# Changing distributions of Cantharidae and Buprestidae within Great Britain (Coleoptera)

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## Abstract

Data are presented on the distribution of selected species from two coleopteran families chosen to represent a random slice of the British fauna. The species have been chosen as exhibiting extremes of range changes, from declining species, through stable distributions, to expanding species. Examination of this small group of beetles already reveals significant changes, some of which may be related to global climate change. Predictions can be made about which others of these beetle families are likely to show detectable changes in range in the near future.

Key words: biological recording, changing distributions, Cantharidae, Buprestidae, Coleoptera.

## Introduction

The Cantharoidea and Buprestoidea Recording Scheme has been in operation since 1984 and is one of a series of recording schemes operated through the UK Biological Records Centre. This particular Scheme covers both Great Britain and Ireland (Alexander 1992, 1994, 1999, 2000). A provisional atlas is due out soon and the data set is very new and not yet published.

This data set is presented here as a 'random' slice of our fauna, and examined to see if any large-scale changes in distribution are apparent. This taxonomic grouping comprises about 60 species of beetle, with the Cantharidae primarily predatory species and the Buprestidae phytophagous. Their conservation status varies from British Red Data Book (Shirt 1987) – six species – right through to more or less ubiquitous species.

The coverage of Great Britain achieved during the operation of the Scheme has been reasonably good. Figure 1 shows the distribution of a fairly ubiquitous species *Cantharis cryptica* Ashe, 1947. However, older records are of variable quality and quantity making assessment of change difficult. Detection of gross change is possible, but gradual declines or increases may not be detectable.

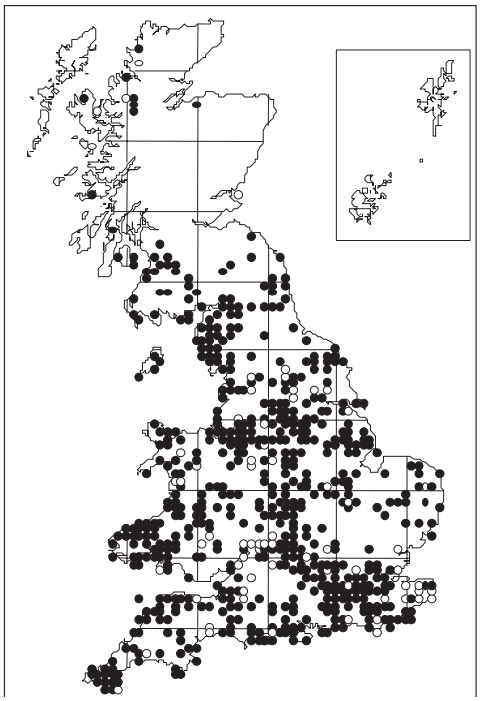

Figure 1
Distribution map for *Cantharis cryptica*. Each circle represents a 10 km square of the Great Britain and Irish National Grids – open circles represent record dates only pre 1980, closed circles for records 1980-2000.

## Changes within past 100 years

Many distributions appear relatively stable, even with highly localised species, like *Ancistronycha abdominalis* (Fabricius, 1798) (fig. 2, 3), which is a species of open woodlands in the uplands. *Cantharis obscura* Linnaeus, 1758 shows a similar pattern.

Others show gross declines and range contractions which reflect the well-documented destruc-

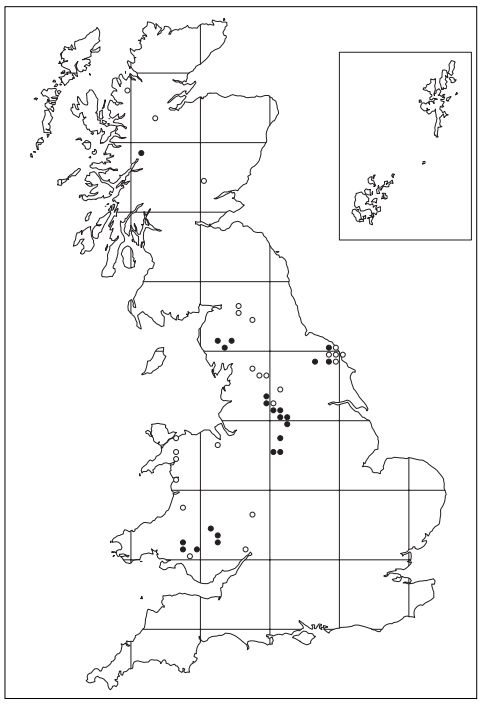

Figure 2
Distribution map for *Ancistronycha abdominalis*. Each circle represents a 10 km square of the Great Britain and Irish National Grids – open circles represent record dates only pre 1980, closed circles for records 1980-2000.

