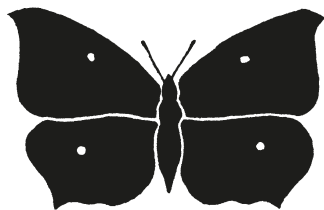


# Invertebrate Conservation News



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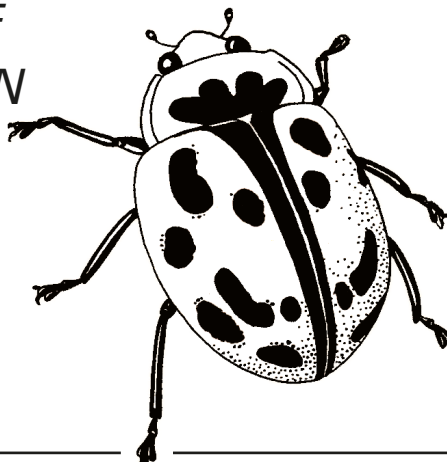
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# INVERTEBRATE CONSERVATION NEWS



**No. 77, September 2015**

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## EDITORIAL

The internet now facilitates many public consultations on proposed changes to the law or to other instruments of the state. Such consultations can be regarded as contributing to the democratic process, at least to the extent of showing the numbers of people answering "yes", "no" or "don't know" to pre-determined questions. Sometimes there is an 'any other comments' box, hinting that someone is waiting to read your well thought-out suggestions.

In the UK, there have been various consultations on government policies relating to the conservation of species and their habitats. Consultations have been instigated also by the European Commission, most recently on the possible amendment of the European Birds Directive and the European Habitats Directive. The latter consultation has aroused suspicion of an intention to repeal or to weaken these directives on the supposition that they are inhibiting economic growth. This suspicion is probably justified in a world where the economic system depends on never-ending growth, with the consequent destruction or degradation of the habitats of the species that share the planet with us. On the other hand, if the consultation originated with good intentions, perhaps it should be seen as an opportunity to suggest reform of certain aspects of European directives which have not been entirely helpful for invertebrate conservation.

In 2012 the introduction of invasive species across international borders was another matter for public consultation, as mentioned in *ICN* No. 68. The



consultation was, however, concerned only with the control of the intentional movement of species, as distinct from the tendency of invasive species to hitch a lift in consignments of foodstuffs, living plants or animals, or in wooden packing materials or the bilges of ships. Regulations can help to prevent such unintentional introductions but only to the extent that is permitted under international free trade conventions. Animal health regulations are fairly rigorous but the same is not true of most plant health regulations. This may explain why, in a single year, the UK recorded its first occurrences of ash dieback, blight of Sweet chestnut and a breeding population of the so-called Asian longhorn beetle *Anoplophora glabripennis*.

In 2013, there was a consultation over another aspect of European governance; namely the European Common Agricultural Policy (CAP), which is widely seen as having worked to the detriment of biodiversity over many years. There are now proposals for the conservation of biodiversity under the CAP but these have not been welcomed by conservation bodies, except very guardedly in relation to a proposed allocation of seven percent of arable land for 'Ecological Focus Areas' (EFAs). Please see our article, below, for some information about the proposed EFAs.





## NEWS, VIEWS AND GENERAL INFORMATION

### **Proposed reform of the European Common Agricultural Policy**

The European Common Agricultural Policy (CAP) is widely believed to have contributed to a net loss of biodiversity in many countries but it has allowed governments to operate agri-environment schemes, such as Higher Level Stewardship in the UK. Now, the European Commission (EC) is proposing that every arable farm in the EU should be required to identify Ecological Focus Areas (EFAs) on 7% of its land. There are also proposals for schemes to retain permanent grassland and to diversify crops but these have not enthused the leading conservation bodies in the UK.

