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Invertebrate Conservation News



Number 76

June 2015



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HARVARD
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ISSN 1356 1359

Editor: David Lonsdale

A publication of The Amateur Entomologists' Society



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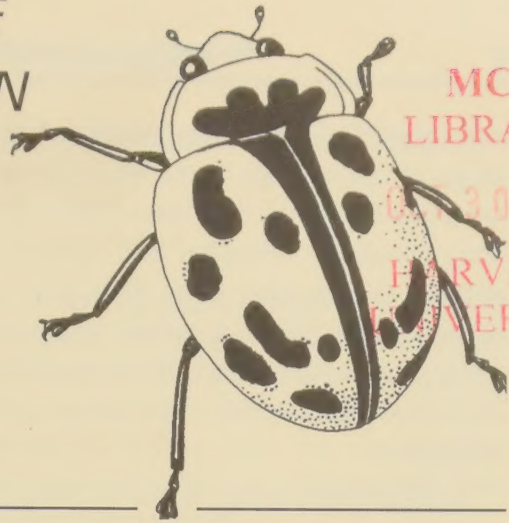
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INVERTEBRATE CONSERVATION NEWS



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No. 76, June 2015

EDITORIAL

This edition of *ICN* is taking shape during the UK 2015 general election, the results of which will be known before publication. The political campaigners have mostly steered clear of environmental or biological conservation, perhaps because they see votes in more conventional issues, such as the economy, health, education and housing. Conventional issues are, however, relevant to wildlife conservation. For example, a large expansion of house building in the UK would help to match the supply with the demand but it would cause consternation about consequent loss of habitat. At first sight, however, urban areas cover so little of the total UK land area (7% in 2011, according to the UK National Ecosystem Assessment), that a few million new houses might leave plenty of space for wildlife.

Although urbanisation still accounts only for a small percentage of the UK land area, the percentage is obviously higher in some regions. Also, much of the 'green' land area is either intensively farmed or consists of uplands that are inhospitable to many warmth-loving species. Another often neglected fact is that many of the sites envisaged for development are refugia for a wide range of species that cannot thrive in an intensively managed and fragmented landscape. These refugia often occur, for example, in 'brownfield sites' and lowland heaths. Also, large-scale housing developments exacerbate the unsustainable abstraction of groundwater, rainfall run-off and flooding, all of which have mainly negative consequences for wildlife.

In the UK, as elsewhere, a high proportion of new houses have very small gardens. High-density developments can help to minimise urban sprawl but they are rarely observed to allow much space for habitat. Where habitats



already exist, earth-moving machinery usually obliterates them in the early stages of construction. Later, when homeowners take possession, most seem unwilling to allow a little native plant life and associated habitat to develop. Many choose to obliterate their already-small green space with paving or decking. On the other hand, there have been schemes for the preservation of pre-existing habitat in certain housing projects in the UK. In other cases, where houses have been built on agricultural land, space has been set aside for habitat creation, as for example at Camborne, Cambridgeshire, in eastern England.

Unfortunately, conservation is often limited merely to mitigating harm caused by change in land use. There is, however, scope for a more positive approach, for example by releasing green space that has been unnecessarily obscured. Perhaps, for example, there could be tax incentives for removing paving and decking that now cover many domestic gardens. Also, it would be helpful to improve the habitat value of excessively manicured urban green space. For example, wildlife could be helped to colonise municipal parks that consist mainly of lawn, surrounded by lollipop trees without any decaying wood habitat in sight. Local authorities receive complaints if they fail to keep public open spaces neat and tidy but, as studies have demonstrated, they could win public acceptance by maintaining only just enough formality and tidiness to show that the place is being cared for.

If habitats could be allowed to develop on a larger proportion of urban green space, the resulting reduction in maintenance costs could be seen as helpful when public budgets are stretched in the UK and in many other countries. Habitat enhancement might therefore even find favour with the next UK government, irrespective of its political complexion.





NEWS, VIEWS AND GENERAL INFORMATION

The Riverfly Partnership

Riverflies include the up-wing flies or mayflies (Ephemeroptera), caddisflies or sedges (Trichoptera) and stoneflies (Plecoptera). All are critically important to the ecology of freshwater systems, both free-flowing (rivers, streams) and still (ponds, reservoirs, ditches) and can be prime indicators of water quality. Among these groups of insects there are eight species designated as Biodiversity Action Plan species in the UK, meaning that there is a government responsibility to protect these species.

