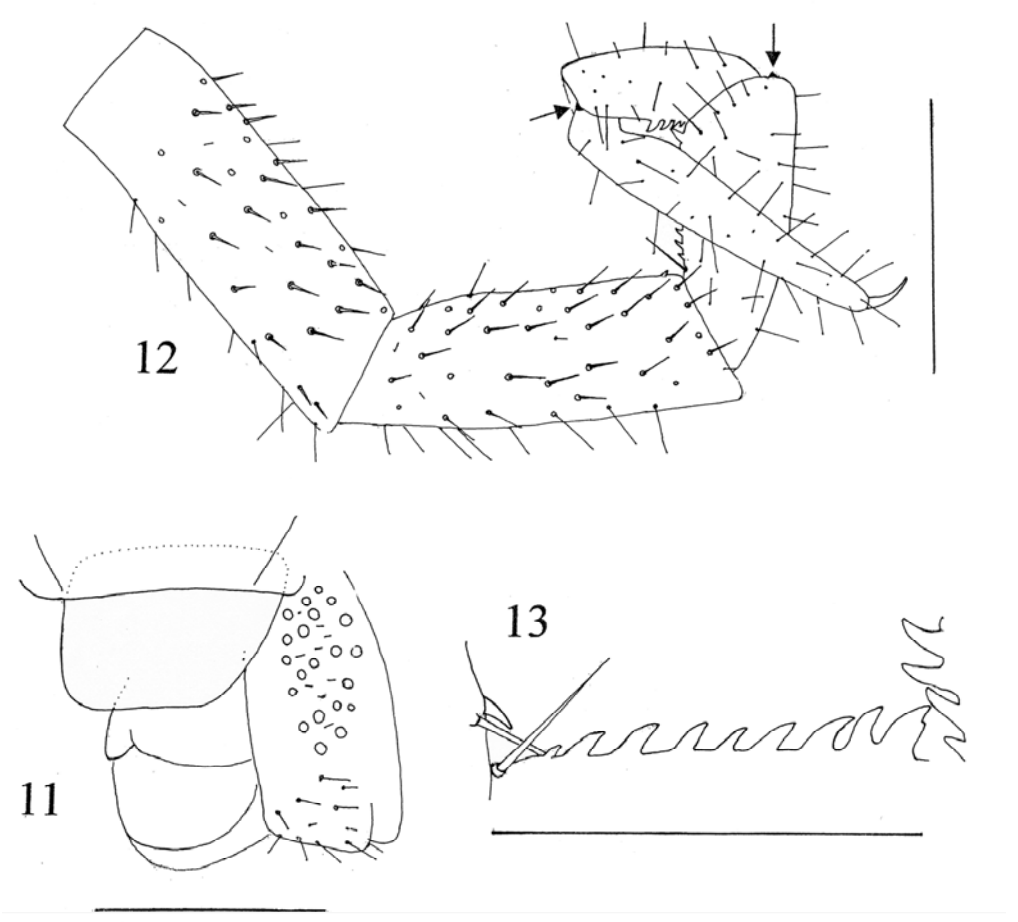


Figures 9-10: ***Cryptops doriae*** **Pocock**
(9) Leg from mid-body region spm 9.1. (10) Femur of leg 20 spm 8.3. Scale bars = 0.5 mm

Ultimate legs: Coxopleural pores 17 (spm 8.1) to 22 (spm 8.2) occupying anterior 60-71% of coxopleuron. Six to 10 small setae in pore field, five to about 10 between the pore field and the posterior margin and four to seven large and small setae on the posterior edge of the coxopleuron (Figure 11). The setae more robust anteriorly, ventrally and posteriorly on the prefemur, and ventrally and posteriorly on the femur (Figure 12). Tibia and tarsus 1 & 2 with long fine setae. Small distal tubercles, often difficult to see, posterior on tibia and tarsus (Figure 12, arrowed) sometimes also anterior on tibia and tarsus I. A loose leg probably from spm 4.1 has a narrow longitudinal glabrous strip on the posterior surface of the prefemur also seen in spm 8.1 but not seen in the other specimens.

Saw teeth: mostly femur 1, tibia 8, tarsus I 3 or 4, but 1+6+3 or 4 in spm 8.1, 1/0+9+3/4 in spm 8.2. Distal tibial saw tooth bifid in 8.3 and 9.1 (Figure 13).

Maturity: Spms 8.1, 8.2, 8.3 and 9.1 contained two or three spermatophores. Specimen 6.1 appears to be an immature female and spms 4.1 & 4.2 immature males.



Figures 11-13: ***Cryptops doriae*** **Pocock**
(11) Ventral view of terminal segments spm 8.3. Only the setae on the coxopleuron are shown. (12) Ultimate leg spm 8 3. Arrows indicate distal tubercles on tibia and tarsus 1. Scale bars = 0.5 mm
(13) Detail of femoral, tibial and tarsal saw teeth spm. 8.3. Scale bar = 0.25 mm

DISCUSSION

Pocock (1891) gave the length of *C. doriae* as 15 mm which compares with a maximum of 13 mm of the Eden specimens. The Nepalese specimens described by Lewis (1999), however, reach a much larger size (up to 33 mm). They also show a concomitant increase in coxal pore number to a maximum of 72 compared to a maximum of 22 in the Eden material. It is possible that we may be dealing with two closely related species distinguishable only on size, or the differences may be the result of different growth rates and number of stadia in different habitats.

Specimens of *Cryptops doriae* are distinguishable from the three British species as characterised by Eason (1966) and Barber (2000) by the presence of a saw tooth on the femur of the ultimate leg. It should be stressed, however, that this tooth is not always easy to see. In addition they differ from *C. anomalans* Newport by the absence of sutures on the head plate and on tergite 1, and from *C. parisi* Brolemann by the absence of head plate sutures and less protuberant anterior border of the forcipular coxosternum. Additional differences from *C. hortensis* Donovan are the presence of several, rather than a single prominent seta in the coxal pore field and the lack of a ventral groove on the ultimate leg prefemur.

ACKNOWLEDGEMENTS

My thanks are due to Dennis Parsons and the other staff of the Somerset County Museum where this work was carried out for providing excellent working conditions.

REFERENCES

Attems, C. (1930) Scolopendromorpha. *Das Tierreich*, Lfg. **54**: 1-308.

Barber, A.D. (2000) The British species of *Cryptops*. *Bull. Br. Myriapod Gp.* **16**: 30-35.

Eason, E.H. (1964) *Centipedes of the British Isles*. London: Warne.

Lewis, J.G.E., (1999) On the genus *Cryptops* in Nepal with redescriptions of *Cryptops australis* Newport and *C. doriae* Pocock (Chilopoda, Scolopendromorpha, Cryptopidae). *Senckenbergiana biologica* **79**: 19-38.

Lewis, J.G.E. Edgecombe, G.D. and Shelley, R.M., (2005) A proposed terminology for the external taxonomic characters of the Scolopendromorpha (Chilopoda). *Fragmenta Faunistica* **48**:1-8.

Pocock, R.I. (1891) On the Myriopoda of Burma. Pt. 2. Report upon the Chilopoda collected by Sig. L. Fea and Mr. E.W. Oates. *Annali del Museo civico di Storia naturali Giacomo Doria, Genova* **30**: 401-432.

A COMPARISON OF THE GROWTH PATTERNS IN BRITISH AND IBERIAN POPULATIONS OF *LITHOBIUS VARIEGATUS* LEACH (CHILOPODA, LITHOBIOMORPHA)

John G. E. Lewis

Somerset County Museum, Taunton Castle, Castle Green, Taunton, Somerset TA1 4AA and Entomology Department, The Natural History Museum, Cromwell Road, London SW7 5BD.

Address for Correspondence: Manor Mill Farm, Halse, Taunton, Somerset TA4 3AQ. E-mail: johngelewis@realemail.co.uk

INTRODUCTION

Eason (1964) assigned specimens of *Lithobius variegatus* Leach to a post-larval stadium on the basis of the number of pores on the coxae of leg pairs 12, 13, 14 and 15. In the first post-larval stadium there are two pores on each coxa of the twelfth pair of legs and one pore on each of legs 13, 14 and 15. This is denoted 2,1,1,1. In the second post-larval stadium there are 3,2,2,2, and so on. In British populations adults are 16 to 24 mm long and there are usually 6,5,5,5 and never more than 7,6,6,6 coxal pores (Eason & Serra, 1986). Stadium 5 is the maturus junior and stadium 6 the maturus senior.

Eason and Serra (1986) further reported that on the west coast of Ireland in the neighbourhood of Clew Bay, County Mayo specimens are 24 to 30 mm long with 7,6,6,5; 7,6,6,6; 7,7,7,6; or 8,7,7,6. Furthermore, Iberian specimens from northern Portugal are also larger than the corresponding stadia of the British form and adults have 7,6,6,6; 8,7,7,7; 9,8,8,8 or 10,9,9,9 coxal pores or numbers approximating to these formulae. This suggested further post-larval stadia in addition to those found in British *variegatus*.

The collection of 24 specimens of *Lithobius variegatus* in Galicia, Spain and adjacent northern Portugal during the British Myriapod and Isopod Group field trip in March 2004 has allowed a more detailed comparison of the size of stadia in British and Iberian populations.

MATERIALS AND METHODS

Body lengths and head widths were measured of the 24 Iberian specimens and 49 British specimens from West Somerset and East Devon. The Spanish specimens were collected from Puerto de Moncelos 23.03.04; Oia Harbour, Pontevedra 24.03.04; Baiona, Pontervedra, 24.03.04; Gondomar, Pontevedra; 24.03.04; below Ninos de Corbo nr, La Guardia (A Guarda), 25.03.04; Camposancos, nr. La Guadia (A Guarda), Pontevedra, 29.03.04 and the Portuguese specimens from Camhino, Viana do Castelo 27.03.04, Castanheira, Viana do Castelo 28.03.04 and Vascoes, Viana do Castelo 28.03.04. British specimens were collected from nr Leigh Farm, 2km N Wimbleball Lake, 27.05.91; Triscombe, Quantock Hills, 07.03.91; Dead Woman's Ditch, Quantock Hills, 07.03.91; between Withypool and Tarr Steps, 29.10.87; Wooten Courtney 15.10.93 (all from Somerset) and 1.2 km SE Churchinford, E. Devon, 30.08.93.

RESULTS

Figure 1 compares the body lengths of the Iberian and British material. In the British material there are only six post-larval stadia. In the Iberian material there are eight although Eason and Serra (1986) recorded 10,9,9,9 coxal pores (i.e. nine post-larval stadia) in their Portuguese material. At each stadium the Iberian specimens are larger then the British ones and, in addition, sizes diverge progressively through the stadia. Figure 2 shows the data for head width, regarded as a better indication of size as body length may vary with the degree of contraction of preserved specimens. The results are similar to those for body length and again show greater divergence between the later stadia of British and Iberian populations.

