Natural England Commissioned Report NECR161

A review of the scarce and threatened beetles of Great Britain

The leaf beetles and their allies

Chrysomelidae, Megalopodidae and Orsodacnidae

Species Status No.19

First published 24 October 2014

www.naturalengland.org.uk

Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Background

Decisions about the priority to be attached to the conservation of species should be based upon objective assessments of the degree of threat to species. The internationally-recognised approach to undertaking this is by assigning species to one of the IUCN threat categories using the IUCN guidelines.

This report was commissioned to update the national threat status of beetles within selected families. Reviews for other Beetle families as well as for other invertebrate groups will follow.

Natural England Project Manager - Jon Webb, **jon.webb@naturalengland.org.uk**

Contractor - D S Hubble

Keywords - beetles, invertebrates, red list (iucn), status reviews

Further information
This report can be downloaded from the Natural England website: **www.naturalengland.org.uk**. For information on Natural England publications contact the Natural England Enquiry Service on 0845 600 3078 or e-mail **enquiries@naturalengland.org.uk**.

ISBN 978-1-78354-142-3

CONTENTS

1. Introduction to the Species Status project

1.1 The Species Status project

The *Species Status* project is a new initiative, that provides up-to-date assessments of the threat status of various invertebrate taxa using the internationally accepted guidelines developed by the International Union for Conservation of Nature (IUCN) (see IUCN, 2012a,b 2013). It is the successor to the JNCC's Species Status Assessment project (http://jncc.defra.gov.uk/page-3352) which ended in 2008. This publication is one in a series of reviews to be produced under the auspices of the new project.

Under the Species Status project, the UK's statutory nature conservation agencies will initiate, resource and publish Red Lists and other reviews of the status of selected taxonomic groups for Great Britain which will then be submitted to JNCC for accreditation (http://jncc.defra.gov.uk/page-1773). All publications will contain a clear audit trail of the assessments made. The approved threat statuses will be entered into the JNCC database of species conservation designations (http://jncc.defra.gov.uk/page-3408) and published by the agencies.

1.2 The Status Assessments

This review adopts the procedures recommended for the regional application of the IUCN threat assessment guidelines (http://www.iucnredlist.org/technical-documents/red-list-documents). Sections 3 and Appendix 2 provide further details. This is a two-step process, the first identifying the taxa threatened in the region of interest using information on the status of the taxa of interest in that region (IUCN2001), the second amending the assessments, where necessary, to take into account interaction with populations of the taxon in neighbouring regions (IUCN 2013). In addition, but as a separate exercise, the standard GB system of assessing rarity, based solely on distribution (Hyman and Parsons 1992), is used alongside the IUCN system.

1.3 Species Status and Conservation Action

Sound decisions about the priority to attach to conservation action for any species should primarily be based upon objective assessments of the degree of threat to the survival of a species. This is conventionally done by assigning the species to one of the IUCN threat categories. However, the assessment of threats to survival should be separate and distinct from the subsequent process of deciding which species require action and what activities and resources should be allocated.

1.4 References and Further Reading

AINSWORTH, A.M. , SMITH, J.H., BODDY, L., DENTINGER, B.T.M., JORDAN, M., PARFIITT, D., ROGERS, H.J. & SKEATES, S.J. 2013. Red List of Fungi for Great Britain: Boletaceae. A pilot conservation assessment based on national database records, fruit body morphology and DNA barcoding. *Species Status Assessment* No 14, ISSN 1473-0154, Joint Nature Conservation Committee, Peterborough.

ALEXANDER, K.N.A. 2014a. *A review of the scarce and threatened beetles of Britain. Buprestidae, Cantharidae, Cleridae, Dasytidae, Drilidae, Lampyridae, Lycidae, Lymexylidae, Malachiidae, Phloiophilidae and Trogossitidae* Species Status No.16 Natural England Commissioned Reports, Number 134.

ALEXANDER, K.N.A, DODD, S. & DENTON, J.S. 2014b. *A review of the scarce and threatened beetles of Britain.The darkling beetles and their allies. Aderidae, Anthicidae, Colydiidae, Melandryidae, Meloidae, Mordellidae, Mycetophagidae, Mycteridae, Oedemeridae, Pyrochroidae, Pythidae, Ripiphoridae, Salpingidae, Scraptiidae, Tenebrionidae & Tetratomidae (Tenebrionoidea less Ciidae).* Species Status No. 18. Natural England Commissioned Reports, Number 148.

CHEFFINGS, C. & FARRELL, L. (eds). 2005. The Vascular Plant Red Data List for Great Britain. *Species Status Assessment* No **7**, ISSN 1473-0154, Joint Nature Conservation Committee, Peterborough.

DAGUET, C., FRENCH, G. & TAYLOR, P. (eds.) 2008. The Odonata Red Data List for Great Britain. *Species Status Assessment* No 11, ISSN 1470-0154, Joint Nature Conservation Committee, Peterborough.

FALK, S.J. & CHANDLER, P.J. 2005. A review of the scarce and threatened flies of Great Britain. Part 2: Nematocera and Aschiza not dealt with by Falk (1991). *Species Status Assessment* No 2, ISSN 1473-0154, Joint Nature Conservation Committee, Peterborough.

FALK, S.J. & CROSSLEY, R. 2005. A review of the scarce and threatened flies of Great Britain. Part 3: Empidoidea. *Species Status Assessment* No 3, ISSN 1473-0154, Joint Nature Conservation Committee, Peterborough.

FOSTER, G.N. 2010. A review of the scarce and threatened Coleoptera of Great Britain Part (3): Water beetles of Great Britain. *Species Status* 1. Joint Nature Conservation Committee, Peterborough.

FOX, R., WARREN, M.S. and BRERETON, T.M. 2010. A new Red List of British Butterflies, *Species Status* 12; 1-32. Joint Nature Conservation Committee, Peterborough.

HYMAN, P.S. (revised PARSONS, M. S.) 1992. A review of the scarce and threatened Coleoptera of Great Britain. Part 1. UK Nature Conservation: 3. Joint Nature Conservation Committee, Peterborough.

IUCN. 1994. *IUCN Red List Categories and Criteria: Version 2.3*, IUCN Species Survival Commission. IUCN, Gland.

IUCN. 2001. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission. IUCN, Gland and Cambridge.

IUCN. 2003. Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0. IUCN Species Survival Commission IUCN, Gland and Cambridge.

IUCN. 2012a. *IUCN Red List Categories and Criteria*. Version 3.1. 2nd Edition, IUCN Species Survival Commission. IUCN, Gland.

IUCN. 2012b. Guidelines for Application of IUCN Red List Criteria at Regional and National Levels. Version 4.0, IUCN Species Survival Commission. IUCN, Gland.

IUCN. 2013. *Guidelines for Using the IUCN Red List Categories and Criteria*. Version 10, IUCN Species Survival Commission. IUCN, Gland.

PERRING, F.H. & FARRELL, L. 1977. *British Red Data Books: 1. Vascular Plants*. Society for Nature Conservation, Lincoln.

PERRING, F.H. & FARRELL, L. 1983. *British Red Data Books: 1. Vascular Plants, edn 2*. Royal Society for Nature Conservation, Lincoln.

SHIRT, D.B. 1987. *British Red Data Books: 2 Insects*. Nature Conservancy Council, Peterborough.

STEWART, N.F. & CHURCH, J.M. 1992. *Red Data Books of Britain and Ireland: Stoneworts*. Joint Nature Conservation Committee, Peterborough.

WIGGINTON, M.J. (ed.). 1999. *British Red Data Books.* 1. Vascular Plants. 3rd edition. Joint Nature Conservation Committee, Peterborough.

WOODS, R.G. & COPPINS, B.J. 2012. A Conservation Evaluation of British Lichens and Lichenicolous Fungi. *Species Status Assessment* No 13, ISSN 1473-0154, Joint Nature Conservation Committee, Peterborough.

2. Introduction to the beetle reviews

Beetles are important as ecological indicators (and much more refined as indicators than most plants), due to the dependency of many species on complex factors such as vegetation structure. They are also found in a much wider range of habitats than some of the more popular groups of insects such as butterflies, dragonflies and bumblebees. Monitoring their status and abundance can provide a very useful indication of ecological 'health', in a way that monitoring plants, birds, bats or other insect groups, for example, may not.

2.1 Taxa selected for this review

Table 1 lists the taxa included in this review. These taxa have each been the subject of a British national recording scheme, coordinated by the Biological Records Centre. The work of these schemes includes the collation of information from the following data sources:

- Historic records
    - As published in the national journals (and in some cases also local journals);
    - Published county reviews;
    - Voucher specimens in national and local museums;
- Modern records, arising from the recording activity of the Coleoptera recording community.

Table 1. Taxa selected for review of Chrysomelidae and near relatives

Family	Subfamily	Species	Total species
Chrysomelidae	Amblycerinae	1	278
	Bruchinae	16	
	Cassidinae	14	
	Chrysomelinae	44	
	Criocerinae	7	
	Cryptocephalinae	25	
	Donaciinae	21	
	Eumolpinae	1	
	Galerucinae	148	
	Lamprosomatinae	1	
Megalopodidae	Zeugophorinae	3	3
Orsodacnidae	Orsodacninae	2	2
			283

The area covered in this review is Great Britain (i.e. England, Scotland and Wales only). Beetle names follow Duff (2012a) and plant names Stace (1997).

2.2 Previous reviews

2.2.1 British Red Data Books: 2. Insects (1987)

The first account of threatened British Coleoptera was included in the *British Red Data Books: 2. Insects* (Shirt, 1987). This listed 546 of the total British beetle fauna (c. 3900), i.e. 14%. Data sheets were given for each of the Category 1 (Endangered) and 2 (Vulnerable) species.

Table 2 analyses the species coverage by category for the families and subfamilies covered in the present volume, allowing for taxonomic changes which have occurred since 1987.

