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EDITIORIAL

This issue of ICN focusses on two species (the European freshwater Pearl Mussel and the Aspen hoverfly) that are believed to require detailed intervention for their long-term survival in the UK. In principle, we can expect species to ‘look after themselves’ provided that their habitats are conserved by general protective and/or restorative practices. More detailed ‘precision’ methods are, however, sometimes appropriate for species that have very exacting habitat requirements that cannot be adequately sustained without intervention.

Given the immense number of invertebrate species, it would be impracticable to attempt very detailed habitat management for more than a very small percentage of them. Also the resources devoted to such management can exacerbate the shortage of funding for broader-brush measures aimed at safeguarding large assemblages of species from adverse human activity.

Irrespective of the diverse motives that underlie conservation efforts, it is fascinating to see the results of detailed observations that reveal the intricate habitat requirements of particular invertebrates. Such information can also provide a very useful insight into requirements that many other species may be expected to have. And as far as the Pearl mussel and the Aspen hoverfly are concerned, there seems no reason to fear that the current measures for management of their habitats could significantly harm other species.
“Killer shrimp”: further spread in England

As mentioned in previous issues of ICN, colonies of the alien predatory freshwater shrimp *Dikerogammarus villosus* were discovered in Great Britain in 2010; first at Grafham Water, Cambridgeshire in eastern England and subsequently at Cardiff Bay and Eglwys Nunydd reservoir in Port Talbot in South Wales. Often known as the Killer shrimp because of its voracious appetite for animals such as native shrimps, young fish and insect larvae, *D. villosus* is highly invasive and can alter the ecology of the water bodies that it colonises. These include still or flowing freshwater and brackish water, often among hard surfaces or vegetation.

The Killer shrimp is native to the Ponto-Caspian region, in common with several other invasive aquatic species that have also reached Great Britain. One of these, as mentioned in *ICN* No. 68, is the closely related *D. haemobaphes*, which was discovered in various canals and rivers in the English Midlands in 2012. Meanwhile, *D. villosus* had spread to Barton Broad, a nature reserve in Norfolk, as reported in *ICN* No. 69. The latest news, from the Environment Agency, is that a new population of *D. villosus* has appeared this year in a Northamptonshire reservoir called Pitsford Water, which already contains a large population of *D. haemobaphes*.

*Dikerogammarus villosus* appears to be in an early phase of colonising Pitsford Water but it is expected to reach the dam and then to spread into the outfall stream of the reservoir, the Faxton Brook, which is a tributary of the River Nene. The biodiversity of the Nene has long been affected by heavy modification of habitats but it could be harmed further if *D. villosus* becomes established. The Environment Agency is considering a strategy for mitigating such damage, by restoring the complexity of river-edge habitats in order to provide refugia for potential prey species.
If *D. villosus* becomes established in the River Nene, it could then spread to other rivers, for example via boat transport or the transfer of water between catchments. Options for reducing the risk of such transfer are therefore being considered. Further information is available at: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1393

**Freshwaters for the future: a manifesto for freshwater invertebrates.**

At the start of October Buglife - The Invertebrate Conservation Trust published an ambitious manifesto aimed at raising the profile of freshwater invertebrates, which make up a critically important component of our fauna and whose future depends on our willingness to mitigate the harmful effects of past and present human activity.

The manifesto, entitled *Freshwaters for the future: a manifesto for freshwater invertebrates*, consists of eight ‘principles’ that “…society must choose to aspire to in order to save and sustain freshwater invertebrates and their habitats”. For each of the eight ‘principles’, there are explanatory references to case studies, together with proposed courses of action and proposed roles for Government, NGOs and other bodies. These roles include promoting public awareness, informing educational practice, conducting research and influencing or changing policy and directives. The eight ‘principles’ (which in some cases are perhaps more like statements than principles) are as follows:

1. Aquatic invertebrates should be more widely understood, cherished and properly valued for the services they provide.
2. Reducing pollution and improving the cleanliness of water is essential to healthy aquatic ecosystems.
3. Biosecurity, eradication and mitigation measures must be improved because of the extreme vulnerability of freshwater species and habitats to damage from invasive non-native species.
4. Climate change is an urgent threat to aquatic ecosystems and actions to make them more resilient must be implemented now.
5. Efforts to conserve aquatic habitats have focussed on rivers and lakes, but most invertebrate biodiversity lives (sic) in small, marginal and dynamic water bodies; these are much more fragile and require improved protection from damage.
6. The use of peat in horticulture destroys wildlife; it is a disgrace and must halt.
7. Freshwater invertebrate populations tell us how healthy our environment is and they must be properly monitored and understood.