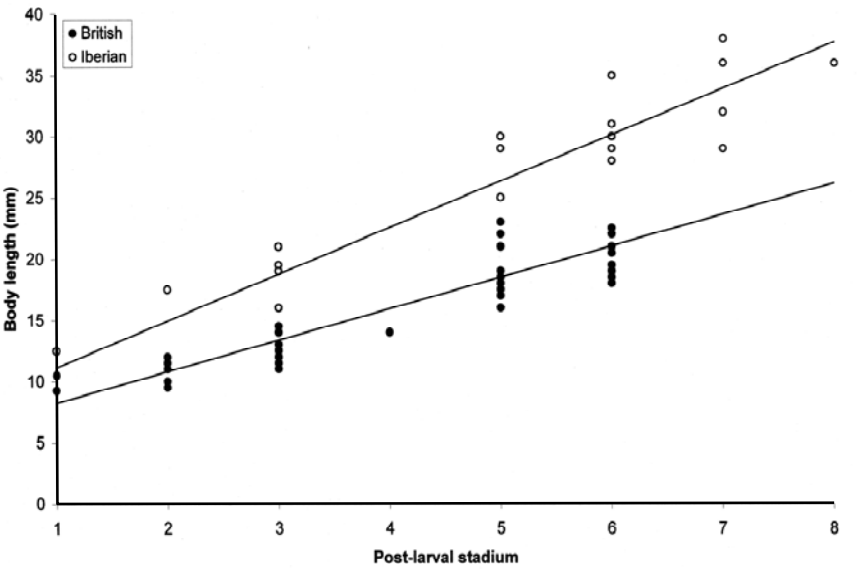


Figure 1: Body lengths of British and Iberian populations of *Lithobius variegatus* with lines of best fit

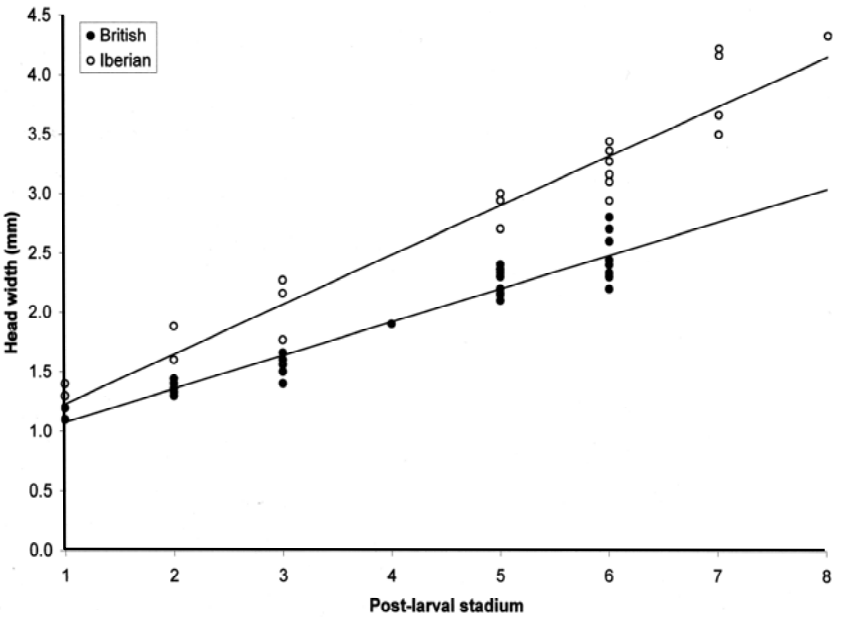


Figure 2: Head widths of British and Iberian populations of *Lithobius variegatus* with lines of best fit

DISCUSSION

Eason and Serra (1986) pointed out that the Iberian specimens are rather larger than the corresponding stadia of the British form but the results here presented indicate that this difference increases through the stadia. The apparent similarity in size between the early post-larval stadia of the two forms suggests that the eggs and larval stadia may be of much the same size. The larger size of the Iberian form is achieved by more growth during each stadium than in the British form, as well as the production of additional stadia.

If the Iberian forms mature at post-larval stadium 5 and 6 as do British specimens and in addition go through stadia 7 and 8 and perhaps stadium 9, there will be four or five mature stadia. If, as seems probable, the eggs of the two forms are of similar size and if the rate of egg production similar, then there will be a major difference in fecundity, it being much higher in the Iberian specimens. This suggests that rates of mortality are much higher in Iberian populations.

ACKNOWLEDGEMENTS

My thanks are due to Dennis Parsons and the other staff of the Somerset County Museum where this work was carried out for providing excellent working conditions. Also to members of the British Myriapod and Isopod Group's 2004 field trip to Galicia for specimens and to Roger Lewis for producing Figures 1 and 2.

REFERENCES

Eason, E.H. (1964) *Centipedes of the British Isles*. London: Warne.

Eason, E.H. & Serra, A. (1986) On the geographical distribution *of Lithobius variegatus* Leach, 1814, and the identity of *Lithobius rubriceps* Newport, 1845 (Chilopoda: Lithobiomorpha). *J. nat. Hist*. **20**: 23-29.

CHARLES RAWCLIFFE'S DISCOVERY OF THE ALIEN WOODLOUSE *STYLONISCUS MAURITIENSIS* (BARNARD 1936)

Glyn M. Collis[1] & Paul T. Harding[2]

[1] 'Seasgair', Ascog, Isle of Bute, PA20 9ET, UK. E-mail: g.m.collis@warwick.ac.uk

[2] c/o Centre for Ecology and Hydrology, Monks Wood, Abbots Ripton, Huntingdon, PE28 2LS, UK. E-mail: phs@ceh.ac.uk

The last formally published species list of alien woodlice of Britain and Ireland was in the Synopsis by Oliver and Meechan (1993). Before that, the same species were listed by Harding and Sutton (1985). Between these two dates, an additional species was discovered by Charles Rawcliffe, and written up in the Newsletter of the British Isopod Study Group (Rawcliffe, 1987). However, the discovery appears to have slipped from the collective consciousness of many isopodologists in the UK, only coming to our attention because of a distribution map on the National Biodiversity Network Gateway http://www.searchnbn.net/. Because it is likely that very few copies of the Newsletter exist today, we were motivated to write this note so that the presence of this species in the UK is better known. The late Steve Hopkin certainly knew of the discovery but his well-known AIDGAP key covers only the 37 species known to be native or naturalised in Britain and Ireland (Hopkin 1991).

In his original note reporting the discovery Charles Rawcliffe quoted from a letter from Tony Barber dated 21/12/85: "Any chance of records from glasshouses and botanic gardens?" Charles lived (and still lives) quite close to Edinburgh Botanic Garden so it is no surprise that he requested permission to collect in the Tropical Houses where he found two specimens of what turned out to be *Styloniscus mauritiensis*. The specimens were sent to Steve Hopkin, together with details entered on Non-marine Isopod Recording Scheme recording cards. We have identified those record cards, which are now at the Biological Records Centre at Monks Wood.

Annotations on the cards by Steve Hopkin indicate that the first specimen, collected on 7th August 1986, was sent for identification to Franco Ferrara, a leading expert on tropical woodlice, based in Florence. It was presumably Ferrara who provided the Taiti & Ferrara (1983) reference cited in Rawcliffe's note, indicating that *S. mauritiensis* was previously known from Mauritius and Hawaii. Further specimens, collected on 11th November 1986, were identified by Steve Hopkin himself and a note on the card indicates that he retained the specimens.

In the Locality box on the cards, as well as "Royal Botanic Garden, Edinburgh", it is indicated that the specimens were found in peat in pots holding *Lycopodium* sp, which is a club-moss, identified on the second card as "*Lycopodium pinifolium* cuttings" and "plant from Indonesia". On the first card, Rawcliffe had added "Glasshouse No. 20 Tropical (26°C)" and "per favour of Gardener". He later wrote "I can add from memory that it was a Malaysian student working in the hothouse who drew my attention to the beasties in the pot" (*in litt* to GMC, 19.03.2007).

Finally, in his Newsletter note of 1987, Rawcliffe also mentions finding another alien species in the hothouses of the Edinburgh Botanic Gardens. This too was sent to Ferrara but, as far as we are aware, it remains an unidentified Philoscid. Ferrara is quoted as being unable to assign it to a known Philoscid genus many of which, he noted, are poorly described. Moreover he was unable to recognise the species even though it had distinctive male characters, especially a process on the merus of pereopod 7 similar to that of *Philoscia muscorum*. Ferrara added "Since we do not know which part of the world it comes from, we dare not describe it as a new species."

REFERENCES

Harding, P.T. & Sutton, S.L. (1985) *Woodlice in Britain and Ireland: distribution and habitat*. Huntingdon: Institute of Terrestrial Ecology.

Hopkin, S. (1991) *A key to the woodlice of Britain and Ireland*. Shrewsbury: Field Studies Council.

Oliver, P.G. & Meechan, C.J. (1993) *Woodlice: keys and notes for the identification of species*. Synopses of the British Fauna (New Series) No. 49. Shrewsbury: Field Studies Council.

Rawcliffe, C. (1987) Collecting in hothouses. *British Isopod Study Group Newsletter No. 22.*

Taiti S, & Ferrara F. (1983) Su alcuni Isopodi terrestri della Réunion, di Mauritius e delle Seychelles. *Revue Suisse de Zoologie*, **90**, 199-231.

AN INDEXED BIBLIOGRAPHY OF THE FIRST PUBLISHED RECORDS OF BRITISH AND IRISH MILLIPEDES (DIPLOPODA)

Paul T. Harding

c/o Centre for Ecology and Hydrology, Monks Wood, Abbots Ripton, Huntingdon PE28 2LS, UK. E-mail: pha@ceh.ac.uk

INTRODUCTION

In the course of compiling information for a chapter on millipede recording in the *Atlas* (Harding in Lee, 2006), I traced the first published record of each millipede species in Britain and Ireland. This work drew on Gordon Blower's baseline review of the distribution of British and Irish millipedes (Blower, 1972), which included a section on "The growth of the British list". Some of the information in Blower (1972) had already been updated (Blower, 1985; Doogue, *et al.*,1993), but all these sources are incomplete and include some minor errors. This paper attempts to provide a complete bibliography of the papers and other published sources, to the end of 2006, that include the first record of each species, separately for Britain and for Ireland.

SOURCES

Wherever possible I have gone back to original sources, checking each publication and searching for possible alternatives where it is not obvious when a species was added to the respective national list. I have drawn on the existing bibliographies compiled by Gordon Blower (1972, 1985). Presumably to save space in the published version, Blower (1972) did not include the titles of journal articles; this has made it difficult to trace several papers for which the bibliographic details are apparently incomplete or incorrect. I have tried to use published sources, rather than ephemeral ones such as newsletters, even when mention in the latter may predate formal publication. A formal publication is one with an international series or book number (ISSN or ISBN) and which, therefore, is held by designated copyright libraries. However, in the case of three species (*Paraspirobolus lucifugus* and *Cylindrodesmus hirsutus* in Britain and *Cylindroiulus truncorum* in Ireland) the only available sources are the BMIG Newsletter.

INTERPRETATION

Early authors frequently published few details with records and, in the case of William Leach (1780-1836) and George Newport (1803-1854), the same information was published more than once. The following conventions have been adopted here.

- Leach (1814) is cited as the first collated source of British records. Although the published version of his paper, read at the Linnean Society in spring 1814, did not appear until 1815, Leach appears to have partially pre-empted this publication with a much shorter article in *Brewster's Edinburgh Encyclopaedia* (Leach, 1814).
- Newport described *Ophyiulus pilosus* in a paper read at the Entomological Society on 6th June 1842, which was published in the (apparently undated) proceedings of the meeting (Newport, 1842). The proceedings of this meeting and the description of *Ophyiulus pilosus* were subsequently published again, verbatim, in the *Annals and Magazine of Natural History* (Newport, 1843). I have cited only the original 1842 description.

It is perhaps worth noting that the original list for Ireland (Templeton, 1836) was compiled by Robert Templeton (d. 1894) from the unpublished manuscripts of his eminent, but enigmatic father, John Templeton (1766-1825), after the latter's death.

CHECK LISTS

Until 1939 there was no collated check list of British and Irish millipedes, so that earlier authors were sometimes uncertain whether or not a record was the first for Britain or Ireland. Brade-Birks (1939) published a full checklist, including six species names that were subsequently omitted by Blower (1958). Since 1939 the check list has been updated several times, in publications by Blower (1958, 1972, 1985), for Ireland by Doogue, *et al.* (1993), and most recently on the BMIG website and by Lee (2006). The species listed in the Index (Table 1), and the nomenclature, follow the check list in Lee (2006). This includes the rejection of *Eumastigonodesmus boncii* (Brolemann, 1908) as a British species. Bagnall (1922) recorded *E. boncii* once from County Durham, but the single female specimen found by Bagnall does not seem to have survived, and the species has not been recorded since.