The Riverfly Partnership (RP), formed in 2008, aims to protect the water quality of the UK's rivers, to further the understanding of riverfly populations and actively to conserve their habitats. All these are difficult tasks, given the nature of the habitat. A network of nearly 100 partner organisations from entomologists to anglers and relevant authorities, the RP undertakes important monitoring and recording activities as well encouraging greater public awareness and engagement.

With 20 active RP hubs across the four nations of the UK, there is potential to make a real difference: for example, in 2013 it was volunteer RP monitors who detected a serious pollution incident on the River Kennet. RP volunteers augment the Environment Agency's sampling regime and, with formal links to Buglife - The Invertebrate Conservation Trust (the group is chaired by Vicky Kindemba, Freshwater Officer at Buglife), they contribute to distribution mapping and conservation plans. To get involved go to: <http://www.riverflies.org/conservation>.

British Horse Society: ragwort guidance note

The British Horse Society (BHS) has produced a new ragwort toolkit, following discussions with other interested organisations. The new BHS toolkit takes account of the ecological importance of Common ragwort *Senecio jacobaea* and it generally reflects the need to avoid the misinformation that has often prevailed. The front page includes the following highlighted statement: *"The BHS does not advocate blanket removal of all ragwort. The plant plays a significant role in biodiversity, providing a habitat and food for many types of insect, plus pollen for bees. Ragwort has an important place in the British ecosystem in areas away from livestock grazing or forage*



production land, and should only be removed from high risk areas." As noticed by Matt Shardlow of Buglife, however, the accompanying interactive guidance incorrectly states: " .. spread of ragwort onto high risk land (see below) is an offence". The official Ragwort Code, published by the relevant UK government department, Defra, remains in place and can be found at: <http://preview.tinyurl.com/pub5uub>. It dates back to 2004 and there could be scope to revise it in the light of a report which was commissioned by Defra (Laybourn *et. al.*, 2013).

References

- BHS (2015). *Toolkit: Dealing with Ragwort*. British Horse Society, UK. <http://preview.tinyurl.com/knp5sx9>
- Laybourn, R., Kessell, D., Jones, N., Conyers, S., Hallam, C. & Boatman, N. (2013). Review of evidence concerning ragwort impacts, ecology and control options. *Report to Defra*, October 2013. <http://preview.tinyurl.com/mmpzy8e>



SITES AND SPECIES OF INTEREST

Global freshwater crayfish decline

A recent data analysis (Richman *et al.*, 2015) examines the worldwide decline of freshwater crayfish and the underlying factors. Applying international criteria, the authors have estimated the risk of extinction of 590 crayfish species, for which data were available. On this basis, their alarming conclusion is that "nearly one third of the world's crayfish species are threatened with extinction". The authors go on to say, "this level of threat exceeds that of most terrestrial and marine taxa, but is similar to that of the freshwater crabs and amphibians highlighting the imperilled status of freshwater species."

Four species have been assessed as being already extinct and a further four as possibly extinct. The four extinct species are *Cambarellus alvarezii* and *C. chihuahuae*, previously found in Mexico, and *Procambarus angustatus* and *Pasifastacus nigrescens*, previously found in the USA. On the other hand,



only 5% of North American crayfish species were assessed as being at risk from climate-related threats, compared with 65% of Australian species.

The authors identify European crayfish species as facing more threats than those in other continents. The most widespread of these threats is the influence of invasive species. In particular, the introduced American signal crayfish *Pasifastacus leniusculus* not only competes with native European species but also carries a fungus-like pathogen, *Aphanomyces astaci*, which causes crayfish plague (see previous editions of *ICN*: e.g. Nos. 58 and 74). The authors state that rising temperature is also implicated, by favouring an expansion in the range of *P. leniusculus* and *A. astaci*. On the basis of presence/absence data, two European species have declined very severely, despite their wide geographic ranges. These are the White-clawed crayfish *Austropotamobius pallipes* (native to the UK), with an estimated decline of between 50 and 80%, and the European Noble crayfish *Astacus astacus*, with a global decline of between 50 and 70%.