The UK Wildlife Trusts believe that the proposed EFAs could offer some prospect of enhancing habitats on arable farms if they can be linked to new agri-environment schemes with the aim of improving landscape connectivity and creating ecological networks. Otherwise the EFAs are unlikely to make a new contribution to biodiversity. The EC's current proposals will allow arable farmers to register their existing uncultivated land as EFAs. Thus, if such land already amounts to 7% of the total, there would be no need to take any land out of cultivation. EFA status could at least help to protect existing habitat-providing features such as trees and hedgerows but various other useful features would not qualify as EFAs under the current proposals. These include areas of permanent grassland, which are intended to be covered under a separate category. In any case, farms that have only grassland will not be required to create EFAs at all.

Another big problem with the proposed EFAs is that they could be moved around from year to year, thus failing to provide any habitat continuity or sustained linkage to other areas of habitat. The Wildlife Trusts are strongly in favour of co-ordination between farmers in order to maintain connected habitats across the landscape, preferably in conjunction with other agri-environment schemes.

The Trusts are not at all happy with the EC's proposals for retaining permanent grassland, which would require farmers to maintain existing areas of permanent grassland on their holdings. This could lead to serious unintended negative environmental consequences, since the EC's definition of permanent grassland makes no distinction between wildlife-rich semi-natural grassland and intensive pasture. The Trusts would prefer to see a requirement to bring grassland areas into better management in order to maximise wildlife



benefits. Meanwhile they believe that farmers have been pre-emptively ploughing up grassland in order to avoid the restrictions that the new measure would impose.

The proposal for crop diversification (i.e. at least three types of crop on arable holdings of three hectares or more) also finds little favour with the Trusts. They see it as a step in the right direction but they are extremely concerned about a number of unintended negative environmental consequences, for example by interfering with low intensity arable cropping on mixed farms, which supports wildlife.

### **UK government partially lifts ban on neonicotinoids**

As reported in *ICN* No. 71, the European Commission imposed a two-year restriction on the use of the neonicotinoid pesticides clothianidin, imidacloprid and thiamethoxam in European Union member states, with effect from 1st December 2013. The Commission's decision was based on the overall weight of evidence that neonicotinoids are harming bees under field conditions but critics of the ban have portrayed the evidence as unreliable or at best circumstantial. Also, there have been complaints that the ban has left farmers unable to grow satisfactory crops of oilseed rape (canola). On the other hand, as pointed out by Buglife - The Invertebrate Conservation Trust, a record harvest of oilseed rape is expected in the EU this year.

If not treated with a neonicotinoid, oilseed rape in some regions can be badly damaged by insect pests, including flea beetles (*Psylliodes luteola* or *P. chrysocephala*) and aphids such as the Peach Potato aphid *Myzus persicae*. Pests on oilseed rape can to some extent be controlled with synthetic pyrethroid insecticides but several applications may be required and there are often problems of pesticide resistance. Also, pyrethroids such as cypermethrin have sometimes caused mass mortality of aquatic invertebrates. As mentioned in *ICN* No. 63, cypermethrin sheep dips were banned in the UK in 2009 but this chemical is currently available for use on oilseed rape.

In response to representations by the National Farmers' Union, the UK government has partially lifted the ban on two neonicotinoids, clothianidin and thiamethoxam, allowing them to be applied over a period of 120 days on about 5% of England's oilseed rape crop, in four eastern counties where there is a high risk of damage by *P. chrysocephala*; Suffolk, Cambridgeshire, Bedfordshire and Hertfordshire. The area involved covers about 30,000 ha (74,000 acres).



Meanwhile the debate continues about the validity of the scientific evidence. Dr Lynn Dicks, a biodiversity and ecosystem services research fellow at the University of Cambridge, believes that there is robust evidence of neonicotinoids harming free living bumblebee colonies in farmland but Dr Chris Hartfield of the NFU claims that the evidence comes largely from artificial dosing experiments rather than field studies. This issue of *ICN* mentions new information about the effects of pesticides on bees (see Research Notes, below).