NON-NATIVE SPECIES

The status of reproducing populations of non-native species recorded only from artificial environments, such as heated glasshouses, and which do not occur in open-air locations, remains anomalous. Pocock (1906a) listed several species from heated glasshouses at the Royal Botanic Gardens at Kew. Some of these species from Kew were included by Brade-Birks (1939) in his check list, only to be ejected from the list by Blower (1958). Despite this, Blower (1985) included *Prosopodesmus panporus*, recently described from heated glasshouses at Kew, in the check list without comment. For the purposes of this paper, I have taken the check list compiled by Blower (1985) as the baseline and subsequent additions that have been published, whether obviously non-native or not, have been included in the Index (Table 1). Casual introductions, such as *Ommatoiulus rutilans* in Shetland, in a consignment of imported mushrooms (BMIG Newsletter, 8, Spring 2004, p1), and probably some of the species listed from Kew by Pocock (1906a), should not be included in a national check list.

Table 1: Index to the first published records of millipede species from Britain and Ireland

Species	First published record from Britain	First published record from Ireland
Family Polyxenidae		
Polyxenus lagurus (Linnaeus, 1758)	Leach (1814)	Pocock (1893)
Family Glomeridae		
Glomeris marginata (Villers, 1789)	Leach (1814)	Templeton (1836)
Geoglomeris subterranea Verhoeff, 1908	Blower (1957)	Doogue *et al.* (1993)
Family Doderiidae		
Adenomeris gibbosa Mauriès, 1960	Harper & Richards (2006)	Blower (1985)
Trachysphaera lobata (Ribaut, 1954)	Jones & Keay (1986)	
Family Polyzoniidae		
Polyzonium germanicum Brandt, 1837	Brade-Birks (1920a)	
Family Craspedosomatidae		
Craspedosoma rawlinsii Leach, 1814	Leach (1814)	Selbie (1912)
Nanogona polydesmoides Leach, 1814	Leach (1814)	Pocock (1893)

Family Anthogonidae		
Anthogona britannica Gregory, Jones & Mauriès, 1993	Gregory, Jones & Mauriès (1993)	
Family Chordeumatidae		
Chordeuma proximum Ribaut, 1913	Nelson (1964)	Jones (1992)
Chordeuma sylvestre C.L.Koch, 1847	Blower (1972)	
Melogona gallica (Latzel, 1884)	Eason (1957) [i]	Blower (1985)
Melogona scutellaris (Ribaut, 1913)	Brade & Birks (1916)	Blower (1985)
Melogona voigti (Verhoeff, 1899)	Corbet (1996)	
Family Anthroleucosomatidae		
Anamastigona pulchella Silvestri, 1898		Anderson (1996)
Family Brachychaeteumatidae		
Brachychaeteuma bagnalli Verhoeff, 1911	Verhoeff (1911)	Blower (1985)
Brachychaeteuma bradeae (Brolemann & Brade-Birks, 1917)	Brade-Birks & Brade-Birks (1917)	
Brachychaeteuma melanops Brade-Birks & Brade-Birks, 1918	Brade-Birks & Brade-Birks (1918a)	Jones (1992)
Family Paradoxosomatidae		
Oxidus gracilis (C.L.Koch, 1847)	Pocock (1902) [ii]	Foster (1919)
Stosatea italica (Latzel, 1886)	Brade-Birks (1922)	British Myriapod Group (1988)
Family Polydesmidae		
Brachydesmus superus Latzel, 1884	Pocock (1901)	Pocock (1893)
Polydesmus angustus Latzel, 1884	Leach (1814)	Templeton (1836)
Polydesmus barberii Latzel, 1889	Bolton & Jones (1996)	
Polydesmus inconstans Latzel, 1884	Pocock (1906b)	Jackson (1913)
Polydesmus coriaceus Porat, 1871	Carr (1916) [iii]	Pocock (1893)
Polydesmus denticulatus C.L.Koch, 1847	Pocock (1901)	Selbie (1913)
Propolydesmus testaceus (C.L.Koch, 1847)	Pocock (1903)	
Family Haplodesmidae		
Cylindrodesmus hirsutus Pocock, 1889	Lee (2006)	
Prosopodesmus panporus Blower & Rundle, 1980	Blower & Rundle (1980)	
Family Pyrgodesmidae		
Poratia digitata Porat, 1889	Blower & Rundle (1986)	
Family Macrosternodesmidae		
Macrosternodesmus palicola Brolemann, 1908	Bagnall (1912a)	British Myriapod Group (1988)
Ophiodesmus albonanus (Latzel, 1895)	Bagnall (1918)	British Myriapod Group (1988)
Family Spirobolellidae		
Paraspirobolus lucifugus (Gervais, 1836)	Lee (2006)	
Family Blaniulidae		
Choneiulus palmatus (Němec, 1895)	Bagnall (1912b)	Blower (1985)
Nopoiulus kochii (Gervais, 1847)	Hopkin & Blower (1987)	Anderson (1999)
Proteroiulus fuscus (Am Stein, 1857)	Evans (1901)	Pocock (1893)
Blaniulus guttulatus (Fabricius, 1798)	Leach (1814)	Pocock (1893)
Archiboreoiulus pallidus (Brade-Birks, 1920)	Brade-Birks (1920)	Blower (1985)
Boreoiulus tenuis (Bigler, 1913)	Bagnall (1918)	English (1976)
Family Nemasomatidae		
Nemasoma varicorne C.L.Koch, 1847	Bagnall (1912b)	Foster (1919)
Thalassisobates littoralis (Silvestri, 1903)	Bagnall (1916)	Cawley (1997)

Family Julidae		
Julus scandinavius Latzel, 1884	Leach (1814)	Selbie (1912)
Haplopodoiulus spathifer (Brölemann, 1897)	Corbet & Jones (1996)	
Ophyiulus pilosus (Newport, 1842)	Newport (1842)	Pocock (1893)
Leptoiulus belgicus (Latzel, 1844)	Bagnall (1922)	Irwin (1992)
Leptoiulus kervillei (Brölemann, 1896)	Blower & Rolfe (1956)	
Metaiulus pratensis Blower & Rolfe, 1956	Blower & Rolfe (1956)	
Allajulus nitidus (Verhoeff, 1891)	Brade & Birks (1917)	
Cylindroiulus britannicus (Verhoeff, 1891)	Evans (1906) [iv]	Brolemann (1896)
Cylindroiulus caeruleocinctus (Wood, 1864)	Pocock (1900)	British Myriapod Group (1988)
Cylindroiulus latestriatus (Curtis, 1845)	Curtis (1845)	Brade & Birks (1916)
Cylindroiulus londinensis (Leach, 1815)	Leach (1815)	Selbie (1912)
Cylindroiulus parisiorum (Brölemann & Verhoeff, 1896)	Brade-Birks & Brade-Birks (1918b)	Doogue *et al.* (1993)
Cylindroiulus punctatus (Leach, 1815)	Leach (1815)	Templeton (1836)
Cylindroiulus salicivorus Verhoeff, 1908	Read, Corbet & Jones (2002)	
Cylindroiulus truncorum (Silvestri, 1896)	Lindroth (1957)	Lee (2006)
Cylindroiulus vulnerarius (Berlese, 1888)	Blower (1985)	Blower (1985)
Enantiulus armatus (Ribaut, 1909)	Blower (1972)	
Unciger foetidus (C.L.Koch, 1838)	Jones (1985)	
Brachyiulus pusillus (Leach, 1815)	Leach (1815)	Templeton (1836)
Ommatoiulus sabulosus (Linnaeus, 1758)	Leach (1814) [v]	Pocock (1893)
Tachypodoiulus niger (Leach, 1814)	Leach (1814)	Pocock (1893)

Notes:

[i] Records from before 1996 may include *M .voigti* (Verhoeff).

[ii] Although Evans (1900) is cited by Blower (1972, 1985) as the author of the first record, this species is included in that paper with a query against the species name.

[iii] It has proved impossible to trace an incontrovertible first record of *P. coriaceus*, notwithstanding the nomenclatural confusion about this species in the British literature. Carr (1916) appears to be the earliest date of publication although the actual record dates from 1903.

[iv] Blower (1972, 1985) states erroneously that *C. britannicus* was first recorded by Evans (1907), but this paper summarises a record published, somewhat obscurely, in the previous year.

[v] Blower (1972, 1985) states erroneously that *O. sabulosus* was first recorded in Britain from Scotland, by Johnston (1835).

DISCUSSION

This somewhat esoteric exercise in collating existing information has highlighted several issues.

- It is important to maintain and regularly update national check lists. This is an appropriate role for a voluntary specialist group, such as BMIG, especially where the necessary expertise does not exist in museums or academic institutions.
- The native, non-native or casually introduced status of species should be considered carefully when compiling national check lists. For a group such as millipedes this is complicated by the synanthropic behaviour of some apparently native species.

- The faunas of geographically discrete areas (e.g. Britain or Ireland), which have distinctive geological or post-glacial histories, should be differentiated.
- There may also be a need to differentiate politically discrete areas (e.g. England, Wales or Scotland), for example to help inform policy making and legislation.
- Publishing new records and the results of surveys is important, not only to maintain the flow of information, but also to give traceable sources of information.
- There is no substitute for publishing important records, such as species new to a country, in anything other than formal ISSN or ISBN publications, thereby ensuring that the records can be traced in the future. Newsletters without ISSN listing and, at present, most web publishing, are ephemeral and may not be able to be traced in only a decade or two.

Access to early publications in libraries is becoming increasingly difficult, even for those with the privilege of access to good libraries. For example, several of the publications that I consulted were classified by Cambridge University Library as Rare Books, which could be used only in controlled conditions.

ACKNOWLEDGEMENTS

I am grateful to the Librarian of the Cambridge University Library and the Librarian of the Royal Entomological Society of London for access to these libraries. I am very grateful to Paul Lee for his comments on a draft of this paper.

REFERENCES/BIBLIOGRAPHY

Anderson, R. (1996) *Anamastigona pulchellum* Silvestri (Chordeumatida: Anthroleucosomatidae) an addition to the fauna of northern Europe, recorded from Ireland. *Bulletin of the British Myriapod Group* **12:** 7-11.

Anderson, R. (1999) Distribution records for millipedes (Diplopoda) in the north of Ireland, including *Anamastigona pulchellum* Silvestri and *Nopoiulus kochii* (Gervais) new to Ireland. *Irish Naturalists' Journal* **26:** 219-227.

Bagnall, R.S. (1912a) New diplopods. *Report of the British Association for the Advancement of Science.* London 1912.

Bagnall, R.S. (1912b) *Chaetechylene vesuviana* and other myriapods new to the British fauna. *The Zoologist* **1912:** 264-266.

Bagnall, R.S. (1916) A November week at Grange over Sands. II Woodlice and Myriapoda. *Lancashire & Cheshire Naturalist* **8:** 349.

Bagnall, R.S. (1918) Records of some new British Diplopoda and Pauropoda with a preliminary check list of the British Myriapoda. *Journal of Zoological Research* **3:** 87-93.

Bagnall, R.S. (1922) On some new and rare British diplopods. *Annals & Magazine of Natural History* (9) **9:** 176-177.

Blower, J.G. (1957) On some new and little-known British millipedes. *Annals & Magazine of Natural History* (12) **10:** 497-508.

Blower, J.G. (1958) *British millipedes (Diplopoda).* Synopses of the British Fauna No. 11. London: Linnean Society.

Blower, J.G. (1972) The distribution of British millipedes as known at the end of 1969. *Bulletin of the British Myriapod Group* **1:** 9-38.

Blower, J.G. (1985) *Millipedes.* Synopses of the British Fauna (New Series) No. 35. London: (Linnean Society) E.J. Brill & Dr W. Backhuys.

Blower, J.G. & Rolfe, S.W. (1956) *Metaiulus pratensis*, gen. et sp. nov., and *Leptoiulus kervillei* (Brolemann), (Diplopoda, Iulidae) from Britain. *Annals & Magazine of Natural History* (12) **9:** 513-520.

Blower, J.G. & Rundle, A.J. (1980) *Prosopodesmus panporus*, an interesting new species of polydesmoid millipede from the Royal Botanic Gardens, Kew, England. *Myriapodologica* **1** (4): 27-34.