Here in the UK, there is a last ditch attempt to save our native *A. pallipes* by developing "ark" populations, isolated from the invading Signal crayfish and the associated plague (see *ICN* Nos. 58, 59 and 74). Extinctions can, however, occur even at the most favoured sites, as shown by the story of Ensor's Pool, in Warwickshire in the English Midlands. This 3.8-hectare site, which includes a 1-hectare former marl pit, was designated as a Special Area of Conservation (SAC) because it supported a very large population of *A. pallipes* (about 50,000) in standing water and was a "good example of a refuge site" because of its isolation from rivers (JNCC, undated). According to a related report (JNCC, 2011), the site was one of a mere three English SACs where populations of *A. pallipes* were isolated from both the Signal crayfish and the plague pathogen. As reported in the *Wildlife reports* section of *British Wildlife* (February 2015), however, recent diving surveys have failed to find a single native crayfish at this site.

The global decline of crayfish species reflects the wider plight of freshwater invertebrate communities, as revealed by other recent studies (see *ICN* Nos. 69 and 74). This is not much helped by conservation efforts that, in an all too familiar manner, concentrate on charismatic species or those with a recognised economic value (e.g. by virtue of a commercial or leisure association). Crayfish are arguably more charismatic and/or economically valuable than many other invertebrates but evidently not enough to receive the protection that they need. Also, as pointed out by Richman *et al.* (*op. cit.*), in order to conserve "freshwater biodiversity hotspots", major gaps in



data need to be filled. Research is needed and it requires funding, with the support of public opinion mobilised through greater awareness. The authors conclude their review by stating "*Conservation planning needs to shift from a reactive to proactive approach if we are to safeguard freshwater systems against anthropogenic environmental damage.*"

References

- JNCC (undated). *SAC Selection: Ensor's Pool*. Joint Nature Conservation Committee, Peterborough, UK. <http://preview.tinyurl.com/nefwbj5>
- JNCC (2011). *White-clawed crayfish (England)*. Joint Nature Conservation Committee, Peterborough, UK. <http://preview.tinyurl.com/pqsb53c>
- Richman N.I., Böhm, M., Adams, S. *et al.* (2015). Multiple drivers of decline in the global status of freshwater crayfish (Decapoda: Astacidea). *Phil. Trans. R. Soc. B* **370**: 20140060. <http://dx.doi.org/10.1098/rstb.2014.0060>

Wood Whites in Devon, south-west England

All too often, reports in *ICN* are dominated by stories of species under threat, habitat loss and the pursuit of "economic growth" at any cost. It is rewarding then, to be able to report on a small success for a delicate and beautiful species of butterfly, the Wood White *Leptidea sinapis*. One of the most dainty of European butterflies, the Wood White is a Biodiversity Action Plan Priority species in the UK, having suffered serious decline from changes in woodland management (particularly the decline of traditional coppicing) and habitat loss. It is not a very mobile butterfly and so does not readily re-colonise areas of restored potential habitat.

While many habitats once favoured by the Wood White have been lost in the last 100 years, Devon Wildlife Trust's Meeth Quarry holds the strongest remaining colony in Devon and is one the most important sites for this butterfly in the UK. A new project to monitor this colony is due to start in the summer of 2015, sponsored by several industrial partners. Data will be gathered using a MRR (Mark, Release, Recapture) method with the aim of better estimating the size of the colony and following the movements of individuals around the quarry site. The Trust will thereby be able to "fine tune" the management of the site in order to further enhance the survival of the colony. See: <http://www.devonwildlifetrust.org> for more information.



Extinctions of aculeate pollinators in Britain

Observation data again come into the fore in a paper published in the prestigious journal *Science*. Using 500,000 records, held by the Ants, Bees and Wasps Recording Society, the authors focus on British bees and flower-visiting wasps (aculeate Hymenoptera), looking for species that have been recorded but have later ceased to generate any records. On this basis 23 species have become extinct in Britain, ranging in time from the last observation of the crabronid wasp *Lestica clypeata* in 1853 to that of the solitary bee *Andrena lathyri* in 1990.

The pattern over time is interesting, since there was considerable loss of species much earlier than is often supposed. The authors suggest that this started with the development of nitrogenous fertilisers, starting with imported guano in the late 19th century, which favoured the rank growth of grasses at the expense of flower-rich swards. According to their analysis, this process of fertiliser-related extinction was accelerated in two distinct phases, corresponding to the drive for increased food production during the two world wars. A further phase of extinction occurred from 1986 to 1994 but, for statistical reasons, it is too soon to determine whether this is part of a distinct trend. Also caution is urged, since the UK's position at the "northern and western edge of the distribution range for many Hymenoptera" results in populations that may already be sparse and ripe for invasion by other species, as seen in the recent colonisations by *Dolichovespula media*, *Bombus hypnorum* and *Colletes hederæ*.