Table 2. Red List categories (Shirt, 1987) for species in the status review of Chrysomelidae and near relatives

Families & subfamilies	Category 1 Endangered	Category 2 Vulnerable	Category 3 Rare	Category 5 Endemic	Appendix No post 1900 records
Chrysomelidae	14	7	9	1	3
Amblycerinae					
Bruchinae					
Cassidinae			1		1
Chrysomelinae	2	1	2		
Criocerinae			1		
Cryptocephalinae	6	4			1
Donaciinae		1	2		
Eumolpinae	1				
Galerucinae	5	1	3	1	1
Lamprosomatinae					
Megalopodidae	1				
Zeugophorinae	1				
Orsodacnidae					
Orsodacninae					

2.2.2 A review of the scarce and threatened beetles of Great Britain (1992 & 1994)

The *British Red Data Book* volume was followed by the publication of *A review of the scarce and threatened beetles of Great Britain* (Part 1) (Hyman, 1992) and Part 2 (Hyman, 1994) which reviewed the status for all British beetles and presented data sheets for all scarce and threatened terrestrial species. Data sheets for aquatic beetles were not included; the statuses have subsequently been determined and data sheets provided (Foster, 2010).

Table 3 analyses the species coverage by category for the families and subfamilies covered in the present volume, allowing for taxonomic changes which have occurred since 1992.

Table 3. Rarity and scarcity categories (Hyman & Parsons, 1992) for species in the status review of Chrysomelidae and near relatives

Families & subfamilies	RDB1	RDB2	RDB3	RDBI	RDBK	Extinct	Notable
Chrysomelidae	**20**	**7**	**6**	**2**	**5**	**3**	**72**
Amblycerinae							
Bruchinae	1						1
Cassidinae	1			1		1	4
Chrysomelinae	2	1	2				8
Criocerinae	1						
Cryptocephalinae	6	4				2	6
Donaciinae		1	2				11
Eumolpinae	1						
Galerucinae	8	1	2	1	5		42
Lamprosomatinae							
Megalopodidae		**1**					**1**
Zeugophorinae		1					1
Orsodacnidae							**1**
Orsodacninae							1

2.2.3 The new review

The present review has been undertaken to provide an up to date assessment of the status of selected beetle families in the format now almost univerasally adopted for the assessment of threat in any taxa. It should be borne in mind that the criteria concentrate on imminent danger of regional extinction, in contrast to the earlier assessments which included the identification of Nationally Rare and Nationally Scarce species.

Much new information has become available since the publication of Shirt (1987) and Hyman (1992 & 1994), the status assigned to many species by the earlier reviews has been revised and numerous nomenclatural changes have been incorporated in accordance with the latest checklist (Duff, 2012a). Appendix 1 provides a listing of all species included within this review together with the category to which they have been assigned at the previous reviews.

3. The IUCN threat categories and selection criteria

3.1 Summary of the 2001 Threat Categories

A brief outline of the revised IUCN criteria and their application is given below, a full explanation being available (IUCN, 2001, 2013) and on the IUCN web site (http://www.iucnredlist.org/; www.iucn.org/). The definitions of the categories are given in Figure 1 and the hierarchical relationship of the categories in Figure 2 (see Appendix 1). The category *Extinct in the wild* has not been applied in this review. All categories refer to the status in the GB (not globally).

Taxa that are confidently assumed to be extinct in Great Britain are listed here as Regionally Extinct (RE) to indicate that populations no longer exist within Britain but do occur elsewhere in the world (IUCN 2003). Proving extinction beyond reasonable doubt is difficult for many organisms and especially invertebrates. Species not recorded in Britain since 1900 are typically assumed to now be extinct, while species not recorded since 1950 but known to be especially difficult to find 'on demand' have been 'tagged' here as Possibly Extinct (IUCN 2011). This category was used to identify those Critically Endangered species that are likely to be Extinct, but for which confirmation is still required. As the IUCN Guidelines point out, this is not a new criterion, but a qualifier that is appended to Critically Endangered taxa, such that relevant taxa are reported as Critically Endangered (Possibly Extinct), abbreviated as CR(PE).

REGIONALLY EXTINCT (RE)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. In this review the last date for a record is set at fifty years before publication.

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Table 4).

ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Table 4).

VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Table 4).

NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

NOT EVALUATED (NE)
A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

Figure 1. Definitions of IUCN threat categories (from IUCN 2001 with a more specific definition for regional extinction)

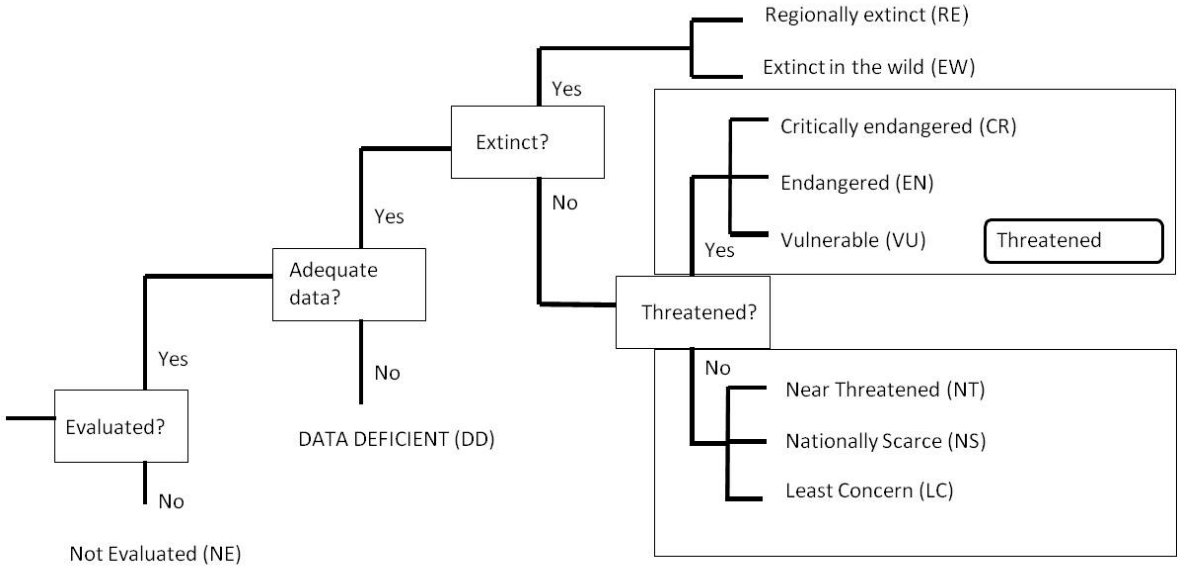

Figure adapted from IUCN (2001)

Figure 2. Hierarchical relationships of the categories

Taxa listed as *Critically Endangered*, *Endangered* or *Vulnerable* are defined as Threatened (Red List) species. For each of these threat categories there is a set of five main criteria A-E, with a number of sub-criteria within A, B and C (and an additional sub-criterion in D for the *Vulnerable* category), and one of which qualifies a taxon for listing at that level of threat. The qualifying thresholds within the criteria A-E differ between threat categories and are summarised in Table 4.

Table 4. Summary of the thresholds for the IUCN Criteria

Criterion	**Main thresholds**		
	Critically Endangered	***Endangered***	***Vulnerable***
A. Rapid decline	>80% over 10 years or 3 generations in past or future	>50% over 10 years or 3 generations in past or future	>30% over 10 years or 3 generations in past or future
B. Small range + fragmented, declining or fluctuating	Extent of occurrence <100km^2 or area of occupancy <10km^2 + two of the following: - severely fragmented or only a single location - continuing decline - extreme fluctuations	Extent of occurrence <5,000km^2 or area of occupancy <500km^2 + two of the following: - severely fragmented or no more than 5 locations - continuing decline - extreme fluctuations	Extent of occurrence 20,000km^2 or area of occupancy <2,000km^2 + two of the following: - severely fragmented or no more than 10 locations - continuing decline - extreme fluctuations
C. Small population and declining	<250 mature individuals, population declining	<2,500 mature individuals, population declining	<10,000 mature individuals, population declining
D. Very small population	<50 mature individuals	<250 mature individuals	D1. <1,000 mature individuals
D2. Very small area of occupancy			D2. <20km^2 or 5 or fewer locations
E. Quantifiable probability of extinction	>50% within 10 years or three generations	>20% within 20 years or five generations	>10% within 100 years

In the main, the assessment procedure relies on an objective assessmsnt of the available evidence. In certain cases, however, subjective assessments are acceptable as, for example, in predicting future trends and judging the quality of the habitat and methods involving estimation, inference and projection are acceptable throughout. Inference and projection may be based on extrapolation of current or potential threats into the future (including their rate of change), or of factors related to population abundance or distribution (including dependence on other taxa), so long as these can be reasonably supported. Suspected or inferred patterns in the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified as part of the documentation. Some threats need to be identified particularly early, and appropriate actions taken, because their effects are irreversible or nearly so (IUCN, 2001). Since the criteria have been designed for global application and for a wide range of organisms, it is hardly to be expected that each will be appropriate to every taxonomic group or taxon. Thus a taxon need not meet all the criteria A-E, but is allowed to qualify for a particular threat category on any single criterion. The criteria A, C, D1 and E are rarely appropriate for most beetles.

The guidelines stipulate/advise that a precautionary approach should be adopted when assigning a taxon to a threat category, and this should be the arbiter in borderline cases. The threat assessment should be made on the basis of reasonable judgment, and it should be particularly noted that it is not the worse-case scenario which will determine the threat category to which the taxon will be assigned.

The categorization process is only be applied to wild populations inside their natural range (IUCN, 2001), with a long-term presence (since 1500 AD) in the GB. Taxa deemed to be ineligible for assessment at a regional level were placed in the category of '**Not Applicable (NA)'.** This category is typically used for introduced non-native species whether this results from accidental or deliberate importation. It may also be used for recent colonists (or attempted colonists) responding to the changing conditions available in Britain as a result of human activity and/or climate change.

In this Review, **Extent of occurrence** (EOO) is not applied to most species as an agreed methodology for its measurement in relation to these beetle species is not available. There are some instances where the known EOO can be measured but these are the exception. They tend to be species known to occur on only one site where more work has been undertaken to ascertain their distribution.