Blower, J.G. & Rundle, A.J. (1986) *Poratia digitata*, a new British hothouse millipede. *Bulletin of the British Myriapod Group* **3:** 11-16.

Bolton, D.E. & Jones, R.E. (1996) *Anthogona britannica* Mauriès and *Polydesmus barberii* Latzel in Devon: millipedes new to the British Isles. *Bulletin of the British Myriapod Group* **12:** 21-22.

Brade, H.K. & Birks, S.G. (1916) Notes on Myriapoda I. On a new variety of *Chordeumella scutellare* Ribaut. *Lancashire & Cheshire Naturalist* **10:** 113-122.

Brade, H.K. & Birks, S.G. (1917a) Notes on Myriapoda V. On *Cylindroiulus* (*Leucoiulus*) *nitidus* (Verhoeff). *Annals & Magazine of Natural History* (8) **19:** 417-424.

Brade-Birks, H.K. &.S.G. (1917b) Notes on Myriapoda VII. A new member of the Ascospermophora (*Iacksoneuma bradeae* gen. et sp. nov.). *Journal of Zoological Research* **2**: 135-149.

Brade-Birks, H.K. &.S.G. (1918a) Notes on Myriapoda XI. Description of a new species of Diplopoda (*Brachychaeteuma melanops*). *Journal of Zoological Research* **3**: 55-61.

Brade-Birks, H.K. &.S.G. 1918b. Notes on Myriapoda XIV. The rediscovery of *Cylindroiulus parisiorum* (Brolemann and Verhoeff). *Annals & Magazine of Natural History* (9) **2**: 470-471.

Brade-Birks, S.G. (1920a) Notes on Myriapoda XXI. Colobognatha, an order of diplopods new to Britain represented by *Polyzonium germanicum* (Brandt). *Annals & Magazine of Natural History* (9) **5**: 198-200.

Brade-Birks, S.G. (1920b) Notes on Myriapoda XXIV. Preliminary note on a millipede new to science. *Annals & Magazine of Natural History* (9) **6:** 364-365.

Brade-Birks, S.G. (1922) Notes on Myriapoda XXVI. The names of some Iulidae and Blaniulidae. *Annals & Magazine of Natural History* (9) **9**: 160-163.

British Myriapod Group (1988) *Preliminary atlas of the millipedes of the British Isles*. Huntingdon: Biological Records Centre.

Brolemann, H.W. (1896) *Lithobius variegatus*, Leach. *Irish Naturalist* **5:** 12-15.

Carr, J.W. (1916) *The invertebrate fauna of Nottinghamshire*. Nottingham: Bell.

Cawley, M. (1997) Distribution records for uncommon millipedes. *Irish Naturalists' Journal* **25**: 380-382.

Corbet, G.B. (1996) *Melogona voigti* (Verhoeff) from the Lothians: a millipede new to the British Isles. *Bulletin of the British Myriapod Group* **12:** 17-20.

Corbet, G.B. & Jones, R.E. (1996) *Haplopodoiulus spathifer* (Brölemann, 1897) in southeast England: a millipede new to the British Isles. *Bulletin of the British Myriapod Group* **12**: 13-15.

Curtis, J. (1845) Observations on the natural history and economy of the insects called wireworms, etc. *Journal of the Royal Agricultural Society of England* **5** (1): 180-237.

Doogue, D., Fairhurst, C.P., Harding, P.T. & Jones, R.E. (1993) A review of Irish millipedes (Diplopoda). In: *Biogeography of Ireland: past, present and future*, edited by M.J.Costello & K.S.Kelly, 83-97. *Occasional Publications of the Irish Biogeographical Society*, no.2.

Eason, E.H. (1957) Chilopoda and Diplopoda from Caernarvonshire. *Proceedings of the Zoological Society of London* **129**: 273-291.

English, M. (1976) New records of millipedes from Munster, Ireland. *Irish Naturalists' Journal* **18**: 341-347.

Evans, W. (1900) Scottish Myriapoda. *Annals of Scottish Natural History* 1900: 127.

Evans, W. (1901) Scottish Myriapoda. *Annals of Scottish Natural History* 1901: 120.

Evans, W. (1906) Some Invertebrata, including *Ixodes borealis*, from St Kilda. *Annals of Scottish Natural History* 1906: 83-88.

Evans, W. (1907) The Myriapoda of the Forth area. *Proceedings of the Royal Philosophical Society of Edinburgh* **16:** 405-414 & **17:** 109-120.

Foster, N.H. (1919) A list of the Myriapoda of Ulster. *Annals & Magazine of Natural History* (9) **4**: 395-407.

Gregory, S.J., Jones, R.E. & Mauriès, J.-P. (1993) A new species of millipede (Myriapoda: Diplopoda: Chordeumatida) from the British Isles. *Journal of Natural History* **28**: 47-52.

Harper, J. & Richards, P. (2006) *Adenomeris gibbosa* – new to the United Kingdom. *Bulletin of the British Myriapod & Isopod Group* **21**: 14-18.

Hopkin, S.P. & Blower, J.G.B. (1987) Displaced ocelli in blaniulid millipedes. *Bulletin of the British Myriapod Group* **4**: 27-29.

Irwin, A.G. (1992) *Metatrichoniscoides* sp. (Isopoda: Trichoniscidae), *Epipsocus lucifugus* (Psocoptera: Epipsocidae), and *Leptoiulus belgicus* (Diplopoda: Julidae) new to Ireland and confirmation of *Rhynchodesmus sylvaticus* (Tricladida: Rhynchodesmidae) as an Irish species. *Irish Naturalists' Journal* **24**: 106-108.

Jackson, A.R. (1913) On some arthropods observed in 1911 and 1912. *Lancashire Naturalist* **5**: 440-444.

Johnston, G. (1835) Insecta Myriapoda found in Berwickshire. *Magazine of Natural History* **8:** 486-494.

Jones, R.E. (1985) *Unciger foetidus*, a millipede new to Britain from Norfolk. *Transactions of the Norfolk and Norwich Naturalists' Society* **27:** 63-65.

Jones, R.E. (1992) A collection of Irish myriapods. *Bulletin of the British Myriapod Group* **8:** 9-12.

Jones, R.E. & Keay, A.N. (1986) *Trachysphaera lobata* (Ribaut), a millipede new to Britain, from the Isle of Wight. *Bulletin of the British Myriapod Group* **3:** 17-20.

Leach, W.E. (1814) *Brewster's Edinburgh Encyclopaedia*: 407-409.

Leach, W.E. (1815) A tabular view of the external characters of four classes of animals which Linné arranged under Insecta. *Transactions of the Linnean Society of London* **11**: 306-400.

Lee, P. (2006) *Atlas of the millipedes (Diplopoda) of Britain and Ireland*. Sofia & Moscow: Pensoft.

Lindroth, C.H. (1957) *The faunal connections between Europe and North America*. Stockholm: Almquist & Wiksell.

Nelson, J.M. (1964) *Chordeuma proximum* Ribaut, a millipede new to Britain. *Annals & Magazine of Natural History* (13) **7**: 527-528.

Newport, G. (1842) Proceedings for June 6th 1842. Description of a new British *Iulus*. *Journal of the Proceedings of the Entomological Society of London* (1840-46): 56-61.

Newport, G. (1843) Description of a new British *Julus*. *Annals & Magazine of Natural History* (1) **11**: 316.

Pocock, R.I. (1893) Notes on some Irish Myriapoda. *Irish Naturalist* **11:** 309-312.

Pocock, R.I. (1900) On two English millipedes (*Iulus londinensis* Leach, *Iulus teutonicus* sp.n.). *Annals & Magazine of Natural History* (7) **6**: 206-207.

Pocock, R.I. (1901) Myriapoda in *Victoria County History of Cumberland* **1**: 193-195.

Pocock, R.I. (1901) Myriapoda in *Victoria County History of Norfolk* **1**: 171-172.

Pocock, R.I. (1902) Myriapoda in *Victoria County History of Surrey* **1**: 176-178.

Pocock, R.I. (1903) Myriapoda in *Victoria County History of Essex* **1:** 193-195.

Pocock, R.I. (1906a) The wild fauna and flora of the Royal Botanic Gardens, Kew. Arthopoda: Antennata. *Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew*, Additional Series **5**: 21-22.

Pocock, R.I. (1906b) Myriapoda in *Victoria County History of Somerset* **1:** 121-123.

Selbie, C.M. (1912). Some new Irish myriapods. *Irish Naturalist* **21**: 113-115.

Selbie, C.M. (1913). New records of Irish myriapods. *Irish Naturalist* **22**: 131-135.

Read, H.J., Corbet, G.B. & Jones, R.E. (2002) *Cylindroiulus salicivorus* Verhoeff, 1908: a millipede new to Britain. *Bulletin of the British Myriapod & Isopod Group* **18:** 41-44.

Templeton, R. (1836) Catalogue of Irish Crustacea, Myriapoda and Arachnida, selected from papers of the late John Templeton; with additions. *Magazine of Natural History* **9:** 9-14.

Verhoeff, K.W. (1911) Uber *Brachychaeteuma* n.g. und *Titanosoma jurassicum* aus England. *Zoologischer Anzeiger* **38**: 455-458.

LIST OF PAPERS ON MYRIAPODA PUBLISHED BY F.A.TURK

Helen J. Read

2 Egypt Wood Cottages, Egypt Lane, Farnham Common, Bucks, SL2 3LE

The following list of publications, in chronological order, is believed to be a complete list of those published by F. A. Turk on Myriapoda.

1944 Myriapoda from Cornwall with Notes and Descriptions of Forms new to the British Fauna. *Annals and Magazine of Natural History* (Ser.11) **11**: 532-551.

1945 Myriapodological Notes I. *Northwestern Naturalist*, September-December 1945: 137-144.

1945 On two new diplopods of the family Vanhoeffenidae from Indian caves. *Annals and Magazine of Natural History* (Ser. 11) **12**: 38-42.

1945 A correction and additional data to two former papers on Opiliones and diplopods from Indian caves. *Annals and Magazine of Natural History* (Ser. 11) **12**: 430.

1947 Myriapodological Notes II. *Northwestern Naturalist*, September-December 1947: 226-234.

1947 On a collection of diplopods from North India, both cavernicolous and epigean. *Proceedings of the Zoological Society of London*. **117**: 65-78.

1951 Myriapodological Notes III. The iatro-zoology, biology and systematics of some tropical 'myriapods'. *Annals and Magazine of Natural History* (Ser. 12) **4**: 35-48.

1952 Chilopods and diplopods from the island of Cyprus. *Annals and Magazine of Natural History* (ser. 12) **5**: 656-659.

1955 The myriapods of Dr Cloudsley-Thompson's expedition to the Tunisian desert. *Annals and Magazine of Natural History* (ser. 12) **8**: 277-284.

1955 The chilopods of Peru with descriptions of new species and some zoogeographic notes on the Peruvian chilopod fauna. *Proceedings of the Zoological Society of London* **124**: 469-504.

1956 Millipedes from Nyasaland: a new species and a rediscovered one. *Annals and Magazine of Natural History* (Ser. 12) **9**: 532-551.

1958 Turk, F.A. & Turk, S.M. *The Foreshore of Cawsand Bay and District*. Plymouth, NUT.

[*Strigamia maritima*]

1967 The non-aranean arachnid orders and the myriapods of British caves and mines. *Transactions of the Cave Research Group* **9** (3): 142-160.

1970 Some Notes on the Acari and Myriapoda collected by Mr. W.G.R. Maxwell in Bulgarian Caves CRG. *Transactions of the Cave Research Group* **12** (1): 39-42.

1972 A new blind millipede (*Tyhlopymaeosoma hazeltonae* n.ge., n.sp.) from a Himalayan cave, with notes on its zoographic importance. *Transactions of the Cave Research Group* **14**: 195-198.

LIST OF PAPERS ON MYRIAPODA PUBLISHED BY S.W. ROLFE

Helen J. Read

2 Egypt Wood Cottages, Egypt Lane, Farnham Common, Bucks. SL2 3LE.

The following list is believed to be all the publications relating to Myriapoda by S. W. Rolfe.