### **More on brownfield habitat destruction**

As mentioned in the last *ICN* editorial, the demand for more houses was one of the themes of the recent general election campaign in the UK. The limited availability and high cost of housing are undeniably problematic both for aspiring house owners and for companies whose employees cannot afford to live within a reasonable travelling distance. Politicians are understandably keen to encourage house building but they also want to assure voters that they want to protect the countryside. Thus, they develop policies for facilitating the development of brownfield sites, probably knowing that such policies will not attract much criticism, except from a small minority who know that some of these sites are very important for biodiversity. As mentioned in our last editorial, many of the species now found on brownfield sites cannot thrive elsewhere.

There is cause for concern not only about the impact of urban development on species of conservation concern but also about the loss of 'ecosystem services' that we humans receive from entire assemblages of plants, animals, fungi and microbes. According to a group of French biologists, these services are inadequately accounted for in Environmental Impact Assessments, which are usually concerned only with the conservation status of species recorded from the sites concerned. With eleven particular ecosystem services in mind, they assessed the effects, both direct and indirect of building a high speed rail project in western France. The eleven services included air purification, flood protection, pollination and natural control of plant pests. Among these, only flood protection is currently included in Environmental Impact Assessments. The biologists concluded that the French railway project was costing approximately €228 000 in lost ecological services every year, even according to the best possible scenario (Tardieu *et al.* 2015).



Considering the hidden loss of ecosystem services, the obliteration of brownfield habitats is of even greater concern than would be recognised purely in relation to the impact on vulnerable species. This obliteration has been continuing at an alarming rate in certain parts of the UK, even though there is official provision for the protection of brownfield habitats from urban development. This provision, for what it is worth, could be removed or eroded under a policy announced by the recently elected government. The new policy is to impose a new 'zonal' system, which will give automatic planning permission on all brownfield sites designated as being suitable for development. Also laws enabling the compulsory purchase of brownfield sites will be strengthened.

Outside the zonal system, elected local councillors will continue to make planning decisions. Central government will, however, take control or impose financial penalties on local authorities that are deemed to be taking too long to develop their local plans or to be falling behind with their planning decisions. Also, central government will bypass some aspects of the democratic process for the fast-tracking of certain site developments under the 'Nationally Significant Infrastructure' regime.

Buglife has expressed serious concern over the above plans, pointing out that existing planning controls are already failing to protect high-quality brownfield habitats, as in the Thames Gateway (a development zone along the Thames estuary). Thames Gateway sites support nationally important populations of the Shrill carder bee *Bombus sylvarum*, the Streaked Bombardier beetle *Brachinus sclopeta* and the Distinguished Jumping spider *Sitticus distinguendus*. Another example, mentioned in the present issue of *ICN*, is the Cinderford Northern Quarter in Gloucestershire, which supports several seriously declining species of Lepidoptera. Buglife cites the Natural England inventory of Open Mosaic Habitat on Previously Developed Land, according to which 8% of brownfield land in England is thought to be of 'high environmental value'.

Buglife is one of a group of environmental charities that have called on the Government to honour its original commitment to 'protect previously developed or brownfield land that is of high environmental value for wildlife'.

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## SITES AND SPECIES OF INTEREST

### Contentious brownfield planning decision in Gloucestershire, SW England

In 2012, the Forest of Dean District Council approved a 'Core Strategy' and the 'Cinderford Area Action Plan', which gave the go-ahead for a controversial proposal to re-develop an area of brownfield land known as the Cinderford Northern Quarter. The Gloucestershire Wildlife Trust (GWT) points out, however, that the site has become a wildlife haven over the last 40 years and now supports rare bats, amphibians and reptiles, dormice, butterflies and orchids. Despite its brownfield designation, it forms part of the Cinderford Linear Park Key Wildlife Site, which the GWT has stated to be one of the most important sites for wildlife in Gloucestershire. In 2014 the District Council announced plans to dispose of the Linear Park, a publicly owned site, and has recently granted planning consent for the construction of 92 new homes in that area.