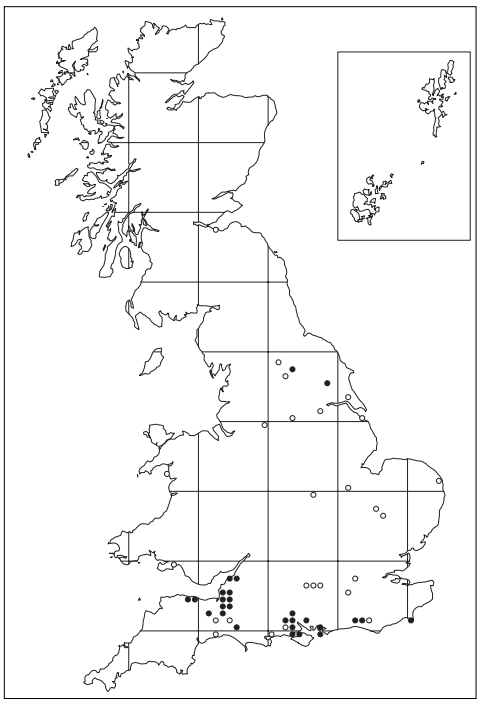

Figure 4
Distribution map for *Cantharis fusca*. Each circle represents a 10 km square of the Great Britain and Irish National Grids – open circles represent record dates only pre 1980, closed circles for records 1980-2000.

tion of semi-natural habitats through intensification of agriculture etc., like *Cantharis fusca* Linnaeus, 1758 (fig. 4), a speciality of damp hay meadows and marshy grasslands. Other species characteristic of these habitats, such as *Cantharis*

Figure 3
*Ancistronycha abdominalis*, adult beetles in copulation. Photo R. Thomas.

*figurata* Mannerheim, 1843, *C. pallida* Goeze, 1777 and *C. thoracica* (Olivier, 1790) show no obvious large scale changes in range but undoubtedly have been lost from many localities within their ranges. Despite its dramatic decline across Britain, *C. fusca* does not feature in the British Red Data Book and has not been picked out as a Species of Conservation Concern during current Biodiversity Action Plan initiatives in Britain.
Other species similarly show declines through habitat loss:

- the ancient tree specialists *Malthinus frontalis* (Marsham, 1802) and *Malthodes crassicornis* (Mäklin, 1846);
- the coppice woodland species *Agrilus angustulus* (Illiger, 1803);
- open woodland species *Agrilus laticornis* (Illiger, 1803), *Rhagonycha lutea* (Müller, 1764) and *R. translucida* (Krynicki, 1832).

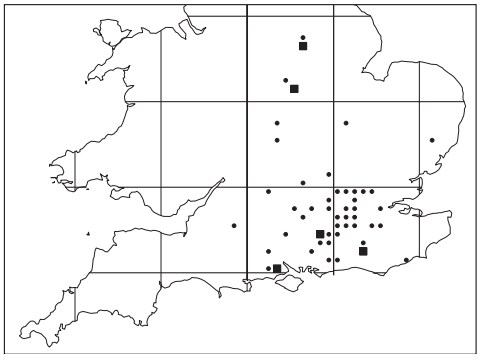

Figure 5
Distribution map for *Agrilus pannonicus*. Squares represent areas with records prior to 1980, with circles more recent records.


Figure 6
*Agrilus pannonicus*, adult beetle. Photo: R. S. Key.

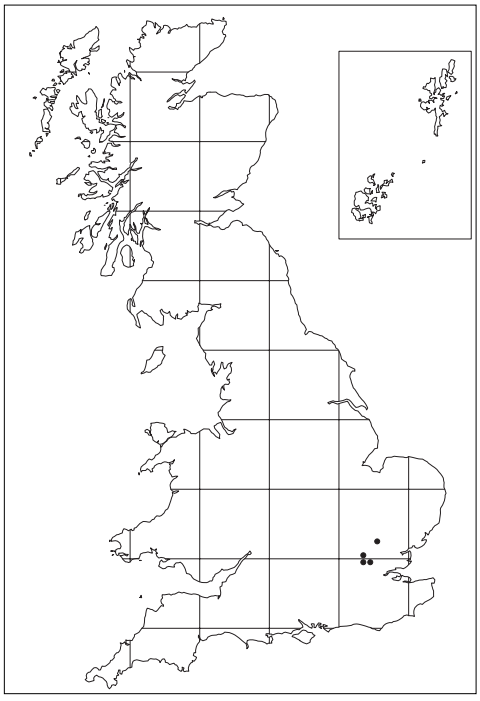

Figure 7
Distribution map for *Agrilus sulcicollis*. Each circle represents a 10 km square of the Great Britain and Irish National Grids – open circles represent record dates only pre 1980, closed circles for records 1980-2000.

Even a few of the more generally widespread species appear to be showing early signs of country-wide decline, like *Cantharis livida* Linnaeus, 1758 and *C. rufa* Linnaeus, 1758 (Alexander 1999).

## Changes within past 20 years

In contrast, two Buprestidae have shown dramatic changes in range during the 20 years of the Recording Scheme. *Agrilus pannonicus* (Piller & Mitterpacher, 1783) = *A. biguttatus* (Fabricius, 1777) (fig. 5, 6), develops in dying and freshly dead thick bark on oak trees (*Quercus robur*). It is widespread across central Europe, within the main range of the host tree, but has a very localised relict distribution in the northern parts of its range, e.g. in the oak forest areas of southern Norway and Sweden (Bílý 1982). Until recently its distribution in Britain was very stable. It was regarded as a classic relict old forest species. Its known localities were the medieval old forests, such as Sherwood, Windsor, the New Forest, and a very small number of other sites.