Area of occupancy (AOO) is another measure that is difficult to apply to invertebrate records and populations as defined by the IUCN guidelines (IUCN, 2012a,b 2013).

"Area of occupancy is defined as the area within its 'extent of occurrence' which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data. To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, it may be necessary to standardize estimates by applying a scale-correction factor. It is difficult to give strict guidance on how standardization should be done because different types of taxa have different scale-area relationships." (IUCN, 2012a).

The IUCN have recommended a scale of 4km^2 (a tetrad) as the reference scale (IUCN, 2013). This needs to be applied with caution and there will be instances where a different scaling is more applicable, or where attempting to apply any scale is extremely difficult. For common and widespread species applying this rule will lead to under-estimation of their true AOO and a degree of interpretation is required. This highlights the importance of peer review and shared expert opinion for making decisions on scale.

3.2 The two-stage process in relation to developing a Red List

The IUCN regional guidelines (IUCN, 2003) indicate that if a given taxon is known to migrate into or out of the region it should be assessed using a two stage approach. Populations in the region under review should firstly be assessed as if they were isolated taxa. They

should then be reassessed and can be assigned a higher or a lower category if their status within the region is likely to be affected by emigration or immigration. The extent to which populations of beetles under threat are interdependent within Britain and between Britain and the Continent is uncertain and perhaps controversial. Recruitment from abroad has clearly accounted for the establishment of some newcomers to the British fauna.

3.3 The use of Near Threatened, Nationally Rare and Nationally Scarce categories

The IUCN guidelines recognize a *Near Threatened* category to identify species that need to be kept under review to ensure that they have not become Threatened. This category is used for species where a potential threat, natural habitat dependency or range change demand frequent review of status.

This review, as permitted under the IUCN guidelines, recognised a *Nationally Rare* category, defined as species recorded from 15 or fewer hectads of the Ordnance Survey national grid in Great Britain. It also recognised *Nationally Scarce* species, which are defined as species recorded in 16 to 100 hectads since 1980. This national set of definitions is referred to as the GB Rarity status within this document. Importantly, Nationally Rare and Nationaly Scarce are not categories of threat.

4. Methods and sources of information

4.1 Introduction

The most recent published list of scarce and threatened beetles (Hyman & Parsons, 1992 & 1994) was based on the Red Data Book criteria used in the British Insects Red Data Book (Shirt, 1987) with the addition of the category RDB K (Insufficiently Known) after Wells, Pyle & Collins (1983). The original IUCN criteria for assigning threat status used in these publications had the categories Endangered, Vulnerable and Rare, which were defined rather loosely and without quantitative thresholds. The application of these categories was largely a matter of judgment, and it was not easy to apply them consistently within a taxonomic group or to make comparisons between groups of different organisms.

4.2 Data sources

The author of this Review assessed the status of all 283 species of leaf beetles and their allies using the information sources described in this section and the system explained in Sections 3 and 6. During this process, the views of a number of other specialists (see Acknowledgements) were sought. The bulk of the data however comes from the Chrysomelidae recording scheme supplemented by information on the NBN Gateway and provided directly by a number of entomologists with experience in particular species and/or locations. It is important to acknowledge the considerable contribution made by all of these recorders.

The key source is the data compilation used for the Atlas (Cox, 2007), as accessed through the NBN Gateway. This was then supplemented using more recent data gathered by the national recorder but not yet accessible via the Gateway. Time was not spent in checking other data uploaded to the NBN Gateway as a brief inspection demonstrated a high level of records that require further checking and correspondence with original contributors.

For species achieving IUCN or GB rarity status, this data was also carefully examined and related to published information and data held by the author and/or peers. Records which were judged unreliable were discarded.

As the Chrysomelidae and near relatives are all plant-feeders, their insect-plant relationships in Britain are summarised in Appendix 3 for those extant species which have data sheets in this review (Section 13).

5. The assessments

5.1 The data table

The key outcome of this Review is the generation of a table which lists all of the taxa in the beetle families covered. The full table has been produced as a spreadsheet which accompanies this text. Appendix 1 provides an extract of the key data. The columns completed in the full accompanying Excel table are as follows:

Species name
Old BRC number
BRC concept
NBN taxon number
Presence in:
    England
    Scotland
    Wales
Area of occupancy
    Total number of hectads occupied for period up to and including 1979
    Total number of hectads occupied from period from 1980-2012
    Total number of dual hectads where species have been recorded from within the hectad in both date classes (see 5.2 below).
GB IUCN status (2013)
Qualifying criteria
Rationale
Global IUCN status (2010)
GB Rarity status (2013)
Status in Shirt (1987)
Status in Hyman (1986)
Status in Hyman (1992)
Ecological account
Popular synonyms

5.2 Date classes

This Review uses 1990 as the **point of measurement** as this was judged to be the date most applicable to the data concerned. It was judged that the adoption of a later date would have resulted in far too many species being found to have fewer than 100 hectads in the modern time period. This would obviously have seriously undermined the value of the assessments made. The use of this date has the consequence that Criterion B2b – continuing decline – has to rely heavily on estimation, inference and projection. The IUCN criteria assess declines based on data from the last ten years, but this is clearly not feasible for most invertebrate groups. It is extremely rare that any beetle has been comprehensively surveyed in the past ten years – even in the case of, for example, *Cryptocephalus coryli*, survey work has been limited to one site, albeit in considerable detail (Pendleton & Pendleton, 2013a). The reviewer has needed to assess whether reductions in the Area of Occupancy represent significant decline or lack of data. This will vary considerably between taxonomic groups and for different species

within taxonomic groups depending on survey effort. Use of B2b for any taxon therefore demands justification by an explanation of confidence in the rate of decline.

The IUCN Guidelines state that: “A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this.” It is clear then that a full review of the evidence is not essential but that it can be projected, much as the ‘population reduction’ criterion may rely on ‘observed, estimated, inferred, projected or suspected’ reduction. The objective is to achieve consensus amongst the appropriate experts on the level of evidence available and to apply it pragmatically.

6. Downgraded species

Down-grading of species should not be seen necessarily as evidence that species status is improving. In many cases the species were graded too highly in the 1992 Review through lack of availability of supporting data. The intervening period has seen a huge increase in recorder effort, targeting species with Nationally Scarce or RDB status – the Review acted as a focus or a 'call to arms', stimulating new recording – and the revised statuses presented here more accurately reflect the status of those species. The 1992 Review should – in many ways - be regarded as a first draft, a first attempt at assessing status. The effect of increased recording effort is particularly clear in the few years prior to the publication of 'the Atlas' (Cox, 2007) with a 'spike' of records submitted being followed by a sharp drop-off aftterwards. Some species have actually increased their abundances and/or ranges in the intervening period, as a result of a variety of factors. Other species appear truly to be declining, and the lack of records following publication of the 1992 Review is thus all the more significant .

The species in Table 5 were included in the earlier review by Hyman & Parsons (1992), but are not included here for the reasons stated in the following table. No species included in Shirt (1987) are excluded in this review.

Table 5. Species included in Hyman & Parsons (1992) but excluded from this review

Scientific name	**Hyman & Parsons, 1992**	**Rationale for exclusion**
Bruchus atomarius	Nb	Though local in England & Wales, and recorded from 83 widespread hectads since 1990, there is little overlap with the 103 hectads prior to this and it is likely that it is encountered on an *ad hoc* basis and is present in more locations than recorded.
Cryptocephalus aureolus	Nb	Widespread in England & Wales, recorded from 137 hectads since 1990 and 142 prior to this.
Chrysolina oricalcia	Nb	Widespread as far north as southern Scotland, and despite a possible decline in some parts of England, recorded from 116 hectads since 1990 and 100 prior to this.
Longitarsus dorsalis	Nb	Widespread in England south of the Humber, recorded from 115 hectads since 1990, a considerable increase on the 24 hectads prior to this, possibly due to increased recording effort and greater confidence in identifying *Longitarsus*.
Longitarsus parvulus	Na	Large increase to 381 hectads since 1990 due to the expansion in flax/linseed cultivation.

There are other species that occur in 100 hectads or less, but which the author believes should not be assessed for scarcity or rarity as they are not considered to be native to Britain. Under the IUCN Guidelines they have been assigned 'Not Applicable'. The species and the rationale for their exclusion are given in Table 6.

Table 6. Species categorised as 'Not Applicable'

Scientific name	Number of post-1990 hectads	Rationale for exclusion
Bruchus brachialis	4	First recorded in 2010 in south Essex. Arrival too recent for conservation status to be assessed.
Bruchus ervi	0	Found breeding in imported lentils in a shop in 1985. Accidental introduction requiring imported produce and heated premises.
Bruchus pisorum	10	Widespread but associated with stored/imported dried peas. Accidental introduction requiring imported produce and heated premises.
Bruchidius imbricornis	1	First recorded in 2012 in Essex. Arrival too recent for conservation status to be assessed.
Bruchidius incarnatus	0	Very rare introduction with dried beans and similar produce. Accidental introduction requiring imported produce and heated premises.
Bruchidius varius	62	First recorded in 1994, now widely scattered in SE England and the Midlands. Arrival too recent for conservation status to be assessed, but likely to expand its range.
Acanthoscelides obtectus	5	Imported with stored legumes. Accidental introduction requiring imported produce and heated premises.
Callosobruchus chinensis	2	Imported with stored legumes. Accidental introduction requiring imported produce and heated premises.
Callosobruchus maculatus	5	Imported with stored legumes. Accidental introduction requiring imported produce and heated premises.
Zabrotes subfasciatus	0	Imported with stored butter beans. Accidental introduction requiring imported produce and heated premises.
Lilioceris lilii	310	First recorded in the 19th century, but expanded its range since the 1980s, now widespread and expanding its range further north and west, and regarded as a garden or horticultural pest.
Chrysolina americana	40	First recorded in 1963, and expanding its range.
Chrysolina coerulans	4	First recorded in 2003, first breeding record in 2011. Arrival too recent for conservation status to be assessed.
Chrysomela saliceti	1	First recorded in 2012, found to be breeding. Arrival too recent for conservation status to be assessed.
Xanthogaleruca luteola	1	Occasional import. Not established.
Diabrotica virgifera	2	Accidental import. Believed to have been extermined but may be present and/or reintroduced.
Luperomorpha xanthodera	3	Accidental import. It is uncertain whether this species can successfully overwinter outside of heated premises.
Psylliodes cucullata	2	First recorded in 1991. Arrival too recent for conservation status to be assessed.