In May 2013 the District Council announced the preparation of a Mitigation Strategy in order to offset the impact of the developments that would be permitted under the Action Plan but GWT remained sceptical. Meanwhile, Forest of Dean Friends of the Earth had issued a legal challenge to the adoption of the Core Strategy and the Cinderford Northern Quarter Area Action Plan but the challenge failed, with an eventual refusal for an appeal in March 2014. An objection was submitted also by Butterfly Conservation (BC), expressing concern about the threat to the Wood White *Leptidea sinapis*, one of the rare butterflies on the site. In the BC submission, Dr Sam Ellis pointed out that this UK BAP Priority Species is one of Britain's fastest declining butterflies, having undergone a 65% national decline in distribution between 1970-82 and 1995-2004. It is currently known only from around 50 sites in England, of which four lie in the Forest of Dean. Dr Ellis referred to surveys in the proposed development boundary during 2010 and 2011, in which several adult butterflies were recorded. He concluded that a breeding population is probably present, forming part of a wider network of colonies within the northern half of the Forest of Dean.

According to the BC submission, the site probably also contributes to the survival of the Forest of Dean populations of two other BAP Priority butterflies that are in serious national decline; the Dingy Skipper *Erynnis tages* and the Grizzled Skipper *Pyrgus malvae*. The latter has, however, not been seen within the site boundary since 2002. The BC submission also mentions three



further BAP Priority species of Lepidoptera that would probably be seriously affected in the Forest of Dean if the development goes ahead as planned. These are the Forester *Adscita statice*, the Small Pearl-bordered Fritillary *Boloria selene* and the Pearl-bordered Fritillary *B. euphrosyne*.

In its deliberations, the District Council took account of an invertebrate survey that was undertaken as part of the 'Cinderford Ecological Appraisal Report' by Entec UK Limited. According to BC, however, the report did not adequately represent the importance of the site for Lepidoptera. This will not surprise anyone in the UK who has looked at the quality of the ecological evidence (if any) that local planning authorities take into account when making their decisions. Lepidoptera are at least sometimes mentioned in such reports but most other kinds of invertebrate might as well not exist. In the case of Cinderford, the report was deficient because the survey work was done much too late in the season for the BAP Priority species of butterfly.

### **Small Pearl-bordered Fritillary: projects in Co. Durham, NE England**

As mentioned in ICN No. 46, The Durham Wildlife Trust has been developing a nature reserve specifically for the Small Pearl-bordered Fritillary *Boloria selene*, after acquiring a lease on Longburn Ford Quarry next to the A68 road. This species has a wide distribution in Great Britain, ranging from the far north to the far south but it has been undergoing a long-term decline, especially in England, both in distribution and abundance. It is therefore listed as a UK Biodiversity Action Plan (BAP) species, with Butterfly Conservation as the Lead Partner.

*Boloria selene* still has strongholds in Wales and Scotland, where the relatively moist conditions favour the vigorous growth of its larval foodplants, Common Dog violet *Viola riviniana* and Marsh Violet *V. palustris*. These occur in a range of habitat types: damp grassland, flushes and moorland, woodland glades and clearings, grassland with bracken and/or scrub, open wood-pasture and wood edges. In woodland areas, traditional coppicing provided sunny but sheltered conditions that were ideal for the adult butterflies, while also encouraging the growth of the foodplants. Cessation of coppicing in many woodlands is thought to be a principal cause of the butterfly's decline.

In County Durham, the butterfly is estimated to have declined by 93% since the mid-nineteenth century. By 2006, only six colonies were known to exist in the county, all of these being confined to small non-woodland habitats. Thus,



*B. selene* has become the most endangered butterfly species in the Durham area. Since 2010, however, work has been under way in order to restore the butterfly's habitat by means of controlled grazing, scrub removal, woodland ride maintenance and the reinstatement of dry stone walls (140 m so far) and hedgerows (3,000 m so far) to serve as shelterbelts. Also, the habitat has been specifically improved by planting propagated Marsh Violets. The area of suitable habitat has thus been increased by 20% and is expected to increase by a further 40% by 2015. Sightings of *B. selene* have increased since the work began, indicating that success may already be evident. As mentioned in ICN No. 49, however, a habitat enhancement project at Pamber Forest, southern England, began to show successful results only after a number of years. In any case, success should always be judged with all species in mind, including those that could be harmed by attempts to enhance the habitat of a particular species or range of species.