1934 Notes on Diplopoda I. The Re-study of a widely distributed British Millipede, *Ophyiulus pilosus* (Newport). *Annals & Magazine of Natural History* (Ser.10) **14**: 192-203.

1935 Notes on Diplopoda II. On one of the rarer of the British Polydesmidae (*Polydesmus testaceus* C.L.Koch) *Annals & Magazine of Natural History* (Ser.10) **15**: 284-290.

1934 Notes on Diplopoda III. Short notes on three injurious millipedes recently observed. *Journal of the South-Eastern Agricultural College, Wye, Kent* **34**: 258-259.

[*Choneiulus palmatus*, *Blaniulus guttulatus*, *Cylindroiulus londinensis* v. *caeruleocinctus*]

1937 Notes on Diplopoda IV. The recognition of some millipedes of economic importance. *Journal of the South-Eastern Agricultural College, Wye, Kent* **40**: 99-107.

[Polydesmidae, Strongylosomidae, Iulidae]

1938 Notes on Diplopoda V. The recognition of some millipedes of economic importance II. *Journal of the South-Eastern Agricultural College, Wye, Kent* **42**: 214-215.

[*Cylindroiulus londinensis* v. *caeruleocinctus, C. britannicus, C. oweni, Tachypodoiulus niger, Ophyiulus pilosus*]

1939 Notes on Diplopoda VI. The recognition of some millipedes of economic importance III. *Journal of the South-Eastern Agricultural College, Wye, Kent* **44**: 180-181.

[Polydesmidae & Stongylosomidae]

1956 Blower, J.G. & Rolfe, S.W. *Metaiulus pratensis,* GEN. ET SP. NOV., and *Leptoiulus kervillei* (Brölemann), (Diplopoda, Iulidae), from Britain. *Annals and Magazine of Natural History* Ser.12 vol. **ix**: 513-520.

1964 New or uncommon plant diseases and pests. Glasshouse millipedes damaging “tom pots”. *Plant Pathology* **13** (1): 45.

[*Oxidus gracilis*]

REPORT ON THE 2006 BMIG MEETING IN AYRSHIRE

Glyn M. Collis

Seasgair, Ascog, Isle of Bute, PA20 9ET. E-mail: g.m.collis@warwick.ac.uk

The meeting was based at the Scottish Agricultural College, Auchincruive, Ayr, 6-9 April 2006. Eighteen BMIG members attended the meeting, joined by seven local naturalists. A list of sites visited is given in Table 1. Species recorded from each site are listed in Table 2 (millipedes), Table 3 (centipedes) and Table 4 (woodlice).

One of the locals, Paul Baker, who described himself as a complete novice with these animals, provided the only finds of the weekend for the woodlouse *Trichoniscoides saeroeensis* and the millipede *Polyxenus lagurus*, both on the shoreline at Dunure NS2514. The latter record became more interesting when publication of the millipede Atlas (Lee, 2006) revealed an old record in the same 10km square. It turned out to be closer still - A.R.Waterston (1939) had found *P. lagurus* at Dunure in 1939. Dunure is its northernmost site on the west coast.

Table 1: List of sites visited

Site number and name		Grid reference
1	Culzean Country Park	NS2309, NS2209
2	Culzean Country Park	NS2310
3	Knock Laugh	NX1791
4	Auchalton Meadows	NS3303
5	Craighead Quarry	NS2301
6	Ayr Gorge	NS4524, NS4525, NS4625
7	Scottish Agricultural College, Auchincruive	NS3823, NS3923
8	Beach & adjacent area, south of Girvan	NX1895, NX1896
9	Craigskelly to Woodland Farm	NX1795, NX1794
10	Dalrymple Church	NS357145
11	Patna Church	NS415106
12	Prestwick/Monkton Dunes	NS3427
13	Fairlie shore	NS2054
14	Lendalfoot (north)	NX1390
15	Lendalfoot (south)	NX1289
16	Pinbain Bridge	NX1391
17	Dunure shore	NS2515
18	Troon Station	NS3230
19	Lower Nethan Gorge	NS8246
20	Glenside, near Hunterston	NS2152
21	Low Craignell	NX5175

The overall highlight of the weekend was finding the millipede *Chordeuma sylvestre* at Culzean Country Park NS2310 and NS2309. This is the first record in Scotland for this species and only the third site in the UK. A record of *Polydesmus coriaceus,* also from Culzean NS2310, is only the second in Scotland. Records of *Craspedosoma rawlinsii* from the Ayr Gorge NS4524 and NS4525 add significantly to the known distribution of this species. Specimens of *Brachychaeteuma* collected from Craighead Quarry NS2301 have been assigned provisionally to *B. bagnalli*. Paul Lee reports that the gonopods of these specimens are more similar to continental forms of *B.*

bagnalli than the typical British form, so they are a welcome addition to material available for understanding variation in this species in Britain.

Table 2: Millipedes (Diplopoda) recorded at various sites

Sites:	1	2	3	4	5	6	7	8	9	10	11	12	14	15	17	19	20	Tot
Polyxenus lagurus															X			1
Glomeris marginata	X	X	X	X		X	X	X	X				X	X		X		11
Craspedosoma rawlinsii						X												1
Nanogona polydesmoides	X			X	X					X	X							5
Chordeuma sylvestre	X	X																2
Melogona gallica				X		X												2
Melogona scutellaris				X	X	X	X											4
Brachychaeteuma bagnalli					X													1
Oxidus gracilis							X											1
Brachydesmus superus	X	X	X	X	X	X	X	X	X									9
Polydesmus angustus	X	X		X	X	X	X		X	X								8
Polydesmus coriaceus		X																1
Polydesmus inconstans		X						X										2
Macrosternodesmus palicola		X		X	X				X	X								5
Choneiulus palmatus							X											1
Proteroiulus fuscus	X	X		X	X	X	X		X								X	8
Blaniulus guttulatus	X	X		X			X	X	X	X								7
Archiboreoiulus pallidus				X	X													2
Boreoiulus tenuis				X	X		X		X	X								5
Nemasoma varicorne			X			X												2
Julus scandinavius	X	X		X	X		X									X		6
Ophyiulus pilosus	X	X	X	X	X	X	X	X	X	X	X							11
Allajulus nitidus		X		X			X											3
Cylindroiulus britannicus	X	X		X	X	X	X	X	X	X								9
Cylindroiulus latestriatus		X					X		X									3
Cylindroiulus londinensis	X																	1
Cylindroiulus punctatus	X	X	X	X	X	X	X	X	X	X	X					X		12
Cylindroiulus truncorum	X	X																2
Cylindroiulus vulnerarius	X																	1
Brachyiulus pusillus				X				X	X	X								4
Ommatoiulus sabulosus	X	X			X		X		X			X						6
Tachypodoiulus niger	X	X	X	X	X	X	X	X	X	X	X	X				X	X	14

The number of centipede species found was disappointingly low with eight geophilomorphs, one species of *Cryptops* and five lithobiomorphs, some of these from only one or two sites. This could be a consequence of weather conditions prior to and at the time of the meeting or to a generally poor chilopod fauna in the area. However, reports from Skye and Wester Ross (Barber, 2004), the Western Isles (Corbet, 2004) and Mull (Scott-Langley, 2002) all produced relatively small numbers of species.

The highlight among woodlice was the discovery of *Porcellio dilatatus* associated with an abandoned greenhouse at SAC, Auchincruive NS3823. Much more mundanely, the good number of records were obtained for *Armadillidium vulgare* near the northern limit of its range. The count of records was inflated a little by revisiting known Ayrshire sites at Troon Station and sites

discovered subsequently at Pinbain Bridge (Stirling, 1995) and Fairlie, but there were five new sites too. To date, the northernmost site for this species in the west is at Clydebank (Futter, 1988), though it has been found as far north as Tayside in the east. It was also pleasing to see records of *Haplophthalmus danicus* and *H. mengii sensu stricto* in West Central Scotland.

Table 3: Centipedes (Chilopoda) recorded at various sites

Sites:	1	2	3	4	5	6	7	8	9	10	11	12	21	Tot
Stigmatogaster subterranea	X	X							X					3
Schendyla nemorensis	X	X							X					3
Strigamia maritima		X												1
Geophilus easoni						X								1
Geophilus electricus			X				X			X				3
Geophilus flavus				X			X		X	X	X			5
Geophilus insculptus	X	X		X	X	X	X		X		X			8
Geophilus truncorum	X	X		X		X								4
Cryptops hortensis	X						X							2
Lithobius crassipes		X	X	X										3
Lithobius forficatus	X	X		X	X	X	X	X	X	X	X		X	11
Lithobius microps												X		1
Lithobius macilentus				X										1
Lithobius melanops	X	X		X		X	X			X				6

Table 4: Woodlice (Isopoda: Oniscidea) recorded at various sites

Sites:	1	2	4	6	7	8	9	10	11	12	13	14	15	16	17	18	20	Tot
Ligia oceanica		X				X	X				X			X	X			6
Androniscus dentiger	X	X	X	X	X	X	X	X	X			X						10
Trichoniscoides saeroeensis															X			1
Trichoniscus pusillus	X	X	X	X	X	X	X	X	X				X	X	X	X		13
Trichoniscus pygmaeus	X	X	X	X	X	X	X	X	X									9
Haplophthalmus danicus	X	X																2
Haplophthalmus mengii		X	X	X														3
Philoscia muscorum	X	X		X	X	X	X	X		X	X	X	X	X	X	X		14
Armadillidium vulgare		X			X	X	X	X		X	X			X		X		9
Oniscus asellus	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	16
Cylisticus convexus					X		X	X	X			X						5
Porcellio dilatatus					X													1
Porcellio scaber	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Porcellio spinicornis	X				X		X	X	X									5

ACKNOWLEDGEMENTS

Records were contributed by Wallace Arthur, Paul Baker, Tony Barber, Glyn & Dawn Collis, Gordon Corbet, Mike Davidson, Steve Gregory, Steve Hopkin, Paul Lee, Jim McLeary, Eric Philp, Richard Price and Helen Read. Paul Lee and Tony Barber helped the preparation of this report by providing comments on the records of millipedes and centipedes, and Gordon Corbet located details of Waterston's record of *Polyxenus lagurus*.

Bruce Philp made it possible for us to use accommodation and facilities at SAC, Auchincruive, and the smooth running of the meeting there was greatly facilitated by Carol Steel, Sally Gray and Archie Gillespie. Deirdre MacKinnon facilitated access to Culzean Country Park. Invaluable local knowledge was provided by Garth Foster, Gill Smart and Jim McLeary. Dawn Collis gave unstinting assistance before, during and after the meeting.

Scottish Natural Heritage provided financial support to the British Myriapod and Isopod Group for the meeting.

REFERENCES

Barber, A.D. (2004) Myriapoda from Wester Ross and Skye. *Bulletin of the British Myriapod and Isopod Group* **20**: 25-33.

Corbet, G.B. (2004) Myriapods on the Outer Hebrides. *Bulletin of the British Myriapod and Isopod Group* **20**: 34-37.

Futter, S. (1998) Pill woodlouse *Armadillidium vulgare* in Clydebank. *Glasgow Naturalist* **23** (3): 62-63.

Harding, P.T. & Sutton, S.L. (1985) *Woodlice in Britain and Ireland: distribution and habitat.* Huntingdon: Institute of Terrestrial Ecology.

Lee, P. (2006) *Atlas of the Millipedes (Diplopoda) of Britain and Ireland*. Sofia: Pensoft.

Scott-Langley, D.A. (2002) Myriapoda (Chilopoda and Diplopoda) from the Isle of Mull and associated islands, Scotland. *Bulletin of the British Myriapod and Isopod Group* **18**: 13-25.

Stirling, A. (1995). Pill woodlouse records from SW Scotland. *Glasgow Naturalist* **22** (5): 528-529.

Waterston, A.R. (1939) Millipede *Polyxenus lagurus* (L.), in Ayrshire. *Scottish Naturalist* No. **239**: 132.