8. Some freshwater species are now so vulnerable that specific, targeted conservation action and legislative changes are required to save them from extinction.

The phrasing of the ‘principles’, their descriptions and the proposed actions is deliberately strong. This is a forceful, well researched document (with more than four pages of references) and it has laudable intentions. It also provides a very useful summary of statistics that could be used, for instance, in project proposals aimed at helping our freshwater systems. Whilst there is no doubt that this is a call for action, the willingness to act is, as ever, subject to the demands for constant economic growth and for the desires of an ever increasing human population. The manifesto can be found at: https://www.buglife.org.uk/freshwaters-for-the-future-a-strategy-for-freshwater-invertebrates

Proposed guidance for commissioning invertebrate surveys

Since the earliest days of ICN and its forerunner newsletters (over 45 years ago), a recurring complaint has been that proposed development sites are not usually surveyed adequately (if at all) for invertebrates and their habitats, at least in the UK. All too often, decision-makers approve site development as if invertebrates did not matter, even though they comprise by far the bulk of the animal species present on most sites.

An initiative has now been launched, in order to help develop guidance for people who may need to commission site surveys for terrestrial invertebrates. This has begun with an article in the magazine of the Chartered Institute of Ecology and Environmental Management (Wilson & Henshall, 2015). The authors have reviewed the current guidance available in the UK and they are calling for comment on suggested guidelines for the commissioning of surveys of terrestrial invertebrates. They point out, for example, that current guidance from a UK statutory agency (English Nature, 2005) states merely that “There are no hard and fast rules about when an invertebrate survey should be requested from a developer, but any site that may have ‘good’ invertebrate interest should be examined in some way.”

The new guidance, when published after consultation, is expected to include an overview of legislation, policy and existing best practice (including case studies), together with information about habitat features that need initially to be recognised in order to decide the requirements (if any) for a site survey.
References


Important Invertebrate Areas in the UK

Buglife - The Invertebrate Conservation Trust has recently started a project “Putting Bugs on the Map”. With funding from the Esmée Fairbairn Foundation, the aim is to identify the UK’s most important areas for invertebrate conservation (IIAs). These are defined as nationally and internationally significant places for the conservation of invertebrates and their habitats. By identifying these sites, Buglife hopes to deploy resources where they are most needed. Invertebrate experts and partner organisations will be requested to assist with the development of criteria for selecting IIAs and with identifying and mapping them.

SITES AND SPECIES OF INTEREST

Freshwater pearl mussels a race against time?

With the recent announcement of Buglife’s freshwater strategy (see above), together with the Swedish research that we reported in the last issue of ICN, freshwater pearl mussels are still in the news. The European freshwater Pearl mussel Margaritifera margaritifera is now increasingly rare and has disappeared from 95% of the range that it occupied 100 years ago. Also most of its remaining populations are showing little or no sign of recent recruitment by new generations and now have an average age of more than 30 years. Individuals usually take at least 12 years to reach reproductive age but some
can eventually attain an age of 130 years, reaching over 140 mm in length. The mussel begins its active life as a glochidium (a larval stage), which parasitises the gills of salmonid fish. As highlighted by the above-mentioned Swedish research, good populations of such fish, together with a suitable riverine environment, are essential for the recruitment of new generations of *M. margaritifera*.