The conservation of *B. selene* in Co. Durham has become part of a wider project, 'Heart of Durham', involving a partnership between Durham Wildlife Trust and Northumbrian Water Limited. By working with landowners and with other project partners, the Trust aims to restore and link habitats in order to develop wildlife corridors on a landscape scale. The project covers an area fringing the North Pennines, stretching from Derwent Reservoir in the north to Hamsterley Forest in the south.

Some of the habitat restoration and enhancement has been carried out with a view to reintroducing *B. selene* to sites that would probably not become naturally recolonised, owing to the relatively weak dispersal capacity of this species. Ten such sites have been selected on the basis of information gained from studies of existing colonies, site surveys and historical records of the butterfly.

So far, re-introductions have been attempted at two sites, starting with at a Woodland Trust (WT) property near the River Browney where habitat restoration is well established. The property concerned is dominated by semi-mature birch, with a scattering of oak and other broadleaves and the odd Scots pine. During the 1990s, the WT selectively felled trees in order to thin the woodland stands and to create five small coupes (cleared areas). The aim was to allow natural regeneration of native broadleaves other than birch in order to provide greater structural and biological diversity. In 2005 one of the coupes was enlarged in order to improve structural diversity further and to create conditions suitable for the reintroduction of *B. selene*, which had previously thrived in the locality. In 2009, this coupe was enclosed for grazing by ponies.



The reintroduction of *B. selene* to the site near the R. Browney eventually took place in May 2014, with the release of 170 caterpillars at the pre-pupal stage. They had been bred from a single female in an enclosure. Adult butterflies were subsequently seen flying at the site, with twenty being recorded by Butterfly Conservation on a single day in July. Further sightings of adults have been made this year, indicating a successful reintroduction so far. In May of this year, 100 caterpillars were released also at another site.



## RESEARCH NOTES

### **Pearl mussel: impact of trout habitat fragmentation**

The freshwater Pearl mussel *Margaritifera margaritifera* is protected by law in the UK and in most other European countries. It was formerly abundant in rivers all around the northern temperate zone but it has become extinct in many parts of its former range and is declining elsewhere. Individuals of *M. margaritifera* can live as long as 130 years but they take 10 to 15 years to reach reproductive age. The population age structure of the mussel is a key consideration in assessing its conservation status. On this basis, Scottish rivers, mainly in the Highlands, are thought to contain more than half the world's 'recruiting population'. Internationally important populations exist also in Norway.

Owing the slow developmental rate of *M. margaritifera*, its populations cannot readily recover from local and regional extinctions and declines, brought about mainly by human activities. These include interference with river flow, drainage, dredging, pollution and the introduction of invasive species such as the Zebra mussel *Dreissena polymorpha*. Also, the taking of *M. margaritifera* for its pearls is thought to have played a part in its decline.

The life cycle of *M. margaritifera* includes a parasitic larval stage (the glochidium), which colonises the gills of fish of certain species of the salmonid family. It has been suggested that the introduction of exotic fish species could



endanger the mussels by out-competing the Brown trout *Salmo lutra*, which is their main larval host. There is, however, evidence that relatively few trout are able to support enough larvae to sustain the population (Geist *et al.* 2005).