The status of new arrivals in Britain is very difficult to ascertain. Where this results from a natural colonisation from the near continent, they may be expected to continue to expand and may exceed 100 hectads within the next few decades. Their natural range, or 'extent of occurrence' under the IUCN Guidelines expands with them, but they are not long-term residents in Britain and so are excluded from the IUCN categorisation. The precautionary principle suggests that they should not be afforded a regional conservation status unless the source population itself is threatened, which would seem unlikely in most cases, although climate change may impose such a threat. In many cases there is a strong suspicion that the arrival in Britain is actually a chance introduction and the resulting populations are not normally afforded conservation status. This is most commonly the case with bruchines associated with imported foods as they require the imported product and heated premises to survive, and do not form established populations. Where it is unclear if a species has formed a population that is expected to be sustained, a 'Data Deficient' (DD) category is used and the species is similarly not assessed.

7. Format of the species accounts

7.1 Information on the species accounts

Species accounts have been prepared for each of the CR, EN, VU, NT and DD species. Previous reviews have also included species accounts for Nationally Rare and Nationally Scarce taxa.

Information on each species is given in a standard form. The data sheets are designed to be largely self-contained in order to enable site managers to compile species-related information on site files; this accounts for some repetition between the species accounts. This section provides context for nine items of information on each of the data sheets and includes a final section discussing taxa which have formerly had conservation status but which have been down-graded as part of this re-assessment process.

7.2 The species name

Nomenclature is intended to be as up to date as possible and is based on Duff (2012a). Information is also provided on any older names which have been used in the main identification literature.

7.3 Identification

The emphasis is on English language publications covering the British Isles; work in other languages or from other/wider geographical areas is only referred to where no other options are available or where the non-English/wider work is more comprehensive, detailed or up-to-date.

Full coverage of adults is provided by Hubble (2012) and will also be given by Andrew Duff's *Beetles of Britain and Ireland, Volume 4: Cerambycidae to Platypodidae* due for publication in 2015. Prior to this, the most recent full coverage was Joy (1932), supplemented by Hodge and Jones (1995). Although not an identification guide, Cox (2007) and the associated supplementary notes provide colour photographs of several species, plus text descriptions of all. A recommended online resource is Lech Borowiec's *European Chrysomelidae* (http://www.biol.uni.wroc.pl/cassidae/European Chrysomelidae/list of subfamilies.htm) which includes high resolution photos of the adults of many species, often including dissected male genitalia.

Three species covered in this review have been newly identified in Britain since the publication of Hubble (2012); they are *Bruchidius imbricornis* (Hodge, 2012), *Chrysomela saliceti* (Mendel & Hatton, 2012; 2013) and *Longitarsus minusculus* (Cox & Duff, 2013), noting that the latter was collected in 2002, but only recently identified.

There is no single guide to juvenile stages; Cox (2007) provides a list of sources covering larvae and pupae, covering various taxonomic groups to species, genera or subfamily level. The larvae of Russian fauna are keyed to species (in Russian) by Zaytsev & Medvedev (2009) which provides good coverage of the British fauna, although the Bruchinae are not included. Ogloblin & Medvedev (1971) gives similar coverage for the European part of the then Soviet

Union, again in Russian. The larvae of several alticine species are figured in Čižek & Doguet (2008) which covers the Czech Republic and Slovakia (in Czech) but overlaps widely with the British fauna.

7.4 Distribution

Records held in the database of the national species recording scheme form the basis for determining the distribution of each species. In most cases these data can be accessed through the NBN Gateway (www.searchnbn.net) and therefore individual records have generally not been listed. The exceptions are those species known from only a relatively small number of sites and where site information is considered essential to understanding habitat, ecology, status, threats and conservation. The Watsonian vice-counties (Dandy, 1969) are included in the NBN database for many records but are not referred to in this review. International distribution is only referred to where a comment on the species' biogeography is considered particularly relevant and where the information is readily accessible.

7.5 Habitat and ecology

This section aims to provide an overview of both the precise habitat requirements of each species – larvae and adults - and the wider landscape context. In many cases current knowledge is inadequate and speculation remains the only option. Information on the life cycle and seasonal patterns is also included.

Separation of where species are found by recorders from the actual habitat preferences of those species is fraught with difficulty. A good example is provided by arboreal beetles which are often taken by sweep-netting the field layer below after they have fallen from the canopy. Fogging often demonstrates that such species typically occur in greater numbers in the canopy than in the field layer, as one might expect. In the absence of fogging data one can only speculate.

Vegetation structure is well known to be of major importance to invertebrates and yet recorders very rarely note the key features of the situations in which they find the beetles. Comments on structure provided in the following species accounts may be based on a relatively few, often personal, experiences.

Flight and mobility are very important in understanding the use beetles make of habitat mosaics, but little is known about these aspects. Climatic factors are an important influence and will vary across the country – in many beetle species active flight is associated with conditions of relatively high temperatures, relatively high humidity, and little or no air movement. Mobility will naturally be higher under the more continental climatic conditions of southern and eastern Britain than in the cooler north and west. Species on the edge of their European range in Britain may be less mobile than their continental equivalents.

The level of wing development varies greatly between chrysomelid species, with many fully winged (and presumed to probably be capable of flight where this has not been observed), while some such as *Mniophila muscorum* are wingless. It also varies within some species, for example *Longitarsus melanocephalus*, the adults of which may have full, reduced or vestigial wings (Shute, 1980). Therefore, the rate of colonisation is also likely to vary greatly between

species, being slower for those which are flightless, such as *Longitarsus symphyti* first recorded in Britain in 2009 (Harrison, 2010). This has implications in particular for species which are in fragmented or otherwise isolated areas of suitable habitat, as those which are flightless may not be able to spread to other areas even where suitable habitat is available.

Considerable emphasis is placed in this review on the importance of relict sites in supporting rare species. This indicates that such species have poor dispersal capacity or that they require a special set of conditions provided only by such sites, or perhaps a combination of the two.

7.6 Status

Status is largely based on range size and both short and long term trends, but association of a species with particular habitats under threat is also taken into account. Counts of hectads known to be occupied since 1990 were used to establish whether or not a species might be considered scarce. The IUCN guidelines (see Section 3) were then used to decide whether such species might also be considered under threat, and to assign a category. Detailed survey data is rare but has been used where available. Also, the large increase in recording effort leading to publication of the Atlas (Cox, 2007) increases the confidence (in most cases) that apparent declines are real rather than artefacts of under-recording or failure to re-visit known sites.

Only species which have been assessed as Critically Endangered, Endangered, Vulnerable, Near Threatened or Data Deficient are provided with species accounts. The status of these and all other species in this review is summarised in Annex 1.

The IUCN criteria are not rigid about the need for real data, but allow for expert opinion – 'estimated, inferred, projected or suspected' are acceptable reasons. Therefore, some species currently known from fewer than one hundred hectads have been excluded from Nationally Scarce status on this basis i.e. taking an equivalent approach given that the IUCN criteria do not cover Nationally Scarce status. It is appreciated that many species of Coleoptera are not yet recorded from more than one hundred hectads but are expected to be found to occur in more than one hundred when their distribution is better known. Thus, assessments of status can only be based on current knowledge, which is very unlikely to be comprehensive in the majority of cases, being based on the experience of a limited number of active recorders in each generation. The likely national distribution of each species and trends in population size must, therefore, be extrapolated from the available information so as to arrive at the best estimate of the likely national status of each species.

Beetles lend themselves to preservation as sub-fossils by virtue of their hard body parts. Many studies of organic deposits that can be reliably dated to postglacial times generate valuable information on the history of a particular species in what is now referred to as Britain. Those studies provide irrefutable evidence for long-term presence. The data has been collated and made available by Buckland & Buckland (2006).

7.7 Threats

It is those human activities that result in the loss of sites or that change the nature of habitats that are most likely to pose the greatest threats to invertebrate populations. Where specific threats might arise they are mentioned, otherwise the statements attempt to summarise in general terms those activities which are considered most likely to place populations of these beetles at risk.

One of the commonest threats during the latter half of the 20th century in particular was changing land use with many areas of grassland habitat being 'improved' through reseeding and/or the application of fertilisers, or converted to arable use. With the resulting loss of plant diversity came reductions in invertebrate diversity, and large increases in the range and abundance of those suited to a monoculture e.g *Longitarsus parvulus* which is associated with flax/linseed. Pesticide use is also likely to have had an impact as part of the broad intensification of land use, affecting chrysomelids both directly (insecticides) and indirectly (herbicides affecting food-plants). Development has also led to significant habitat loss (the Dorset heathlands being a well-known example) with further degradation due to factors such as pollutants in urban or road run-off and pressure through increased site use, especially where unsympathetic to its conservation value.

The reduction or cessation of traditional land management and land use also led to habitat loss and degradation through succession with grass- and heathland areas becoming scrubbed over, and open areas within woodland reverting to closed-canopy conditions. This neglect can even be seen in sites with some conservation protection or designation where the required level of rotational disturbance (e.g. felling, coppicing, mowing, grazing) is not implemented. Further, land management is often unsympathetic to less well-known and familiar groups of organisms, especially when their conservation ecology is not well known and understood. As noted by Rackham (2006), conservation measures should be based on practical observation rather than unstable theory.

7.8 Management and conservation

Some of the oldest nature reserves in Britain were created to protect their invertebrate interest, eg Wicken Fen, but beetles are rarely the prime movers in site designation and protection. Nevertheless the value of beetles as indicators of site condition has been recognised when many SSSI have been re-evaluated. Beetles also feature in designations for some Special Areas of Conservation (SAC).