STREET SAFARI: RECORDING MYRIAPODS AND ISOPODS AS PART OF A COMMUNITY PROJECT IN SHEFFIELD, UK

Peter Clegg & Paul Richards

Sheffield Galleries & Museums Trust, Weston Park Museum, Sheffield, S10 2TP, UK

INTRODUCTION

Street Safari was a two-year community project funded by the Heritage Lottery Fund running from February 2005 to spring 2007. Run by Sheffield Galleries and Museums Trust in partnership with the Sorby Natural History Society (SNHS), the project aims were to involve the people of six adjoining north Sheffield districts in identifying and recording the wildlife of their local area. A series of events and activities took place aimed at encouraging a new generation of naturalists and producing new records for what is an under-recorded area of a well-recorded city.

The recording area is based around twenty 1km grid squares in a 5x4 pattern. It comprises a series of heavily built up housing estates. It is a generally deprived community that is part of an area regeneration scheme funded with Single Regeneration Budget and Objective One European money. Much of the area is given over to council housing, some of which has been recently demolished leaving open spaces between properties which have been cleared to some extent and since become overgrown. Many of the gardens back onto open land that in many cases has been used as a dumping ground for all manner of domestic waste. An eyesore to many, but a delight for the myriapodologist!

For many people it has been a great surprise to find that the estates contain many diverse habitats including sandstone cliffs, open heathland, small areas of ancient woodland and a major river that in recent times has recovered from severe industrial pollution and now supports a wide range of wildlife. Almost all of these areas are linked together forming a green artery running through the recording area. One site, Wardsend Cemetery, situated between the river and a railway line and last used for burials in 1977, is a wonderful area of graveyard, old heath, meadow and woodland containing copious quantities of urban rubble, which provides homes for mammals and invertebrates.

The nature of the landscape in the Street Safari area means that the recording of myriapods and isopods has been high on the agenda for the initial wildlife walks and events. They have also proved very easy to both demonstrate in classrooms and find in the field. To make the most of the two-year project these ground invertebrates have provided subject matter all year round, and obviously never fail to deliver when a specimen is required. A good list of species could therefore be guaranteed, whatever the date or weather.

Sheffield is particularly well recorded for ground invertebrates due to the ongoing surveys that produced *The Millipedes, Centipedes and Woodlice of the Sheffield area* (Richards 1995). However, the north of the city was much less well covered than the more accessible suburbs elsewhere. Therefore not only were all records useful to the survey, but they were also easily placed in the context of the rest of the city. It was possible to say that every record our contributors made was of real significance to an active data set.

RECORDING EVENTS

Many parents, unemployed and elderly people engaged with the street safari project, but the majority of events involved local primary school children. At several 'children's university' events and after-school clubs, easily identified species were introduced for the children to become familiar with. "Rosy woodlice" (*Androniscus dentiger*) and "Stripy centipedes" *(Lithobius variegatus*) are some of the more obvious, but other seemingly difficult millipedes could also be discussed. Never underestimate the power of the word "genitalia" when trying to engage the attention of a 10 year old or their parents!

Sessions were developed looking at camouflage and habitat types, before going in search of real invertebrates. Sometimes prior preparation was required, laying logs and bricks into an environment some weeks in advance of a session. Resources were provided to help collect and identify specimens. Another useful tool was "Nature Notebook". This is a user-friendly interface for the RECORDER biological recording software, which was developed for the "Nature Lab" area of the new Sheffield Weston Park Museum. This allows users to select from around 200 readily identifiable species, locate themselves on a map, add the date and their name and then enter the record into the main dataset. For invertebrates this includes *Glomeris marginata, Ommatoiulus sabulosus*, *Nanogona polydesmoides*, *Armadillidium vulgare* and *Lithobius variegatus* among others. Running this in the field on a laptop PC allows not only a quick reference identification check, but also the ability to add a record instantly to the dataset and see immediate feedback and context for the record as they see their new record mapped among the dots for the rest of the city. Other species were identified by the authors and members of SNHS. Training workshops were offered to develop identification skills further.

PRINCIPLE RESULTS

The introduction to a breadth of groups through Nature Notebook and other activities hopefully gave a wide base of knowledge for the participants to build on. They could become quite confident in the familiar species and were in turn more excited by the new things they found which took a bit more effort to identify. As more 'common' species were found, equally, specimens new to the recorders turned up, which would help to engage their interest further.

The area adjacent to a landfill site at Parkwood Springs provided records for the common pill woodlouse (*Armadillidium vulgare)* that is anything but common in Sheffield. This was in a new 10km square at only its third site within the city.

A number of locations in one square produced the nationally scarce millipede *Brachychaeteuma bradeae* (Photo 1). Several male specimens were found and comparisons of gonopods showed them to be very variable between the *B. bradeae* and *B. bagnalli* condition. Although on balance they were closer to *B bradeae* in overall appearance, the great variation within a single population lends further fuel to the possibility that these two should be considered as a single, very variable species (Figure 1). Since this species is best found as an adult in winter (Lee 2006), it is an example of how valuable myriapod recording can be for inspiring beginners because it offers the opportunity to make significant discoveries at times when other wildlife groups are unavailable.

A significant find for Street Safari was the discovery of the centipede *Cryptops anomalans* (Photo 2) under a well-embedded stone, in an area of rubble and broken glass at the bottom of a garden next to a wood in Firth Park. This magnificent beast measured 60mm long and was immediately spotted as something out of the ordinary. Nothing else in Sheffield looks remotely similar, apart

from some wayward *Lithobius pilicornis*, which are equally far from their normal range in the south of England.

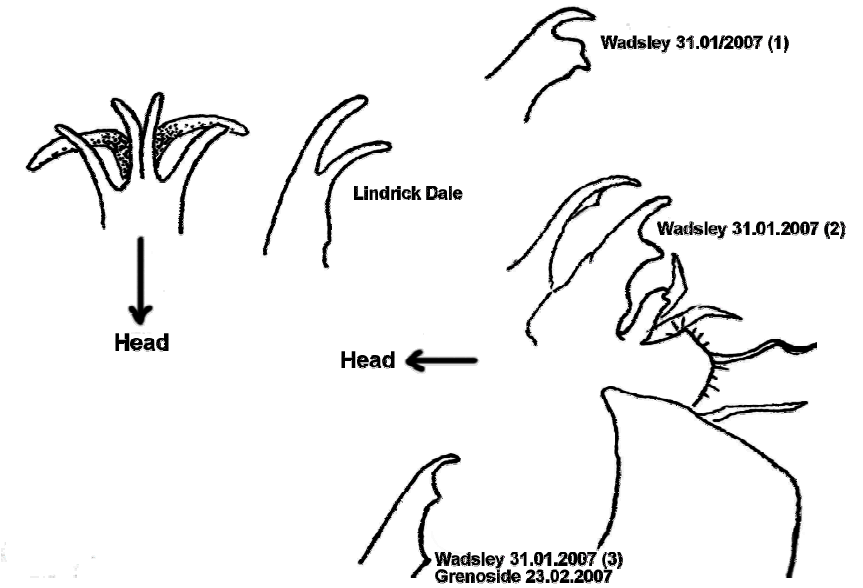


Figure 1: Gonopods of *Brachychaeteuma bradeae* from the Sheffield area

Chasing after dangerous carnivores is always a bonus on a guided walk, especially when it inflicted a noticeable bite on the walk organiser, Paul Richards, as he grabbed for it. The small puncture marks in his finger and localised redness and swelling made for a much more memorable trip for the participants! The rubbish and tipping around the area provide many such synanthropic opportunities when 'on safari'. In 1988 when the latest maps were published (Barber & Keay 1988) there were only 20 records of this species from Britain and Ireland, though today there are around twice that number recorded. It is mostly known from London and the southeast of England, although it has been recorded in Cardiff and Bristol. The Sheffield record is the first north of the Home Counties. It was a big surprise to find such a large and obvious creature and shows the value of Street Safari in getting into the less easily surveyed or less appealing synanthropic sites. Both *Lithobius pilicornis* and *Cryptops anomalans* again demonstrate the value of looking at myriapods in this educational setting. They offer exciting urban discoveries that really inspire new recorders to seek out the next 'first record' for the area.

Photo 1: *Brachychaeteuma bradeae*

Photo 2: *Cryptops anomalans*

Among the millipedes, significant new records were made of some less often recorded species. *Melogona scutellaris, Macrosternodesmus palicola, Archiboreoiulus pallidus, Boreoiulus tenuis* and *Polydesmus inconstans* were found, often several kilometres from previously known localities. In addition to the myriapods and isopods, the pseudoscorpion *Roncus lubricus* is a species that has only recently been found in Sheffield through pit-fall trapping in urban sites. It turned up in Street Safari as only the fifth record for the area.

In addition to these recording highlights there is now a much better coverage of the commoner species to give even greater validity to the distribution maps. A selection of appended 'before and after' maps shows the improvement there has been in our knowledge of the invertebrate fauna for this area. In total Street Safari added 1590 records of all species, of which well over a quarter (443) were myriapods and isopods. Table 1 shows the complete list of records for each species by 1km grid square.

For very practical reasons the national atlases for invertebrate distributions use 10km and even 100km national grid squares as the basic recording unit (Lee 2006, Barber & Keay 1988, Harding & Sutton 1985 and Kime 1990). All the records for Street Safari occur within a single 10Km square when mapped at a national scale. However, as the maps and data show, there is a huge amount to be gained from focusing in to the 1Km or closer scale for local distribution studies. Certainly for Street Safari it was also much more meaningful to compare species occurrences from adjacent 1km squares than for areas some miles away in virtually 'foreign' parts of Sheffield. Not only did this have more significance for people that live there, but it also helps to pick out the reality of local distributions as influenced by quite small changes in neighbourhood habitats. For example, the topography of Sheffield is such that one housing estate may have areas sitting above a steep, sandy, south-facing deforested embankment (Parkwood springs), while others are clustered around a damp ancient woodland (Roe wood). Both are in the same 10km grid square and Sheffield district, but each provides a very different species list for adjacent 1Km squares. At another level, some areas of parkland are mown and 'cared for', while others are left derelict and unmanaged. At an even closer focus, there are obvious differences between one garden and that next door that were noted but these do not show up even at the 1km level of recording. Observing these changes in biodiversity at such a small scale is eye opening for local residents and helps to generate a greater sense of ownership to the community. It is also beneficial to local conservation, ecological and planning authorities responsible for the management of these environments.

SOCIAL OBJECTIVES

Of the non-recording objectives achieved, it was most pleasing to find that the communities as a whole really latched on to what Street Safari was about and it became quite well-known in the area. Plans to cascade skills from experts to beginners were partially achieved, but are likely not to reach fruition unless considerable ongoing relationship with the museum is maintained. Street Safari leaves a 'legacy unit' of recording resources, including a laptop with Nature Notebook, collecting equipment, identification guides, binoculars, GPS and recording cards with which to continue the previous activities. This legacy also includes funding for a good number of school sessions within the museum on curriculum-based biological recording topics. Further to this the museum now offers a venue to develop a junior nature club where the more enthusiastic children can continue to feed their interest.