Recent experimental work in tributaries of the Ljungan River in Sweden has indicated that larvae of *M. margaritifera* are better able to develop on the migratory strain of the Brown trout, *Salmo trutta* m. *trutta* (known as the Sea-trout) than on the purely freshwater strain, *S. trutta* m. *fario* or *S. trutta* m. *lacustris* (Österling & Söderberg, 2015). Also, the migratory trout was the more abundant type in autumn, when the mussel larvae colonise the gills of the fish, and also in the following summer, when the mussels leave the gills to take up residence in the sandy river bottom. For these reasons, the authors suggest that the mussel populations of the Ljungan catchment are mainly dependent on the migratory trout. Since trout migration is impeded by structures such as weirs and dams, this dependence could be contributing to the vulnerability of the mussel populations.

In the Ljungan River system, eight hydroelectric power plants have divided the Brown trout populations into a number of separate tributary resident populations and sea migratory populations. The authors conclude that it would be more helpful to create pathways around obstacles such as dams and weirs, rather than to try to sustain isolated fish populations by re-stocking them. This approach would help both endangered kinds of fish and dependent invertebrates such as *M. margaritifera*.

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### **Bumblebees: effects of a 'natural' insecticide and the taste of neonicotinoids**

The insecticide azadirachtin is derived from seeds of the Neem tree *Azadirachta indica*, a south Asian species, which has been used in traditional medicine in India for over 2,000 years. There are many other uses for various parts of the tree, including its young shoots and flowers, which are eaten as a vegetable. In organic husbandry, azadirachtin is seen as an environmentally friendly alternative to synthetic pesticides and it is approved for this purpose in various countries but not currently in the UK.

Organic growers favour the use of products that do not harm pollinators and other beneficial invertebrates. They have widely used azadirachtin, which has a low mammalian toxicity and a high rate of biodegradation but recent research has indicated that it could be harmful to bumblebees even at very low concentrations. The research, which was carried out on the Buff-tailed bumblebee *Bombus terrestris*, included tests on growth and development in laboratory micro-colonies and on foraging behaviour. There were also some palatability tests, intended to show whether the bees would avoid collecting pollen or nectar containing azadirachtin (Barbosa *et al.*, 2015).

After being fed with sugar water containing azadirachtin at a concentration of 6.4 mg/l or more over a period of 11 weeks, only 30% of larvae survived. This concentration had to be halved in order for more than 50% of them to survive. Also, no adult males developed from larvae fed at 6.4 mg/l or above.

Adverse developmental effects were found in bees that had been fed azadirachtin at concentrations low enough to allow survival to the adult stage. The males weighed less than those fed with plain sugar water, while the females failed to produce any egg cells where they had been fed with azadirachtin at concentrations above 16 mg/l.

In the palatability tests, only seven percent of worker bees were repelled by sugar water containing 32 mg/l of azadirachtin, which is the 'maximum field recommended concentration'. The researchers estimated that a concentration of 504 mg/l would have been required to repel half of them. If so, bumblebees in the field would probably not be deterred from gathering azadirachtin-contaminated nectar and pollen to feed their colonies. The research group therefore set up an experiment in which bumblebees living in laboratory micro-colonies were allowed to forage for sugar water containing azadirachtin. Even where the foragers gathered sugar water containing only one fiftieth of the recommended field concentration of azadirachtin, significantly fewer males hatched in the colonies concerned. These males



had deformed wings, mouthparts, legs and antennae. At 3.2 mg/l, no males hatched at all.

In a separate research project, it was found that three commonly used neonicotinoid pesticides, imidacloprid, thiamethoxam and clothianidin, were more palatable than plain sugar water to workers of *B. terrestris* and the Honeybee *Apis mellifera* (Kessler *et al.*, 2015).

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## OBITUARY

### Raymond A. Softly

It is with sadness that we report the death of Ray Softly on 24 June 2015, at the age of 99. Ray contributed a wealth of moth records for north London, Middlesex and Hertfordshire and he was an active supporter of the former AES Conservation Group in the 1970s. Only five years ago he contributed a letter to the *ICN* editor on the subject of human over-population. A full obituary is planned for the December edition of the *AES Bulletin*.

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