Where known sites have the benefit of statutory protection, as, for example, in the case of National Nature Reserves (NNRs) or Sites of Special Scientific Interest (SSSI), this is noted. Sites designated as SAC under the European Habitats Directive and SSSI have the potential to provide protection for beetles as long as the conservation interest associated with them is acknowledged, and as long as that interest is effectively translated into site conservation objectives. Loss of suitable habitat continues in undesignated sites. The populations of many beetle species with fragmented distributions are relicts of previously widespread populations, surviving in small patches of relatively undisturbed habitats after loss of the intervening habitats. For these species it is critical to maintain a chain of protected sites. Other species are more mobile and often rely on dynamic ecological processes operating over areas larger than

those normally covered by individual designated sites. Some of these species have benefited from recent changes in the modern landscape, for example the tall herb pioneer community that colonises brownfield sites following abandonment of use. Others, such as the beetle assemblages associated with thermophilic patchwork landscapes, where the small scale intricacies provide local shelter and warmth, have been seriously impacted by rigid approaches to flood control and land management.

Preventative measures and positive action designed to maintain populations are suggested where these are known or can reasonably be inferred. Inevitably, in many cases, this section tends to be generalised, identifying practices that have been found to favour those aspects of the habitat with which the species may be associated. It is very rare that a threatened British beetle has been subject to a monitoring scheme but these are referred to where such schemes are known about, although a few species have been investigated in detail as part of the UK Government's Biodiversity Action Plan. Fry & Lonsdale (1991) and Kirby (2001) both give excellent general accounts of the relevant conservation issues and habitat management measures which may be undertaken.

For most species, the precise levels of, for example, grazing or cutting are not known and therefore management advice is generic. However, this general advice is retained in order to ensure that the species data sheets can be read as stand-alone documents.

7.9 Published sources

Literature references that have contributed information to the Data Sheet are cited here.

8. Acknowledgements

The Review was commissioned by Jon Webb (Natural England) and managed by Steven Falk (Buglife). The format and content is based closely on the recent water beetle review (Foster, 2010) and Keith Alexander's subsequent publications in this review series; key sections of text have been adopted and adapted for the current review in order to maintain consistency of approach.

A number of people provided invaluable comments on draft versions of the review spreadsheet: John Bratton, Martin Collier, Adrian Fowles, Steve Lane, Geoff Oxford, Alan Stewart, Jon Webb and those members of the Inter-Agency Working Group (IAWG) whose comments were anonymised or combined.

Geoff Oxford also provided invaluable recent data and articles about the Tansy Beetle *Chrysolina graminis*, including work by and on behalf of the Tansy Beetle Action Group.

Mark Telfer provided information about discussions and issues relating to parallel work on the Carabidae.

Björn Beckmann at the Biological Records Centre as ever provided prompt responses to requests for reprints and for data to be added to the recording scheme database. Special thanks also go to Stephanie Rorke at BRC for prompt and precise completion of several data-handling requests – essential help during the early stages of this review and much appreciated.

Dave Hubble
28 St. Mary's Road
Eastleigh
Hants
SO50 6BP

9. Species listed by IUCN status category

In this list the species are given in taxonomic order within status categories.

Regionally Extinct
Clytra laeviuscula Ratzeburg, 1837
Cryptocephalus violaceus Laicharting, 1781
Hypocassida subferruginea (Schrank, 1776)

Critically Endangered (Possibly Extinct)
Bruchidius olivaceus (Germar, 1824)
Cryptocephalus exiguus Schneider, 1792
Labidostomis tridentata (Linnaeus, 1758)
Chrysomela tremula Fabricius, 1787
Longitarsus aeruginosus (Foudras, 1860)
Apteropeda splendida Allard, 1860
Psylliodes hyoscyami (Linnaeus, 1758)

Critically Endangered
Smaragdina affinis (Illiger, 1794)
Bromius obscurus (Linnaeus, 1758)
Galeruca laticollis (Sahlberg, C.R., 1838)
Longitarsus longiseta Weise, 1889
Chaetocnema aerosa (Letzner, 1847)
Psylliodes luridipennis Kutschera, 1864

Endangered
Zeugophora flavicollis (Marsham, 1802) *Macroplea mutica* (Fabricius, 1793)
Oulema erichsoni (Suffrian, 1841)
Macroplea mutica (Fabricius, 1793)
Cryptocephalus coryli (Linnaeus, 1758)
Cryptocephalus decemmaculatus (Linnaeus, 1758
Cryptocephalus nitidulus Fabricius, 1787
Cryptocephalus primarius Harold, 1872
Cryptocephalus querceti Suffrian, 1848
Cryptocephalus sexpunctatus (Linnaeus, 1758)
Chrysolina cerealis (Linnaeus, 1767)
Chrysolina graminis (Linnaeus, 1758)
Chrysolina latecincta (Demaison, 1896), with subspecies *intermedia* (Franz, 1938)
Longitarsus ferrugineus (Foudras, 1860)
Dibolia cynoglossi (Koch, J.D.W., 1803)
Psylliodes attenuata (Koch, J.D.W., 1803)
Psylliodes sophiae Heikertinger, 1914
Cassida denticollis Suffrian, 1844

Vulnerable
Zeugophora turneri Power, 1863
Donacia aquatica (Linnaeus, 1758)
Donacia dentata Hoppe, 1795
Donacia sparganii Ahrens, 1810
Cryptocephalus biguttatus (Scopoli, 1763)
Cryptocephalus punctiger Paykull, 1799
Hydrothassa hannoveriana (Fabricius, 1775)
Phyllotreta striolata (Fabricius, 1803)
Longitarsus absynthii Kutschera, 1862
Longitarsus nigerrimus (Gyllenhal, 1827)
Ochrosis ventralis (Illiger, 1807)
Chaetocnema sahlbergii (Gyllenhal, 1827)

Near Threatened
Cryptocephalus frontalis Marsham, 1802
Phratora polaris Schneider, 1886
Chrysolina marginata (Linnaeus, 1758)
Longitarsus nigrofasciatus (Goeze, 1777)
Pilemostoma fastuosa (Schaller, 1783)

Data Deficient
Smaragdina salicina (Scopoli, 1763)
Agelastica alni (Linnaeus, 1758)
Aphthona pallida (Bach, 1856)
Longitarsus minusculus (Foudras, 1860)
Longitarsus symphyti (Heikertinger, 1912)
Longitarsus obliteratoides Gruev, 1973
Cassida sanguinosa Suffrian, 1844

10. Species listed by GB Rarity Status category

Nationally Rare

Zeugophora flavicollis (Marsham, 1802)
Zeugophora turneri Power, 1863
Bruchidius olivaceus (Germar, 1824)
Macroplea mutica (Fabricius, 1793)
Donacia dentata Hoppe, 1795
Donacia sparganii Ahrens, 1810
Oulema erichsoni (Suffrian, 1841)
Labidostomis tridentata (Linnaeus, 1758)
Smaragdina affinis (Illiger, 1794)
Cryptocephalus biguttatus (Scopoli, 1763)
Cryptocephalus coryli (Linnaeus, 1758)
Cryptocephalus decemmaculatus (Linnaeus, 1758)
Cryptocephalus exiguus Schneider, 1792
Cryptocephalus nitidulus Fabricius, 1787
Cryptocephalus primarius Harold, 1872
Cryptocephalus punctiger Paykull, 1799
Cryptocephalus querceti Suffrian, 1848
Cryptocephalus sexpunctatus (Linnaeus, 1758)
Chrysolina cerealis (Linnaeus, 1767)
Chrysolina graminis (Linnaeus, 1758)
Chrysolina latecincta (Demaison, 1896), with subspecies *intermedia* (Franz, 1938)
Chrysolina marginata (Linnaeus, 1758)
Hydrothassa hannoveriana (Fabricius, 1775)
Chrysomela tremula Fabricius, 1787
Phratora polaris Schneider, 1886
Galeruca laticollis (Sahlberg, C.R., 1838)
Agelastica alni (Linnaeus, 1758)
Phyllotreta striolata (Fabricius, 1803)
Longitarsus aeruginosus (Foudras, 1860)
Longitarsus absynthii Kutschera, 1862
Longitarsus ferrugineus (Foudras, 1860)
Longitarsus longiseta Weise, 1889
Longitarsus nigerrimus (Gyllenhal, 1827)
Longitarsus nigrofasciatus (Goeze, 1777)
Longitarsus obliteratoides Gruev, 1973
Longitarsus quadriguttatus (Pontoppidan, 1763)
Ochrosis ventralis (Illiger, 1807)
Neocrepidodera impressa (Fabricius, 1801)
Chaetocnema aerosa (Letzner, 1847)
Chaetocnema sahlbergii (Gyllenhal, 1827)
Apteropeda splendida Allard, 1860
Dibolia cynoglossi (Koch, J.D.W., 1803)
Psylliodes attenuata (Koch, J.D.W., 1803)
Psylliodes hyoscyami (Linnaeus, 1758)

Psylliodes luridipennis Kutschera, 1864
Psylliodes sophiae Heikertinger, 1914
Pilemostoma fastuosa (Schaller, 1783)
Cassida denticollis Suffrian, 1844
Cassida sanguinosa Suffrian, 1844