Table 1: Chart showing species occurrences by 1 Km grid square

SPECIES: Millipedes	**Grid Ref. SK:**	**3290**	**3291**	**3292**	**3293**	**3390**	**3391**	**3392**	**3393**	**3490**	**3491**	**3492**	**3493**	**3590**	**3591**	**3592**	**3593**	**3690**	**3691**	**3692**	**3693**
Glomeris marginata				x	x																
Nanogona polydesmoides		x			x	x													x	x	
Melogona scutellaris		x												x					x	x	x
Brachychaeteuma bradeae		x							x												
Brachydesmus superus																x					
Polydesmus angustus					x																
Polydesmus coriaceus							x		x	x				x		x		x			
Polydesmus inconstans										x											
Macrosternodesmus palicola		x							x	x											
Ophiodesmus albonanus									x												
Proteroiulus fuscus			x		x	x	x			x				x					x	x	
Blaniulus guttulatus		x				x				x	x				x					x	x
Archiboreoiulus pallidus							x			x											
Boreoiulus tenuis		x	x		x		x		x	x	x								x	x	x
Nemasoma varicorne														x		x					
Julus scandinavius														x							
Ophyiulus pilosus		x												x				x			
Cylindroiulus britannicus			x		x	x								x		x			x		
Cylindroiulus punctatus		x			x	x	x		x	x				x		x	x	x	x	x	x
Ommatoiulus sabulosus				x																	
Tachypodoiulus niger			x	x	x	x	x		x	x				x		x					x
Centipedes																					
Stigmatogaster subterranea		x			x			x	x	x	x	x		x			x	x	x		
Schendyla nemorensis		x							x												
Geophilus electricus		x																			
Geophilus insculptus (*alpinus*)					x		x														
Geophilus flavus										x										x	x
Geophilus truncorum							x														
Cryptops anomalans																			x		
Cryptops hortensis			x							x				x			x	x			
Lithobius forficatus			x		x	x		x		x		x	x	x				x	x		
Lithobius microps				x	x	x		x	x	x	x		x	x	x		x	x		x	x
Lithobius variegatus			x	x	x					x		x		x					x		
Woodlice																					
Androniscus dentiger																	x	x			
Trichoniscus pusillus agg.		x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Trichoniscus pygmaeus									x									x		x	
Armadillidium vulgare										x											
Oniscus asellus		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Philoscia muscorum		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x		x	x
Porcellio scaber		x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x
Pseudoscorpion																					
Roncus lubricus				x																	

THE FUTURE

If funding can be secured, Street Safari will be expanded to communities across the city and make comparisons between each recording area. These will be in equally under-recorded sites and will offer the opportunity to add a considerable amount of new data on Sheffield's invertebrates. The city's existing biological records centre and the museum's 125 year run of weather data will also allow the city-wide data to enhance studies on climatic change studies as well as basic distribution information. Entomological studies have already shown clear northward distributional advances across the city in recent years and Street Safaris would be well placed to capture these small faunistic changes and relate them to environmental conditions.

For the current phase of Street Safari, the success of the project will be judged not only by the number of people (over 1000) who have become involved but also by the amount of new biological records generated. If Street Safari has meant that people have become more aware of the local wildlife and that some have been enthused enough to carry on recording and submitting records when the project is over then it will have been even more worthwhile. The test of this will be seen by the number of records that continue to be received from northern suburbs. In the meantime the biological data set has been enhanced enormously and a snapshot has been captured of what was formerly a big blank on the maps for all species, not just the myriapods.

ACKNOWLEDGEMENTS

Thank you to Monteney, Mansel and Foxhill schools and everyone who took part in Street Safari and recorded things they'd never heard of. Thank you to the members of the Sorby Natural History Society for sharing their skills. We're especially grateful to Alistair McLean for all his efforts in sorting out the databases and producing the maps.

REFERENCES

Barber, A.D. & Keay, A.N. (1988) *Provisional atlas of the centipedes of the British Isles.* Huntingdon: Biological Records Centre.

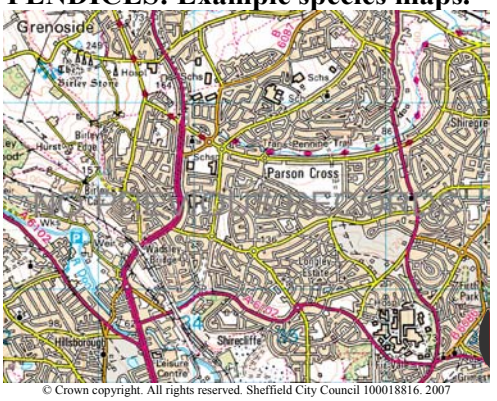
Harding,P.T. & Sutton, S.L. (1985) *Woodlice in Britain and Ireland: distribution and habitat.* Huntingdon: ITE.

Kime, R.D. (1990) A provisional Atlas of European Myriapods Part 1. *Fauna Europaea Evertebrata* Vol 1.

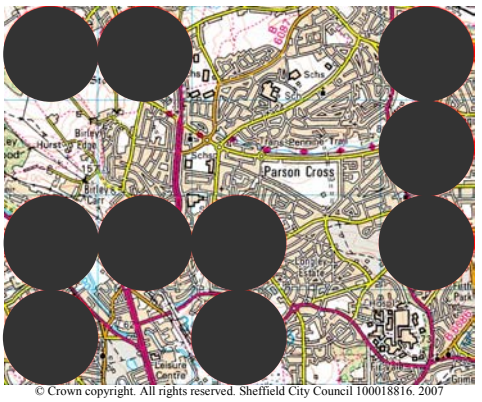
Lee, P. (2006) *Atlas of the Millipedes (Diplopoda) of Britain and Ireland.* Series Faunistica No **59**. Pensoft, Sofia.

Richards, J.P. (1995) Millipedes, Centipedes and Woodlice of the Sheffield Area *Sorby Record Special Series,* No.**10**. Sorby Natural History Society/Sheffield City Museum.

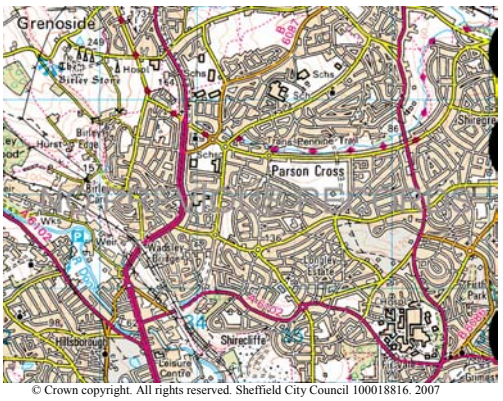
APPENDICES: Example species maps.



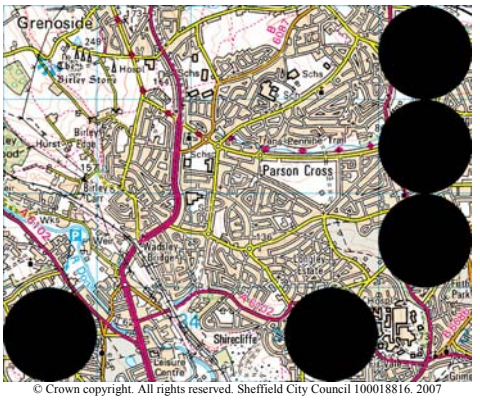
Boreoiulus tenuis, pre 2005



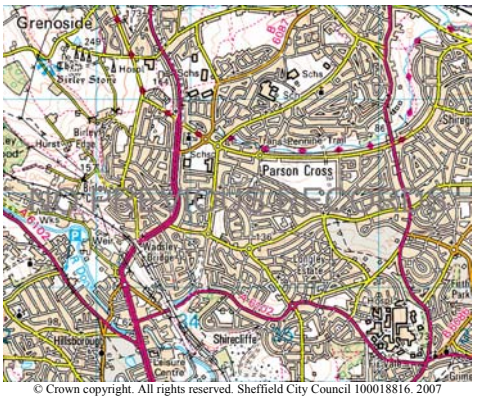
Boreoiulus tenuis, with Street Safari records



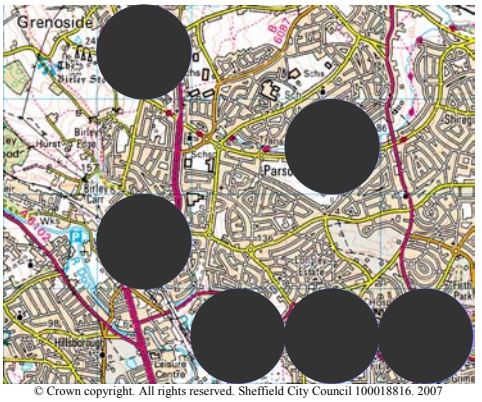
Melogona scutellaris, pre 2005



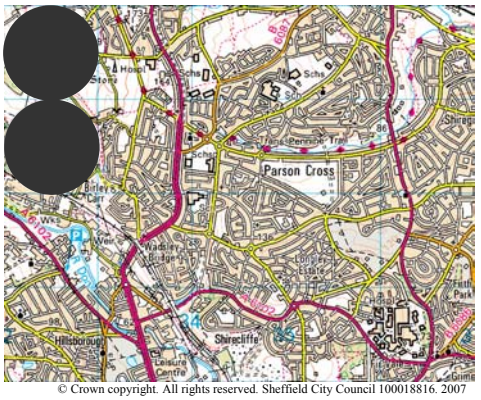
Melogona scutellaris, with Street Safari records



Polydesmus coriaceus, pre 2005

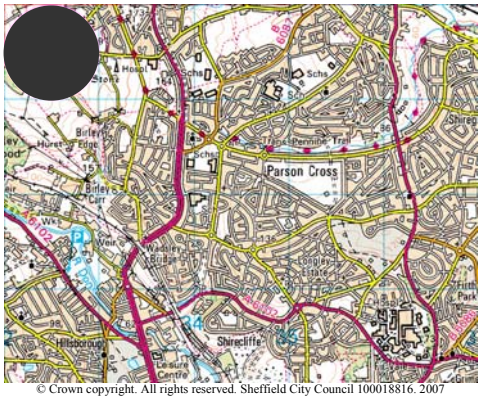


Polydesmus coriaceus, with Street Safari records

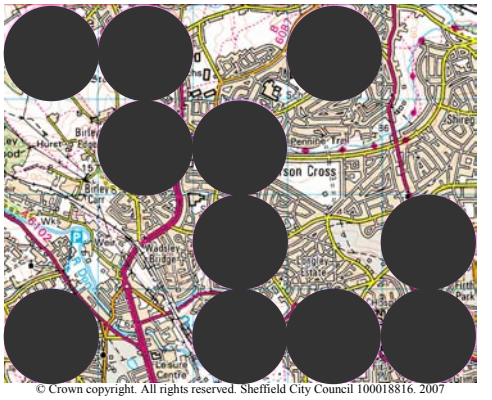


Tachypodoiulus niger, pre 2005

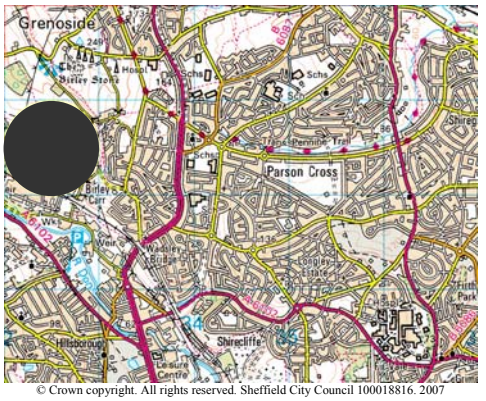
Tachypodoiulus niger, with Street Safari records



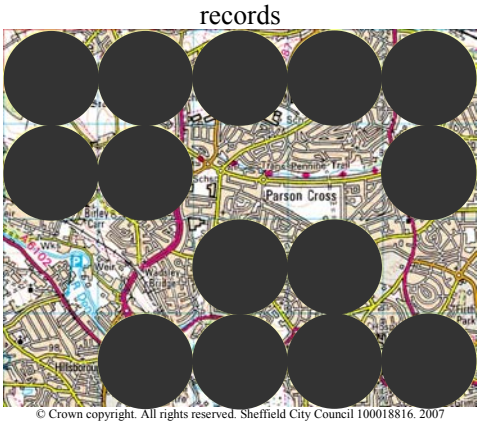
Stigmatogaster subterranea, pre 2005



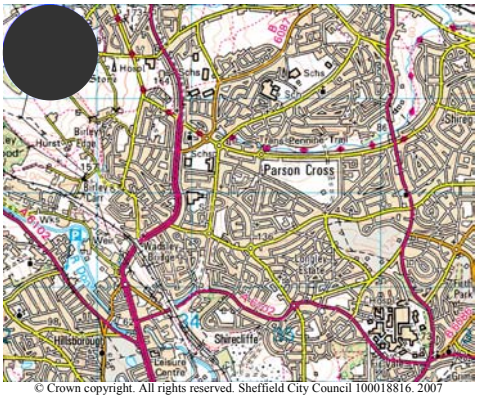
Stigmatogaster subterranea, with Street Safari records