In any case, the evidence of long-standing effects of changes in grassland management demonstrates the need for our agricultural policy to take pollinators into account. Meanwhile, despite much popular support and interest, their populations continue to suffer (e.g. see recent articles on the suspected effects of neonicotinoids: *ICN* Nos. 60, 64, 65, 69 to 71, 74).

Reference

- Ollerton, J. Erenler, H., Edwards, M., Crockett, R. (2014). Extinctions of aculeate pollinators in Britain and the role of large scale agricultural changes. *Science* 346: 1360. DOI: 10.1126/science.1257259





RESEARCH NOTES

Effects of light pollution on marine invertebrates

As mentioned in past editions of *ICN*, (Nos. 66, 69, 72 and 75), there is increasing evidence that light pollution can profoundly affect populations of terrestrial invertebrates, often to their detriment. Dr Tom Davies and co-workers, whose work on street lighting was mentioned in *ICN* No. 75, have also been studying the effects of light pollution on the sessile marine epifauna, consisting of species that remain fixed to solid surfaces as adults (Davies *et al.*, 2015). It was already known that the free-swimming larvae of these species respond to light when settling. Also, Dr Davies was aware that, in all coastal regions (except in Antarctica), communities of these species are exposed to nocturnal light from a variety of artificial sources, including coastal towns, harbours, offshore infrastructure in the form of oil, gas and renewable energy installations, shipping and light fisheries. He could not, however, find any reports of research on the effects of light pollution on the behaviour of these species.

The research team devised a method for studying effects of artificial light on the settlement behaviour of marine epifauna species. They provided an artificial substrate, consisting of eighteen pairs of vertically orientated 10 x 10 cm plastic (PVC) panels, grey in colour, with a bare but roughened surface. These were deployed at a depth of 20 cm from a floating raft in the Menai Strait, between the mainland of North Wales and the island of Anglesey, for 12 weeks in July 2013. During this time, each pair of panels was exposed to artificial illumination at 19 lux, 30 lux, or left unlit as a control. The light source consisted of cool white LED lamps, a source of lighting that is being installed increasingly. The lower intensity of 19 lux was comparable with the exposure of epifaunal invertebrates in nearby illuminated areas (5 to 21.6 lux). After exposure, the panels were brought to the laboratory and the abundance of each taxon (identified as far as practicable) was assessed, either by counting individuals, or by percentage cover in the case of colonial mat-forming taxa. In all, there were forty seven taxa representing seven phyla.

By comparing the communities that had colonised the illuminated and the non-illuminated panels, significant overall differences in community-composition were found in both the colonial mat-forming taxa and the taxa that were counted as individuals. Thirteen of the latter taxa



were found in sufficient numbers for species-specific analysis. This showed significant effects of nocturnal lighting on five of these taxa: three sessile species and two mobile species.

Colonisation by two of the sessile species was suppressed significantly by the lighting, these being the colonial ascidian *Botrylloides leachi*, at both 19 and 30 lux, and the hydroid *Plumularia setacea*, at 30 lux. The opposite effect was, however, found at both these light intensities in the case of the third sessile species; the tube-building polychaete worm *Spirobranchus lamarecki*. The two mobile taxa: i.e. the copepod *Metis ignea* and amphipods of the genus *Corophium*, were significantly more abundant under the 30 lux treatment.

The authors conclude that LED lights can alter the recruitment of sessile marine invertebrates, influencing the composition of epifaunal communities. They comment on the recent global surge in the use of LEDs, including within the shipping and the oil and gas industries. While acknowledging the benefits of LED lighting for low energy consumption, they point out that its broad spectral range is likely to affect invertebrate behaviour more than the output from sodium lights. At this early stage in their research, they point out that the consequences of night-time lighting for a broader range of marine ecosystems and the services they provide remain unknown.

The results of this study have prompted concern that the effects of lighting could be greater in tropical waters, which can be penetrated by artificial light more deeply than the murkier waters of Britain, perhaps enough to affect the larvae of corals when they seek substrates for settlement and reef building.