Nationally Scarce
Orsodacne cerasi (Linnaeus, 1758)
Orsodacne humeralis Latreille, 1804
Macroplea appendiculata (Panzer, 1794)
Donacia aquatica (Linnaeus, 1758)
Donacia bicolora Zschach, 1788
Donacia cinerea Herbst, 1784
Donacia crassipes Fabricius, 1775
Donacia impressa Paykull, 1799
Donacia obscura Gyllenhal, 1813
Donacia thalassina Germar, 1811
Plateumaris bracata (Scopoli, 1772)
Plateumaris rustica (Kunze, 1818)
Clytra quadripunctata (Linnaeus, 1758)
Cryptocephalus bilineatus (Linnaeus, 1767)
Cryptocephalus bipunctatus (Linnaeus, 1758)
Cryptocephalus frontalis Marsham, 1802
Cryptocephalus hypochaeridis (Linnaeus, 1758)
Cryptocephalus parvulus Müller, O.F., 1776
Chrysolina haemoptera (Linnaeus, 1758)
Chrysolina sanguinolenta (Linnaeus, 1758)
Chrysolina sturmi (Westhoff, 1882)
Phaedon concinnus Stephens, 1831
Gonioctena decemnotata (Marsham, 1802)
Gonioctena viminalis (Linnaeus, 1758)
Luperus flavipes (Linnaeus, 1767)
Calomicrus circumfusus (Marsham, 1802)
Phyllotreta consobrina (Curtis, 1837)
Phyllotreta cruciferae (Goeze, 1777)
Phyllotreta punctulata (Marsham, 1802)
Aphthona nigriceps (Redtenbacher, 1842)
Longitarsus aeneicollis (Faldermann, 1837)
Longitarsus agilis (Rye, 1868)
Longitarsus anchusae (Paykull, 1799)
Longitarsus ballotae (Marsham, 1802)
Longitarsus brunneus (Duftschmid, 1825)
Longitarsus curtus (Allard, 1860)
Longitarsus fowleri Allen, 1967
Longitarsus ganglbaueri Heikertinger, 1912
Longitarsus lycopi (Foudras, 1860)
Longitarsus nasturtii (Fabricius, 1793)
Longitarsus obliteratus (Rosenhauer, 1847)

Longitarsus ochroleucus (Marsham, 1802)
Longitarsus plantagomaritimus Dollman, 1912
Longitarsus rutilus (Illiger, 1807)
Longitarsus tabidus (Fabricius, 1775)
Altica brevicollis Foudras, 1860
Altica longicollis (Allard, 1859)
Lythraria salicariae (Paykull, 1800)
Crepidodera nitidula (Linnaeus, 1758)
Epitrix atropae Foudras, 1860
Podagrica fuscicornis (Linnaeus, 1767)
Podagrica fuscipes (Fabricius, 1775)
Mantura chrysanthemi (Koch, J.D.W., 1803)
Mantura obtusata (Gyllenhal, 1813)
Mantura rustica (Linnaeus, 1767)
Chaetocnema confusa (Boheman, 1851)
Chaetocnema subcoerulea (Kutschera, 1864)
Apteropeda globosa (Illiger, 1794)
Mniophila muscorum (Koch, J.D.W., 1803)
Psylliodes chalcomera (Illiger, 1807)
Psylliodes cuprea (Koch, J.D.W., 1803)
Psylliodes luteola (Müller, O.F., 1776)
Cassida hemisphaerica Herbst, 1799
Cassida nebulosa Linnaeus, 1758
Cassida nobilis Linnaeus, 1758
Cassida prasina Illiger, 1798

11. Taxonomic list of Red Data Book and Nationally Scarce Species

Table 7. Taxonomic list of Red Data Book and Nationally Scarce species

Species Name	**Shirt (1987)**	**Hyman & Parsons (1992)**	**This review (IUCN Status)**	**This review (GB Rarity Status)**
Zeugophora flavicollis	RDB1	RDB2	EN	NR
Zeugophora turneri		Na	VU	NR
Orsodacne cerasi			LC	NS
Orsodacne humeralis		Nb	LC	NS
Bruchus atomarius		Nb	LC	
Bruchidius olivaceus		RDB1	CR(PE)	
Macroplea appendiculata	RDB3	RDB3	LC	NS
Macroplea mutica	RDB3	Na	EN	NR
Donacia aquatica		RDB3	VU	NR
Donacia bicolora		RDB2	LC	NS
Donacia cinerea		Nb	LC	NS
Donacia crassipes		Nb	LC	NS
Donacia dentata		Na	VU	NR
Donacia impressa		Na	LC	NS
Donacia obscura	RDB2	Na	LC	NS
Donacia sparganii		Na	VU	NR
Donacia thalassina		Nb	LC	NS
Plateumaris bracata		Na	LC	NS
Plateumaris rustica		Nb	LC	NS
Oulema erichsoni	RDB3	RDB1	EN	NR
Labidostomis tridentata	RDB1	RDB1	CR(PE)	
Clytra laeviuscula	Extinct	Extinct	RE	
Clytra quadripunctata			LC	NS
Smaragdina affinis	RDB1	RDB1	CR	NR
Smaragdina salicina			DD	NR
Cryptocephalus aureolus		Nb		
Cryptocephalus biguttatus	RDB2	RDB2	VU	NR
Cryptocephalus bilineatus		Nb	LC	NS
Cryptocephalus bipunctatus		Nb	LC	NS
Cryptocephalus coryli	RDB1	RDB1	EN	NR
Cryptocephalus decemmaculatus	RDB2	RDB2	EN	NR
Cryptocephalus exiguus	RDB1	RDB1	CR(PE)	NR
Cryptocephalus frontalis		Na	NT	NR
Cryptocephalus hypochaeridis			LC	NS
Cryptocephalus nitidulus	RDB1	RDB1	EN	NR

Species Name	Shirt (1987)	Hyman & Parsons (1992)	This review (IUCN Status)	This review (GB Rarity Status)
Cryptocephalus parvulus		Nb	LC	NS
Cryptocephalus primarius	RDB1	RDB1	EN	NR
Cryptocephalus punctiger		Na	VU	NR
Cryptocephalus querceti	RDB2	RDB2	EN	NR
Cryptocephalus sexpunctatus	RDB2	RDB2	EN	NR
Cryptocephalus violaceus	Extinct	Extinct	RE	
Bromius obscurus	RDB1	RDB1	CR	NR
Chrysolina cerealis	RDB1	RDB1	EN	NR
Chrysolina graminis		Na	EN	NR
Chrysolina haemoptera		Nb	LC	NS
Chrysolina latecincta	RDB2	RDB2	EN	NR
Chrysolina marginata		Na	NT	NR
Chrysolina oricalcia		Nb		
Chrysolina sanguinolenta		Na	LC	NS
Chrysolina sturmi		Nb	LC	NS
Phaedon concinnus		Nb	LC	NS
Hydrothassa hannoveriana	RDB3	RDB3	VU	NR
Chrysomela tremula	RDB1	RDB1	CR(PE)	
Gonioctena decemnotata		Nb	LC	NS
Gonioctena viminalis			LC	NS
Phratora polaris	RDB3	RDB3	NT	NR
Galeruca laticollis	RDB1	RDB1	CR	NR
Luperus flavipes		Nb	LC	NS
Calomicrus circumfusus		Na	LC	NS
Agelastica alni	Extinct	RDBK	DD	NR
Phyllotreta consobrina			LC	NS
Phyllotreta cruciferae		Nb	LC	NS
Phyllotreta punctulata		Nb	LC	NS
Phyllotreta striolata			VU	NR
Aphthona nigriceps		Na	LC	NS
Aphthona pallida			DD	NR
Longitarsus absynthii		Na	VU	NR
Longitarsus aeneicollis		Nb	LC	NS
Longitarsus aeruginosus		RDB1	CR(PE)	
Longitarsus agilis		Na	LC	NS
Longitarsus anchusae		Nb	LC	NS
Longitarsus ballotae		Nb	LC	NS
Longitarsus brunneus		Nb	LC	NS
Longitarsus curtus		Na	LC	NS
Longitarsus dorsalis		Nb		
Longitarsus ferrugineus		RDB1	EN	NR
Longitarsus fowleri		Na	LC	NS

Species Name	Shirt (1987)	Hyman & Parsons (1992)	This review (IUCN Status)	This review (GB Rarity Status)
Longitarsus ganglbaueri		Na	LC	NS
Longitarsus longiseta		RDBK	CR	NR
Longitarsus lycopi		Nb	LC	NS
Longitarsus minusculus			DD	NR
Longitarsus nasturtii		Nb	LC	NS
Longitarsus nigerrimus	RDB1	RDB1	VU	NR
Longitarsus nigrofasciatus		Na	NT	NR
Longitarsus obliteratoides			DD	NR
Longitarsus ochroleucus		Nb	LC	NS
Longitarsus parvulus		Na		
Longitarsus plantagomaritimus		Nb	LC	NS
Longitarsus quadriguttatus	RDB3	Na	LC	NR
Longitarsus rutilus	RDB2	Na	LC	NS
Longitarsus symphyti			DD	NR
Longitarsus tabidus		Nb	LC	NS
Altica brevicollis		Na	LC	NS
Altica longicollis		Nb	LC	NS
Lythraria salicariae		Nb	LC	NS
Ochrosis ventralis		RDB3	VU	NR
Neocrepidodera impressa		Na	LC	NR
Phyllotreta striolata		Na	VU	NR
Crepidodera nitidula		Nb	LC	NS
Epitrix atropae		Nb	LC	NS
Podagrica fuscicornis		Nb	LC	NS
Podagrica fuscipes		Na	LC	NS
Mantura chrysanthemi		Na	LC	NS
Mantura obtusata		Nb	LC	NS
Mantura rustica		Nb		NS
Chaetocnema aerosa		RDBK	CR	NR
Chaetocnema confusa			LC	NS
Chaetocnema sahlbergii		Na	VU	NR
Chaetocnema subcoerulea		Nb	LC	NS
Apteropeda globosa		Nb	LC	NS
Apteropeda splendida		RDB1	CR(PE)	NR
Mniophila muscorum		Nb	LC	NS
Dibolia cynoglossi	RDB1	RDB1	EN	NR
Psylliodes attenuata		RDB1	EN	NR
Psylliodes chalcomera		Nb	LC	NS
Psylliodes cuprea			LC	NS
Psylliodes hyoscyami	RDB1	RDB1	CR(PE)	
Psylliodes luridipennis	RDB1	RDB2 Endemic	CR	NR
Psylliodes luteola		RDBK	LC	NS