As mentioned in the last issue of *ICN*, the Scottish Highlands are the main European stronghold for breeding populations of *M. margaritifera*. The species occurs in scattered populations elsewhere in the UK but only two of these — one each in England and Wales — are thought to be undergoing recruitment. This is unfortunately not happening in the south-western county of Devon but recent surveys by the Devon Wildlife Trust (DWT), in partnership with the Environment Agency and Natural England, have indicated that about 2,000 adult mussels are present in the River Torridge, North Devon. There is a population also in the nearby River Taw.

Without intervention, the North Devon populations of the mussel are headed for extinction, given that most of the adults found in the Torridge were evidently over 50 years old and that no sign of the glochidial stage was found in the gills of salmonid fish in the river. The DWT has therefore recently launched a project to reinvigorate the population on the River Torridge, with help from experts and local communities. A previous attempt to encourage the mussels to breed by putting them in artificial tanks was not successful and so the new plan is to develop a breeding facility in the form of an ‘ark site’, where the conditions could be artificially enhanced at a suitable place in the Torridge or Taw catchments. Some mussels could then be relocated in the ark site on a trial basis.

This project is part of the Northern Devon Nature Improvement Area landscape scale approach and is one of several aimed at conserving the freshwater Pearl mussel across the UK, funded by the Freshwater Biological Association and Environment Agency. There is also local funding through a Biffa Award. The project already includes co-operation with landowners to restore stretches of the Torridge and its tributaries by addressing run-off and sedimentation problems, and by promoting the freshwater Pearl mussel as a valuable indicator species of the Torridge.
More information is available from:
http://jncc.defra.gov.uk/ProtectedSites/SACselection/species.asp?FeatureIntCode=S1029

http://www.devonwildlifetrust.org/freshwater-pearl-mussels/

and

http://www.devonwildlifetrust.org/i/Freshwater_Pearl_Mussel_case_study.pdf

**Wallasea wetland nature reserve — expanding and protecting habitats**

A project to restore 650 ha of estuarine and coastal wetland in the eastern English county of Essex has reached a milestone with the opening of the first intertidal habitat to tidal flooding. This massive landscape (re-)engineering undertaking, known as the Wallasea Island Wild Coast Project, has taken 16 years to come to fruition and has produced the largest coastal wetland biotope ever artificially constructed in the UK. The term ‘constructed’ is used advisedly as it has meant landscaping on a massive scale to resuscitate drained and ‘recovered’ saltmarsh, a biotope that has been lost at an alarming rate over the past 500 years.

There are still grand plans for much of the site but already a mosaic of habitats has been created. These are being managed to create suitable conditions for a wide range of invertebrates and small mammals alongside some target bird species. Species of particular interest in the area include the endangered [Scarce (Nb)] Shrill Carder bee *Bombus sylvarum*, the rapidly declining Brown banded Carder bee *Bombus humilis*, the very rare parasitic tachinid fly *Meigenia majuscula* and the Black Oil beetle, *Meloe proscarabaeus*.

A full account of the history and future of this site is given by Ausden *et al.* (2015).

**Reference**

The Aspen hoverfly - a lesson in precision conservation

As mentioned in the current *ICN* editorial, the conservation of certain invertebrate species depends on detailed habitat management, with the aim of enhancing or emulating natural processes that would otherwise not take place sufficiently. One of the less well-known examples of this is the conservation of the Aspen hoverfly *Hammerschmidtia ferruginea* (Diptera: Syrphidae) in Scotland.

The first record of *H. ferruginea* in the UK was made in the Cairngorms, north-eastern Scotland, 110 years ago. Between then and 1987 only 29 adults were captured from just four locations. This small, mostly chestnut brown hoverfly was therefore assigned Endangered status and it has been listed as a Priority Species in the UK Biodiversity Action Plan. Research over the last 25 years has revealed details of its habitat requirements. In particular its larvae have been found (at least in Scotland) to develop in the soft, moist layer of decomposing tissue between the bark and the wood of fallen stems or branches of Aspen *Populus tremula*. The latter need to be at least 20 cm in diameter in order to contain a sufficient thickness of decomposing tissue, which remains in a suitable condition only for a relatively brief stage in the decay process. The larvae feed on microbes within this tissue and can also develop in the same manner, but less often, in sap-runs on living Aspen trees. The adults need pollen and nectar from plants such as Bird Cherry *Prunus padus*.