Reference

Davies, T.W., Coleman, M., Griffith, K.M. & Jenkins, S.R. (2015). Night-time lighting alters the composition of marine epifaunal communities. *Biol. Lett.* 2015 11 20150080; DOI: 10.1098/rsbl.2015.008. Published 29 April 2015.





PUBLICATIONS

Climatic Risk and Distribution Atlas of European Bumblebees by Pierre Rasmont, Markus Franzén, Thomas Lecocq, Alexander Harpke, Stuart Roberts, Jacobus C. Biesmeijer, Leopoldo Castro, Björn Cederberg, Libor Dvořák, Úna Fitzpatrick, Yves Gonthier, Eric Haubruge, Gilles Mahé, Aulo Manino, Denis Michez, Johann Neumayer, Frode Ødegaard, Juho Paukkunen, Tadeusz Pawlikowski, Simon Potts, Menno Reemer, Josef Settele, Jakub Straka and Oliver Schweiger. Special edition of: *BioRisk* **10**: 1-236. DOI: 10.3897/biorisk.10.4749

This landmark monograph explores the likely impact of climate change on bumblebee distributions across Europe. Why should we be interested? The Chair of the IUCN's Bumblebee Specialist Group says it all in his Foreword:

"Pollinators are increasingly recognised as providing a vital ecosystem service, not least for feeding people, and bumblebees are among the most important pollinators in north temperate regions like Europe. This atlas breaks new ground in assessing the most likely consequences of climate change for these important pollinators in Europe. The prognosis is shown to be dire."

The effects of various adverse factors on invertebrate populations tend to be greatest at the climatic limits of the species concerned. Future climate change could therefore have severe impacts on assemblages of wild bees, including bumblebees, especially with an increasing incidence of adverse factors such as the pollution, the use of pesticides, the introduction of invasive species, (including pathogens, which are sometimes carried by invasive invertebrates) and habitat modification/conversion. In the words of the authors, the broad aims of this substantial work are:

- to inform the broader public about the potential risks of climate change for the future fate of European bumblebees;
- to aid biodiversity conservation managers and policy makers;
- to provide background knowledge for critical discussions about the sustainable provision of pollination services in the light of food security.

The monograph provides an illustrated atlas based on 988,187 observation records for all 69 European bumblebees. The distribution of each species is



modelled against the likely impact of three climate change scenarios (SEDG, BAMBU and GRAS, named after kinds of plant). The more recent scenario options (RCPs) post-dated this data analysis. In the most extreme model (held by some researchers to be the most likely), a total of 77% of European bumblebee species would lose the largest part of their suitable climatic area by 2100, with more than a third of the total number of species driven to the verge of extinction. Only three species are shown as potentially benefiting from climate change: *Bombus argillaceus*, *B. haematurus* and *B. niveatus*.

Mitigations are also identified: "*In principle .. [conservation actions] .. should aim at (i) guaranteeing the unrestricted, or even aid, movement of the species through the landscape to new areas, (ii) facilitate the colonisation success in the new areas, (iii) improve habitat conditions and microclimatic protection in the areas indicated to become unsuitable...*" The authors recognise, however, that translocation is highly controversial, especially when many of the threatened species are already rare, and poorly understood in terms of success, ecological risks and viability.

This remarkable work is a wake-up call for action, at least in order to understand better how our pollinators will respond to climate change, in combination with other anthropogenic impacts leading to habitat degradation and loss.



PAST UK EVENTS

Amateur Entomologists' Society conference, 2014

The above conference, held jointly with the British Ecological Society (BES), took place on 31st October 2014 (see ICN No. 74 for the list of speakers and topics). The event was fully attended and was generally acclaimed as a great success. We are very grateful to the speakers, to the BES and, especially to John Millar, who organised the conference. A full report on the conference, including abstracts of the presentations, can be found in the December 2014 issue of the AES Bulletin.



FUTURE UK EVENTS

Durham Wildlife Trust (www.durhamwt.co.uk).

- Sat. 13th June 2015: Beetles, 1.30 to 3.30 p.m. Venue: Lane Meadows & Station Wood Local Nature Reserve, Gateshead, Tyne & Wear. Grid reference NZ 212620 (access off Market Lane, Swallowwell. This event, entitled Beetles, Bees & Butterflies, is to celebrate the “Wildlife Trusts Meadows Weekend” and to encourage biological recording at the reserve, which includes a flower-rich meadow with a wealth of insect life in a mainly urban area. There will be short talks from representatives of Butterfly Conservation and the Bumblebee Conservation Trust. Children are welcome but must be accompanied by an adult. Booking is required: tel. 0191 584 3112.