Species Name	**Shirt (1987)**	**Hyman & Parsons (1992)**	**This review (IUCN Status)**	**This review (GB Rarity Status)**
Psylliodes sophiae	RDB3	RDB3	EN	NR
Pilemostoma fastuosa		Na	NT	NR
Hypocassida subferruginea	Extinct	Extinct	RE	
Cassida denticollis	RDB3	RDB1	EN	NR
Cassida hemisphaerica		Na	LC	NS
Cassida nebulosa		RDBI	LC	NS
Cassida nobilis		Nb	LC	NS
Cassida prasina		Nb	LC	NS
Cassida sanguinosa			DD	NR

12. Criteria used for assigning species to threatened categories (see Appendix 2 for criteria and categories)

Table 8. Criteria used to assign extant species to GB IUCN categories with a level of threat VU or greater, not including Data Deficient (DD) or Regionally Extinct (RE) species

Species Name	GB IUCN Status	Criteria used
Zeugophora flavicollis	EN	B2a, bii, biv
Zeugophora turneri	VU	B2a, bii
Bruchidius olivaceus	CR(PE)	C1, C2a(i), D
Macroplea mutica	EN	B2a, bii, biv
Donacia aquatica	VU	A2c, B2a bii
Donacia dentata	VU	B2a, bii, biv
Donacia sparganii	VU	B2a, bii, biv
Oulema erichsoni	EN	B2a, bii, biv
Labidostomis tridentata	CR(PE)	C1, C2a(i), D
Smaragdina affinis	CR	B2a, bii, biv
Cryptocephalus biguttatus	VU	B2a, bii, biv
Cryptocephalus coryli	EN	B2a, bii, biv
Cryptocephalus decemmaculatus	EN	B2a, bii, biv
Cryptocephalus exiguus	CR(PE)	B2a, bii, biii,biv
Cryptocephalus nitidulus	EN	B2a, bii, biv
Cryptocephalus primarius	EN	B2a, bii, biv
Cryptocephalus punctiger	VU	B2a, bii, biv
Cryptocephalus querceti	EN	B2a, bii, biv
Cryptocephalus sexpunctatus	EN	B2a, bii, biv, bv
Bromius obscurus	CR	B2a, bii
Chrysolina cerealis	EN	B2a, bii
Chrysolina graminis	EN	B2a, bii, biv
Chrysolina latecincta	EN	B2a, bii, biv
Hydrothassa hannoveriana	VU	B2a, bii, biv
Chrysomela tremula	CR(PE)	C1, C2a(i), D
Galeruca laticollis	CR	B2a, bii, biv
Phyllotreta striolata	VU	B2a, bii, biv
Longitarsus absynthii	VU	B2a, bii, biv
Longitarsus aeruginosus	CR(PE)	C1, C2a(i), D
Longitarsus ferrugineus	EN	B2a, bii, biv
Longitarsus longiseta	CR	B2a, bii
Longitarsus nigerrimus	VU	D2
Ochrosis ventralis	VU	B2a, bii, biv
Chaetocnema aerosa	CR	B2a, bii, biv
Chaetocnema sahlbergii	VU	B2a, bii, biv
Apteropeda splendida	CR(PE)	B2a, bii, biv
Dibolia cynoglossi	EN	B2a, bii, biv

Species Name	GB IUCN Status	Criteria used
Psylliodes attenuata	EN	B2a, bii, biv
Psylliodes hyoscyami	CR(PE)	C1, C2a(i), D
Psylliodes luridipennis	CR	B2a, bii, biii
Psylliodes sophiae	EN	B2a, bii, biv
Cassida denticollis	EN	B2a, bii, biv

13. The data sheets

The data sheets are given in alphabetical order by scientific name within each subfamily (which are also arranged alphabetically). Individual species can be found by looking up the generic or specific names (including synonyms used in Shirt (1987) and Hyman & Parsons (1992) in the index. Dimensions of eggs are given where observations have been made but are not formally published/described and in these cases, mean values are given. Where descriptions of juvenile stages, including eggs, have been published, the references are cited.

13.1 Bruchinae

Previously considered a distinct family (Kingsolver, 2002), bruchines have been variously known as seed beetles, pea weevils, bean weevils, bean beetles and beanseed beetles due to their association with the seeds of leguminous plants. Many are pests of such crops, including dried and stored produce, especially in tropical and subtropical areas.

BRUCHIDIUS OLIVACEUS C1, C2a(i), D
CRITICALLY ENDANGERED (POSSIBLY EXTINCT)
Order COLEOPTERA
Family CHRYSOMELIDAE

Bruchidius olivaceus (Germar, 1824)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Previously recorded from scattered sites across southern England.

Habitat and ecology On sainfoin *Onobrychis viciifolia* on calcareous grassland and agricultural land. Adults feed on pollen, larvae develop within seeds and probably overwinter within the pods. Possibly also found on rock-roses *Cistus*, brideworts *Spiraea* and the introduced Scorpion Senna *Hippocrepis emersus*.

Status Last recorded in 1923 following a rapid decline likely to be due to factors beyond simply the decline of its main food-plant, for example changes in agricultural management and loss of chalk grassland. There have been “sufficient” “adequate” searches for this species. This species is considered 'Possibly Extinct' as it hasn’t been seen for decades would qualify as CR(PE) C1, C2a(i), D on the basis that it is likely or there is a strong presumption that to have populations less than 50 mature individuals and have declined over the stated period.

Threats Precise details of its habitat requirements are not known but sainfoin declined greatly once it was no longer grown as a fodder crop. Other factors may include loss of unimproved grassland through fertiliser application and/or conversion to arable land, development and succession/neglect.

Management and Conservation Sainfoin was previously an important crop around Newmarket, the Cotswolds and in Hampshire, and is currently gaining popularity again as a nutrient-rich feed, green manure and game cover (Francis, 2009). Therefore, although other

causes of its decline are uncertain, it is possible that the beetle may expand or re-establish as it is known from the western Palaearctic, including France.

Published sources Francis (2009), Hubble (2012).

13.2 Zeugophorinae

The only subfamily within the Megalopodidae and includes a single genus *Zeugophora*, previously placed within the Criocerinae and later the Orsodacninae (e.g. Mohr, 1966; Lopatin, 1984) which is now a separate family, the Orsodacnidae. Zaitsev & Medvedev (2009) place this subfamily (along with the Orsodacninae) within the Chrysomelidae.

ZEUGOPHORA FLAVICOLLIS
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family MEGALOPODIDAE

Zeugophora flavicollis (Marsham, 1802)

Identification The adult is keyed by Hubble (2012). Egg described by Urban (1922). Larva described by Urban (1922); Henriksen (1927); Steinhausen (1994). Pupa described by Maisner (1974); Cox (1996).

Distribution Sparsely scattered (south-east and central England only). Although recorded from a new site in 2001 (Epsom Common, Surrey), only known to have two key sites (Epsom and Bookham Common, also Surrey) with very occasional specimens noted elsewhere in England.

Habitat and ecology Broad-leaved woodland and commons. On poplars *Populus* usually aspen *P. tremula* and sometimes willows *Salix alba* & *S. caprea*. Adults feed on leaves of mature 8m+ trees, larvae are leaf-miners.

Status This species has declined from sixteen prior to 1990 to four hectads post 1990 and was previously scattered but widespread in England as far north as Cumbria. Showed a marked decline from a generally widespread distribution (historically undoubtedly present in more hectads) to a now-restricted distribution and a small number of sites. Although recorded from a new site in 2001 (Epsom Common, Surrey), there are only two key sites (Epsom and Bookham Common, also Surrey). It qualifies as having an AoO of less than 500km^2, has declined and is found in two sites.

Threats Habitat loss through clear-felling and conversion to conifer forestry, also aspen removal, and succession/neglect leading to development into high forest. Lack of appropriate woodland management.

Management and Conservation Cut glades and rides/ride margins on rotation to maintain a variety of vegetation structure. Where there are gaps in the age structure of trees, ensure continuity by filling these through planting or regeneration. Avoid unnecessary aspen removal.

Published sources Cox (1996), Henriksen (1927), Hubble (2012), Maisner (1974), Steinhausen (1994), Urban (1922).

ZEUGOPHORA TURNERI
VULNERABLE B2a, bii
Order COLEOPTERA
Family MEGALOPODIDAE

Zeugophora turneri Power, 1863

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva and pupa described by Tomilova & Kuznetsova (1975).

Distribution Central and northern Scotland.

Habitat and ecology Broadleaved woodland. Adults on leaves of aspen *Populus tremula* and young birches *Betula*, larvae mine aspen leaves.

Status Only known from central and northern Scotland, now restricted to a small number of sites following a decline with loss from some locations. It has declined from fourteen hectads prior to 1990 to seven post 1990. Its AOO is estimated at below 500km^2.

Threats Habitat loss through clear-felling and conversion to conifer forestry, also aspen removal, and succession/neglect leading to development into high forest. Lack of appropriate woodland management.

Management and Conservation Cut glades and rides/ride margins on rotation to maintain a variety of vegetation structure. Where there are gaps in the age structure of trees, ensure continuity by filling these through planting or regeneration. Avoid unnecessary aspen removal.

Published sources Hubble (2012), Tomilova & Kuznetsova (1975).

13.3 Donaciinae

Commonly known as the reed beetles and associated primarily with water bodies and wetlands, donaciines are more elongate than many chrysomelids and many are distinctive, being brightly metallic in colour.

DONACIA AQUATICA
VULNERABLE A2c, B2a, B2ii
Order COLEOPTERA
Family CHRYSOMELIDAE

Donacia aquatica (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described by Xambeu (1890). Pupa described by Cox (1996).

Distribution Widely scattered and localised from southern England to central Scotland.

Habitat and ecology *Carex* sedge-dominated aquatic vegetation by open water, also with rushes *Juncus* in flushes beside upland tarns. Adults feed on the upper surfaces of leaves, larval ecology unknown.