It began to be found more widely from the early 1980s, so the population was at a strong point when the south-east of England received some severe storms, especially in 1987. At the time this event was claimed to be part of a 'natural' cycle, but, with hindsight, it seems more likely to be a manifestation of predicted effects of global climate change brought about through the activities of mankind.

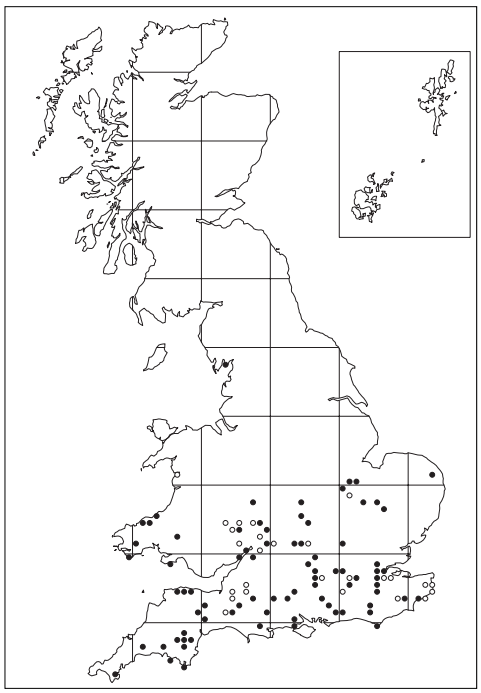

Figure 8
Distribution map for *Malthinus balteatus*. Each circle represents a 10 km square of the Great Britain and Irish National Grids – open circles represent record dates only pre 1980, closed circles for records 1980-2000.

A previously unknown fungal disease on oak also appeared during the 1990s and continues to provide a steady supply of suitable host trees – probably another manifestation of the undesirable effects of globalisation!

*Agrilus sulcicollis* Lacordaire, 1835 (fig. 7) is a species unknown in Britain when the Scheme was launched in 1984. It is another oak *Quercus* bark species. It was first detected in the British Isles in 1992 in Hertfordshire, and has subsequently been found in a wide arc of country across the north of London: Middlesex (1998), and Bedfordshire and Essex (2000). It is assumed that it was first introduced accidentally with imported timber.

A third species, *Agrilus sinuatus* (Olivier, 1790), appears to have been expanding locally in response to increased extent of its larval habitat in agricultural land – old hawthorns *Crataegus monogyna* which have developed along field boundaries where they are no longer maintained by cutting and on rough hillsides which are no longer grazed.

## Predictions for future changes

If the local climate continues to warm then it should be possible to predict which species will begin to show noticeable change.

Interestingly *Agrilus sulcicollis* is one of three species which Levey (1977) predicted might become established in Britain on the basis of their known distribution in northwestern Europe. We await the arrival of the other two species: *Agrilus cyanescens* Ratzeburg, 1837 (develops in woody growth of *Lonicera* species) and *Anthaxia quadripunctata* (Linnaeus, 1758) (develops under bark on spruce *Picea* and pine *Pinus*) – the latter has been brought in with imported timber in the past but has never established itself in the wild.

Other species which currently show a southern distribution in Britain may be expected to expand northwards. *Malthinus balteatus* Suffrian, 1851 (fig. 8) is a species of moist woodlands across southern Britain and appears to be a relatively mobile species within its range. *Malthinus seriepunctatus* Kiesenwetter, 1851 is more catholic in its choice of woodland habitats and is similarly southern and relatively mobile.

It is very difficult to offer predictions beyond these simple approaches as climate change models suggest a wide range of effects which will vary in different areas of the country. Species presently with a northerly distribution may be expected to retreat northwards if the climate warms, but it has been suggested that these upland areas will also become wetter and so the impact on the local insects will be very complex.

## Conclusions

Examination of this small group of beetles – selected as a random slice of the British fauna – reveals significant changes.

The main changes currently detectable are of declines which reflect the loss and degradation of semi-natural habitats directly through human land-use. A high percentage of the 60 species have declined significantly during the 20th century – 12 (20%) of the species give serious cause

for conservation concern (Alexander, 1999). Others also show signs of extensive decline.

Only two or three species are currently showing expanded distributions within Britain. These are variously thought to be due partly to global climate change, partly to globalisation, and partly to changing land-use patterns.

To some extent, predictions can be made about which other of these beetle families are likely to show detectable changes in range in the near future, although this is a very complex area.

The overarching conclusion is that habitat loss and degradation remain the main issues for conservation attention. Global climate change will merely exacerbate the problems. Changing distributions of species may just be a distraction.

## Acknowledgements

The data presented here have been collected by a large number of entomologists throughout Great Britain, acting in a voluntary capacity, and have been processed by the UK Biological Records Centre.

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