Amateur Entomologists’ Society (www.amentsoc.org).

The society is holding many field and indoor meetings in 2015. The main purpose of the following event is to encourage a new generation of entomologists.

- Sat. 27th June 2015, 10 a.m., 11 a.m. & 2 p.m. Bug Club day. Venue: Dinton Pastures Country Park, Davis Street, Hurst, Berkshire, RG10 0TH, UK. This event is for members of the Bug Club, accompanied by adults. It is being held jointly with the British Entomological & Natural History Society (BENHS) and the second item on the programme (11 a.m.), after a session on moths, is a tour of the BENHS collections and library. After lunch (2 p.m.), a bug walk is planned. For details, see <http://www.amentsoc.org/events/listings/0788/> or contact secretary@amentsoc.org.

Imperial College, London

- Fri. 10th July 2015, 2 to 6 p.m. Venue: Imperial College, Silwood Park Campus, Ascot, UK. “Bugs!” –an event organised by the group “Grand Challenges in Ecosystems and the Environment”. The event will include exhibits, demonstrations and talks (indoor and outdoor) for a range of different interests and knowledge levels. The group hopes to have presentations of research projects, bug hunts, building “bug hotels” and pond dipping, among others. For details, see: <http://www.bugsandmesocosms.com/>



Inner Forth Landscape Initiative

- Sat. 6th June, 10 a.m. to Sun. 7th June 2015, 4 p.m. “Forth Nature Counts Bioblitz Falkirk”. Venue: Kinneil Local Nature Reserve, near Bo’ness, Falkirk. Grid ref: NS 985811. The organisers of this bioblitz will be joined by representatives of Buglife – The Invertebrate Conservation Trust and of the Urban Orchard Project. Cost - free but booking essential: see more at: <http://preview.tinyurl.com/qazyye8> or tel. 01324 831 568. Also, for anyone interested in voluntary recording at this reserve (a former colliery site next to the Firth of Forth), a foreshore survey walk is planned for 13th June (11:00 a.m. to 12:00 p.m.), starting at the Kinneil Snab Lane car park off Kinneil Road (A904) at the junction with Castlehill (EH51 0PT).

Severn Gorge Countryside Trust (SGCT)

- Tue. 23rd June, 10:00 a.m. Spiders in the gorge: a spider identification workshop in the Severn Gorge. Tutor: Nigel Cane-Honeysett. Venue: SGCT, Darby Road, TF8 7EP. This workshop is an introduction to spiders and spider identification. An outdoor session will include simple techniques of temporary capture for identification. A classroom session will include identification of preserved specimens under a microscope, using the Collins Field Guide to Spiders. Fee: £20 by BACS, or cash or cheque to SGCT. Booking by email: bookings@severngorge.org.uk or phone 01952 433880.

The Wildlife Trusts (Beds, Cambs. & Northants)

- Sat. 6th June, 10 a.m. to 4 p.m. Identification of Bumblebees, with information about their role in UK conservation. This is a training workshop with Adrian Knowles. Venue: Pegsdon Hills, Pegsdon Hills and Hoo Bit, Hitchin, Bedfordshire. Grid ref. TL 120 295. Cost: £35 for amateurs; £115 professionals; free to BCN Wildlife Trust volunteers. Booking: Tel: 01604 774031 (Juliette Butler) or visit: trainingworkshops@wildlifebcn.org
- Sun. 16th Aug., 10 a.m. to 4 p.m. Identification of ants with Brian Eversham. Venue: Cooper’s Hill, Ampthill, Bedfordshire. Grid reference TL 028 376. This workshop is intended for people who have already a basic understanding of ants and their identification. It will concentrate on the identification of some of the more tricky species, especially the red ants in the genus *Myrmica*. Much of the day will be spent identifying specimens with a microscope or hand lens, though there will be an opportunity for fieldwork, too. The different closely-related species have distinct ecological requirements, and are especially useful in monitoring habitat structure. Cost: £35 for amateurs; £115 professionals; free to BCN Wildlife Trust volunteers. Booking as above for the bumblebee workshop.

INVERTEBRATE CONSERVATION NEWS

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