The rarity of *H. ferruginea* is probably a consequence of its exacting requirements but rarity alone does not render it liable to become extinct in the UK. In principle, its populations ought to persist, provided that natural processes continue to generate a supply of dead Aspen stems and branches of suitable size and condition at any given time. In practice, however, various factors have been found to be reducing the availability of the habitat. These include the removal of material for firewood, the killing of trees by ring-barking (which tends not to provide the right habitat) and the reduction in size of Aspen stands affected by industrial development.

Since *H. ferruginea* is not only rare but also probably threatened by adverse human activity, it can be regarded as warranting detailed intervention, as well as the general protection of Aspen stands and the habitats that they provide for a range of other insects. For the specific conservation of *H. ferruginea*, small numbers of wind-damaged Aspen stems can, for example, be cut or lowered (with all due precautions for safety and for other habitats) in order to make ground contact and thus remain sufficiently moist if a need for this is
determined during annual monitoring of a known habitat site.

A recent article by Rotheray et al. (2015) gives an excellent account of the work to raise awareness of this fly and its conservation, which they say has been achieved through “working partnerships between volunteer entomologists, conservation organisations, land owners and government agencies”. Importantly, they also say: “The UK BAP process has greatly assisted the work; the addition of Aspen hoverfly to the list of Priority Species provided a focus which facilitated funding and development of the project.”

The extensive surveys, ecological research and entomology behind this project are testament to the dedication, since the 1990s, of a small group of Scottish based dipterists, the Malloch Society (www.malloch soc.org) and their partners, particularly the Royal Society for the Protection of Birds and Scottish Natural Heritage. The work done here adds to our knowledge of decaying wood and its management as well as encouraging greater collaboration between a variety of agencies. It is rewarding to see that this sort of work goes on, albeit largely unnoticed by mainstream media and the general populace, and that long-term studies can reap such conservation benefits.

Reference

RESEARCH NOTES

Pollinating insects in urban environments

As reported over ten years ago in ICN No. 46, a study in Sheffield, northern England showed that considerable wildlife habitat can exist even in gardens that might seem very neat, tidy and stocked with exotic plants. The Sheffield study examined the diversity of a wide range of insect and other invertebrate
taxa, including some that are valuable as pollinators, such as hoverflies and bees. It is therefore perhaps not surprising that a more recent study across the UK has found greater diversity of bee species in urban areas than in farmland (Baldock et al., 2015). The reverse was, however, found for hoverflies. Also, the overall species-diversity of pollinators, including various bees, flies, hoverflies and butterflies, was found to be the same in urban areas, farmland and nature reserves.

Regrettably, wildlife habitats in urban gardens are being increasingly destroyed and damaged, at least in the UK. New housing developments usually contain a far smaller proportion of green space than old ones, while many of the old ones are being covered by back garden re-developments. There is also a continuing craze for paving gardens. As a result of such changes, the relatively high diversity of urban bees may be part of a fading legacy from the days when houses were provided with relatively large gardens. With demand for new houses ever increasing, it is important to protect other forms of urban green space and to improve the habitat quality of areas that currently contain large expanses of species-poor lawn or artificial surfaces.

Reference

EU agri-environment schemes: a before and after comparison
As mentioned in the last issue of ICN, a proposed reform of the European Common Agricultural Policy would include the designation of ‘Ecological Focus Areas’ (EFAs) on arable farms. Given that wildlife conservation organisations see EFAs as a potentially very mixed blessing, it is timely to try to assess the effects of the last major set of reforms, in 2007, on biodiversity. With this in mind, a group from Germany, the UK and the Netherlands has recently undertaken a desk study (Batáry et al., 2015).