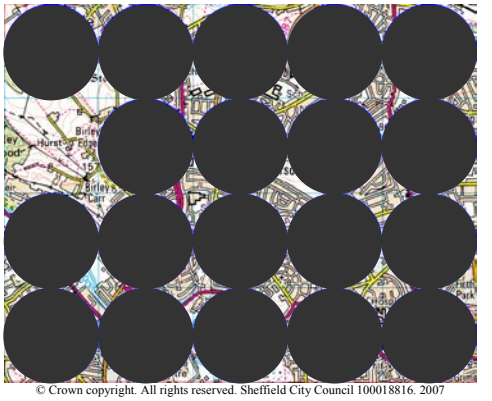
Lithobius microps, pre 2005



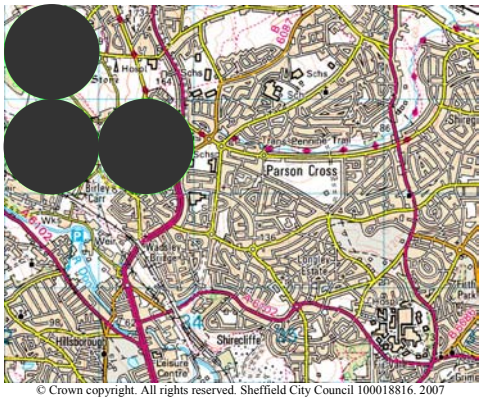
Lithobius microps, with Street Safari records



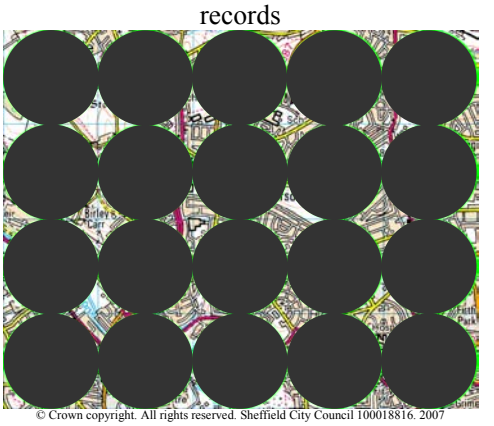
Trichoniscus pusillus agg., pre 2005



Trichoniscus pusillus agg., with Street Safari records



Oniscus asellus, pre 2005



Oniscus asellus, with Street Safari records

BOOK REVIEW

ATLAS OF THE MILLIPEDES (DIPLOPODA) OF BRITAIN AND IRELAND BY PAUL LEE (2006)

Published by Pensoft, Bulgaria on behalf of the Biological Records Centre. (Pensoft *Series Faunistica* no. 59.) ISBN 10: 954-642-277-0; hbk, 32 euros.

This atlas is the first in a new series, in a new style, to be published by Pensoft for the BRC. Previous 'definitive' atlases, as distinct from 'provisional' ones, have been produced by various publishers in a variety of formats, the nearest in style to the millipede one being that for land and freshwater molluscs published by Harley Books in 1999. The smaller number of species of millipedes (56 species mapped compared with 212 molluscs) has allowed a more generous format, with text and map for each species on facing pages, and a coloured photograph following the text for 24 species.

Comparison with the *Preliminary Atlas* published by the BRC in 1988 shows the enormous amount of recording activity since then, mainly by members of the British Myriapod Group (now the British Myriapod and Isopod Group). In spite of the annual field meetings targeting under-recorded areas, recording intensity is still very uneven. However a map showing number of records per square allows this to be taken into account, and a valuable innovation is indicating on all the species maps, by light grey shading, those squares from which at least one record has come, leaving the totally unrecorded squares white.

Of the nine mapped species that are additional to those mapped in the 1988 atlas, five have been newly discovered in the region since 1988 and four were listed in 1988 on the basis of very few records. Amongst these new species most are from the south of England or Ireland, but one, *Melogona voigti*, is from the east of Scotland. With regard to the last it is unfortunate that the map of the closely related *M. gallica* treats all records as *M. gallica s.l.* without distinguishing those that have been certainly identified as *M. gallica s.s.*, including at least two in Scotland.

The date-classes used are pre-1980 and 1980 onwards. This would have been better indicated on each map rather than buried in the introductory text, and as is so often the case the final cut-off date is even more difficult to find – it is mid-2003, with a few later additions to 2005. Subsequent data sets that will add significantly to the coverage are the results of the field meeting in Ayrshire in 2006 and of a survey of invertebrates on Scottish Wildlife Reserves in 2002-5, funded by the Heritage Lottery Fund.

The text includes useful summaries of habitat (with statistics in an appendix), phenology, and distribution elsewhere. Six additional species that have only been found indoors, mainly in heated glass-houses, are not mapped but are dealt with briefly following the maps. However it is frustrating that no distinction is made between out-door and glass-house records on the maps – it would be useful to show how far north species can survive out-doors. For example in the case of *Choneiulus palmatus* in my local patch, Fife, I know of one glass-house and three out-door sites, but what about those further north in Angus? Having a northern bias I would also have liked to see an indication of the altitude limits of those species that penetrate the highlands.

When it comes to interpretation of the maps much of the discussion regarding the history of each species is necessarily speculative. In 1962 I wrestled with the problem of interpreting the 'Lusitanian' element in the fauna of Ireland (*Science Progress* 50:177-191), including the millipede

Polydesmus coriaceus (*P. gallicus* as it was), arguing that most species arrived by human-aided dispersion rather than on land bridges. No detailed maps were then available but those that now exist, and developments in Quaternary history in general, do I believe support that view. In the case of *Enantiulus armatus*, apparently confined to Devon and Cornwall, to the view 'there is no reason . . . to assume it is anything other than native', I would add that there is equally no reason to assume that it *is* native – and with its apparent absence from the rest of southern England I would tip the probability in favour of introduction. Opportunities for human-assisted transport seem to be increasing all the time, with movement of farm stock, the massive trade in garden plants mostly from south to north and increase in travel generally. We don't have the advantage of the conchologists who have extensive subfossil finds to provide evidence.

As a one-time organiser of a national recording scheme I know the trials and tribulations and demands on time that are involved. The past and present organisers are all to be congratulated on achieving a superb result, which will provide a valuable basis for monitoring and further discovery in the future.

Gordon B Corbet

SHORT COMMUNICATIONS: OBSERVATIONS

CYLINDROIULUS LONDINENSIS AND *C. CAERULEOCINCTUS* AT WESTONBIRT, GLOUCESTERSHIRE

John Harper

4 Fairhome, Gilwern, Abergavenny, NP7 0BA, UK

During a field meeting of the Gloucestershire Invertebrate Group, I found the large, thick, black snake millipede *Cylindroiulus londinensis* under logs and broadleaf litter in the woodland clearing (ST850895) near the garden plant sales centre. The only other record of this species from the Cotswolds is from the North Cotswolds in 10km square SP12 (Lee 2006). In addition, the very similar *C. caeruleocinctus* was recorded in the same clearing, and also in the adjacent plant centre, but it is not known whether there was any difference in the microhabitats of the two species here. *C. caeruleocinctus* is sparsely scattered in the Cotswolds but there is a dense cluster of records to the east in Buckinghamshire and Oxfordshire, clearly this being partly the result of recorder effort! At one time the two species were considered to be conspecific (Blower 1985) but they are clearly distinguishable - there were no intermediates in the Westonbirt samples.

What is especially interesting is that the two species have only once previously been found together in the UK - in a wood near Orpington in Kent by Kime (1978). Being closely related taxonomically, one would think that, ecologically, they normally would be mutually exclusive.

REFERENCES

Blower, J.G. (1985) *Millipedes.* Synopses of the British Fauna (New Series) No. 35. London: (Linnean Society) E.J. Brill & Dr W. Backhuys.

Kime, R.D. (1978) The distribution of millipedes in the south of England. A preliminary survey. *ABH. Verh. naturwiss. Ver. Hamburg. (NF)* **21/22**: 135-147.

Lee, P. (2006) *Atlas of Millipedes of Britain and Ireland*. Pensoft.

INSTRUCTIONS FOR AUTHORS SUBMITTING ARTICLES TO THE BULLETIN OF THE BRITISH MYRIAPOD & ISOPOD GROUP

The Bulletin is published by The British Myriapod & Isopod Group. c/o H.J. Read, 2 Egypt Wood Cottages, Egypt Lane, Farnham Common, Bucks. SL2 3LE. U.K

BACK NUMBERS AND SUBSCRIPTIONS

Back numbers and subscriptions are obtainable from P. Harding, 60 Boxworth Road, Elsworth, Cambridge, CB3 8JQ. Email: pha@ceh.ac.uk Subscriptions from countries other than Britain are welcome.

SUBMITTING MANUSCRIPTS – GENERAL

The editors are: A.D. Barber, Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD, U.K. Email: tony@barber-jones.com (centipedes), H.J. Read, 2 Egypt Wood Cottages, Farnham Common, Bucks. SL2 3LE, U.K. Email: helen.read@dsl.pipex.com (millipedes) and S.J. Gregory, Northmoor Trust, Little Wittenham, Nr. Abingdon, Oxon. OX14 4RA. Email: steve.gregory@ northmoortrust.co.uk (terrestrial woodlice and freshwater-slaters).

The Bulletin accepts manuscripts on any aspect of myriapods or terrestrial and freshwater isopods. Items should be about British species, by British workers or likely to be of interest to British workers. Comparisons of British fauna and that of other European countries would be welcome.

Manuscripts should be submitted to the appropriate editor, preferably on disk or via email and ideally in a format compatible with MS WORD. Manuscripts can also be submitted on paper.

SUBMITTING MANUSCRIPTS – LAYOUT AND FORMAT

Please consult previous editions for layout and format of references and submit items as close to this as possible. Editors may return items for reformatting if they do not conform to the house style.

There is no page limit, but for large items please check with an editor before submission. Short notes can be submitted for the 'Miscellanea' or 'Short Communications' sections.

Figures should be in black ink and clearly drawn. They should be of a size that can be reduced to fit on an A4 page. Originals or good quality copies should be submitted with the text. Figures can also be submitted electronically but originals may be requested if electronic versions are not of suitable quality. Please contact one of the editors regarding reproduction of photographs and also reproduction of figures in colour.

References should follow the format of recent issues, standard abbreviations for journal titles should be used (or the full title of the journal). Layout should be as in recent editions of the Bulletin; the following are examples:

Eason, E.H. (1964) *Centipedes of the British Isles*. London: Warne.

Blower, J.G. (1985) *Millipedes*. Synopses of the British Fauna (New Series) No. 35. London: (Linnean Society) E.J. Brill & Dr W. Backhuys.

Eason, E.H. & Serra, A. (1986) On the geographical distribution *of Lithobius variegatus* Leach, 1814, and the identity of *Lithobius rubriceps* Newport, 1845 (Chilopoda: Lithobiomorpha). *J. nat. Hist*. **20**: 23-29.

Barber, A.D. (2000) The British species of *Cryptops*. *Bull. Br. Myriapod Gp.* **16**: 30-35.

REVIEWING AND PRINTING

All manuscripts will be peer reviewed. The editors reserve the right to hold articles over for a future year and may decide not to produce a Bulletin in years where there is insufficient copy.

Every effort is made to send proofs to authors for checking but this cannot be guaranteed for late submitted articles.

No reprints are available but authors will receive a pdf file of their article.

Please contact one of the editors for further details, specimen copies of the Bulletin or any queries.

SUBMISSION & PUBLICATION DATES

All articles should be submitted by 1st February for inclusion in that year's Bulletin. Late items may be included subject to the editors' discretion.

The publication date is anticipated to be 1st June each year, the editors do not guarantee this and reserve the right to miss years if copy is lacking.