By way of introduction, the authors observe that agri-environment schemes are rare outside Europe. In other continents, especially the Americas, conservation efforts are mainly confined to designated areas such as national parks. Agri-environment schemes exist in countries like the USA and Australia but most of them promote the reversion of farmland to
protected area status. The value of agricultural land for biodiversity tends to be better recognised in Europe, where it occupies over half of the total land area. For millennia, traditional extensive methods of farming took place amidst considerable biodiversity, especially favouring species that require vegetational disturbance. Farmland habitats have, however, been very much degraded and destroyed by modern intensification of land use and by the accompanying loss of landscape mosaic. The abandonment of low-grade agricultural land has also led to habitat loss or degradation, owing to vegetational succession.

Agri-environment schemes pay farmers to help reduce the further loss and degradation of habitats and, to some extent, to restore them. The schemes can either be ‘horizontal’ (i.e. applying to agricultural practices throughout a country), or ‘zonal’ (i.e. being designed particularly for areas of particular ecological value or sensitivity). Overall, the schemes are a major source of nature conservation funding within the European Union (EU) and their cost exceeds that of other conservation efforts in the continent as a whole. The authors of the study refer to statistics showing, for example, that such schemes in England (including those with non-biodiversity objectives) cost €375 million/year from 2007 to 2013, as compared with around €250 million of other governmental expenditure on nature conservation in 2013 and 2014.

There have been many attempts to measure the success of agri-environment schemes by means of case studies and meta-analyses, especially following a review that cast doubt on the value of schemes (Kleijn & Sutherland, 2003). Most of these analyses have indicated that the schemes have enhanced biodiversity but with varying degrees of success, depending on the structure and management of the landscapes concerned. A statistically rigorous comparison of schemes before and after the reform of 2007 had not previously been achieved, owing partly to complications caused by increasing EU membership and also to differences between schemes operated by individual member-countries under the over-arching framework. The authors of the recent study have therefore reviewed the structure of current schemes across Europe and they have also conducted two new meta-analyses.

With regard to the overall purpose of agri-environment schemes, the authors observe that the roles of the schemes have shifted following their initial introduction across the EU, when they were intended mainly to protect threatened habitats or landscapes. The emphasis later shifted more towards the prevention of species-loss, especially of farmland birds, and there has been a more recent shift towards the improvement and maintenance of ‘ecosystem services’, such as pollination and biocontrol of ‘pests’.
The new analysis indicates that schemes implemented after the 2007 revision of the EU’s agri-environmental programmes do not appear to have provided more ecological benefits than their forerunners. The authors mention, however, that certain benefits may be too long-term yet to be measurable. Also, they point out that the benefits of the newer schemes have to some extent been cancelled out by the continued underlying degradation of farmland habitats.

Looking at schemes both before and after the 2007 reform, the authors found that the benefits were greater in areas not producing a commercial yield (e.g. field margins, hedgerows and wildflower strips) than in those being used for crop production. This finding therefore lends support to the rationale behind projects such as Buglife’s B-lines project (Buglife, 2015).

The authors concede that they have left various important questions still to be addressed. For example, have the schemes been more effective in agriculturally marginal areas than in intensively farmed areas? Also, how important is the provision of training and advice for farmers in implementing the schemes? Another question is to what extent the schemes have benefited ‘ecosystem services’ such as pollination, although the answer is likely in principle to be positive. Looking at government expenditure more widely, the authors have identified a need to know whether farmland biodiversity schemes are more or less cost-effective than schemes for designating and managing protected areas (e.g. Natura 2000 sites). Overall, they conclude that the European experience shows that agri-environment schemes can be effective for conserving wildlife on farmland but that they are expensive and need to be carefully designed and targeted.

References


OBITUARY

Thomas Graham Howarth BEM, FRES

We sadly record the death of Graham Howarth on 8th April 2016 at the age of 99. Graham represented the Amateur Entomologists’ Society for many years on the committee currently known as Invertebrate Link. This began with the formation of the ‘Entomological Liaison Committee’ not very long after Graham’s wartime service, which had included a long spell as a prisoner of the Japanese. Graham continued to represent the AES until his retirement from the Natural History Museum (South Kensington) in 1976, diligently providing a report every year for publication in the AES Bulletin. A more detailed obituary will appear in the AES Bulletin.
INVERTEBRATE CONSERVATION NEWS

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