Status Formerly widespread, especially in southern England. Following a large decline and reduction in range, now sparsely scattered as disjunct populations. Foster et al (2007) undertook a survey to describe, in more detail, the status of this species in 2005. Sites where the species had been recorded since 1980 were visited and searches of its habitat were undertaken. Of the sixteen sites that could be pinpointed as having previous occupation, *D.aquatica* was found in seven of them, the AoO therefore being far less than 500km^2. The implication is that it has been lost from over 50% of its sites between 1990 and 2005. The species qualifies as vulnerable under A2c, but also B2a and B2ii (less than 10 populations and continuing decline).

Threats Habitat loss due to falling water tables caused by over-abstraction, and infilling of lakes and ponds. Water pollution and succession/neglect may also contribute to this.

Management and Conservation Maintain high water levels. Isolate water bodies from pollution, including nutrients/eutrophication. Maintain structure and abundance of plant populations, and open conditions, by rotational clearing of emergent vegetation as appropriate. Avoid infilling or drainage of ponds, and create new ponds in suitable habitat.

Published sources Cox (1996, 2007), Hubble (2012), Xambeu (1890).

DONACIA DENTATA
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Donacia dentata Hoppe, 1795

Identification The adult is keyed by Hubble (2012) and Menzies & Cox (1996). Egg undescribed. Larva described by Bienkowski (1992). Pupa undescribed.

Distribution A few widely scattered locations in southern England.

Habitat and ecology Usually on arrowhead *Sagittaria sagittifolia* in dykes but may also be associated with water-plantains *Alisma* and yellow water-lily *Nuphar lutea*. Adults feed on leaves and possibly pollen (including on other plants), larvae on roots and submerged leaf axils.

Status Previously widespread in southern England with scattered records as far north as Cumberland. Following a large decline, now known from a small number of sites in the south. Prior to 1990 it has been recorded in forty one hectads; since 1990 it has been found in nine (which are roughly equatable to different locations and having a maxiumum AoO of 90km^2), making it appropriate for the Vulnerable category.The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the decline is real.

Threats River engineering, dredging, water level regulation, damming and flood-alleviation works may all damage or destroy habitat and populations/subpopulations. Further impacts may occur through water pollution, leisure activities (e.g. motor-boat use) and succession/neglect.

Management and Conservation Maintain high water levels. Isolate water bodies from pollution, including nutrients/eutrophication. Maintain structure and abundance of plant populations, and open conditions, by rotational clearing of emergent vegetation as appropriate. Avoid unsympathetic river works and consider regulation of leisure use where required.

Published sources Bienkowski (1992), Cox (2007), Hubble (2012), Menzies & Cox (1996).

DONACIA SPARGANII
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Donacia sparganii Ahrens, 1810

Identification The adult is keyed by Hubble (2012) and Menzies & Cox (1996). Egg undescribed. Larva described by Bienkowski (1992). Pupa undescribed.

Distribution A few widely scattered locations in southern England and south Wales.

Habitat and ecology Usually on floating leaves of bur-reeds *Sparganium* trailing in flowing water, sometimes on various river-bank plants. Adults possibly also feed on pollen, larvae feed on roots.

Status Previously widespread in southern England with scattered records as far north as southern Scotland. Following a large decline, now known only from a few widely scattered locations in southern England and south Wales. Prior to 1990 it was recorded in forty-six hectads; since 1990 it has been found in nine (which are roughly equatable to different locations and having an AoO of far less than 500km^2), making it appropriate for the Vulnerable category.The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the decline is real.

Threats River engineering, dredging, water level regulation, damming and flood-alleviation works may all damage or destroy habitat and populations/subpopulations. Further impacts may occur through infilling of lakes and ponds, water pollution and succession/neglect.

Management and Conservation Maintain high water levels. Isolate water bodies from pollution, including nutrients/eutrophication. Maintain structure and abundance of plant populations, and open conditions, by rotational clearing of emergent vegetation as appropriate. Avoid unsympathetic river works and infilling of lakes and ponds.

Published sources Bienkowski (1992), Cox (2007), Hubble (2012), Menzies & Cox (1996).

MACROPLEA MUTICA
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Macroplea mutica (Fabricius, 1793)

Identification The adult is keyed by Hubble (2012) and Menzies & Cox (1996). Juvenile stages undescribed.

Distribution Widely scattered, mainly around the coast of east and south-east England.

Habitat and ecology On various plants in brackish water, usually coastal, sometimes inland. Usually in brackish clay pits and dykes near the coast, also estuaries and inland saline lagoons. Adults feed on submerged leaves (usually fennel pondweed *Potamogeton pectinatus*), larvae probably on roots of the host plant.

Status Historically sparsely scattered from SE to NW England. Following a marked decline from nineteen to five post 1990 hectads, which broadly equate to five well-scattered locations. The decline, number of locations and the estimated AOO of less than 500km^2 means this species is categorised as Endangered. Now mainly in the east and south-east. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the decline is real.

Threats Habitat loss through land reclamation, sea defence works and infilling of lakes and ponds. Further impacts may occur through water pollution and succession/neglect. Coastal locations potentially vulnerable to sea level rise, development and ‘coastal squeeze’.

Management and Conservation Maintain high water levels. Isolate water bodies from pollution, including nutrients/eutrophication. Maintain structure and abundance of plant populations, and open conditions, by rotational clearing of emergent vegetation as appropriate. Avoid unsympathetic coastal works, and infilling of lakes and ponds.

Published sources Cox (2007), Hubble (2012), Menzies & Cox (1996).

13.4 Criocerinae

In Britain, a small subfamily of relatively elongate, parallel-sided beetles represented by 8 species including the introduced lily beetle *Lilioceris lilii*.

OULEMA ERICHSONI
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Oulema erichsoni (Suffrian, 1841)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Medvedev & Zaitsev (1978); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Recently recorded only from Somerset.

Habitat and ecology Usually on floating sweet-grass *Glyceria fluitans*, mainly in wet peat cuttings or trenches with little other vegetation, or on heaths. Adults and larvae feed on upper epidermis of floating sweet-grass leaves.

Status Very few locations and largely dependent on wet, poorly vegetated peat cuttings. Currently recorded from three locations in Somerset, suggestion an AOO of less than 12km^2. The species has also been lost from Kent and Devon, showing an overall decline in locations.

Threats Loss of habitat through drainage and drying of the cut peat surface. Also succession/neglect may reduce or degrade suitable habitat.

The severe floods during the winter of 2013/14 may have impacted the entire extended population within the Somerset Levels where this species is found and this has been treated as a single site for the purposes of applying IUCN criteria. Thus *O. erichsoni* has been assessed as CR rather than EN as would otherwise have been indicated.

Management and Conservation Maintain high water levels to ensure peat stays moist, but avoid excessively high levels if possible. Also, small-scale turf-cutting may be beneficial as long as the resulting habitat is not drained.

Published sources Hubble (2012), Medvedev & Zaitsev (1978), Zaitsev & Medvedev (2009).

13.5 Cryptocephalinae

A subfamily consisting of two tribes in Britain; the Clytrini (composed of one scarce and one recently extinct species) and the Cryptocephalini, all of which are in the genus *Cryptocephalus*. As well as including several rare or endangered species, the latter have some of the most interesting life histories of any British beetles, being known colloquially as 'pot beetles' due to the cocoons their larvae live in, constructing them from their own faeces. The cocoons or 'pots' are initially built by the female during and immediately after egg laying, with the egg being held between the rear metatarsi and covered by faeces from the female, precise structures varying by species. Once covered, the pots are dropped to the ground among leaf litter, which often forms much of the larval diet.

CLYTRA LAEVIUSCULA
REGIONALLY EXTINCT
Order COLEOPTERA
Family CHRYSOMELIDAE

Clytra laeviuscula Ratzeburg, 1837

Identification The adult is keyed by Hubble (2012). Egg described by Klausnitzer & Forster (1971). Larva described/keyed by Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Previously rare and scattered, known only from Surrey, Berkshire and Perthshire.

Habitat and ecology Caledonian pine and birch woodland and calcareous grassland, the habitats being determined by the ant species whose nests are required for larval development. Adults feed on leaf margins and flowers of various trees, especially willows *Salix* and poplars *Populus*.

Status Last recorded from Berkshire in 1895.

Threats Unknown. Suitable ant species are known from previous sites, therefore habitat loss or degradation may be the cause of decline.

Management and Conservation None unless it is reintroduced or recolonises – a widespread Palaearctic species, including France.

Published sources Hubble (2012), Klausnitzer & Forster (1971), Steinhausen (1994), Zaitsev & Medvedev (2009).

CRYPTOCEPHALUS BIGUTTATUS
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus biguttatus (Scopoli, 1763)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Southern England, with a few records as far north as Yorkshire. Recent records from Sussex, Dorset and Hampshire, though very few since 2000.

Habitat and ecology Wet heath, bogs, moors and commons; adults and larvae feed on above-ground parts of cross-leaved heath *Erica tetralix*. Larvae are sometimes found in leaf-litter.

Status Previously widespread in southern England with scattered records as far north as Lancashire, but now declined to a small number of sites in the south, especially in and around Surrey (Piper, 2002). It has been recorded prior to 1990 in thirteen hectads and post 1990 in ten hectads (hectads equates to locations for this species). It is therefore declining and also has an AOO of below 2000km^2, placing it in the vulnerable category. Rather than being under-recorded, it is more likely that some records of *C. biguttatus* may actually be a similar colour form of the much commoner *C. bipunctatus*.

Threats Habitat loss through fertiliser application, improvement, conversion to arable use or forestry, drainage and development. Ongoing loss and degradation of heathland habitat through neglect where traditional heathland management has ceased, leading to scrub growth and a reduced diversity of heath successional stages.

Management and Conservation Maintain high water levels. Promote a diversity of heath successional stages – preferably by grazing, otherwise rotational cutting, scraping or (if there are no other options) controlled burning.

Published sources Cox (2007), Hubble (2012), Piper (2002), Zaitsev & Medvedev (2009).

CRYPTOCEPHALUS CORYLI
ENDANGERED B2a, bii, biv
Hazel pot beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus coryli (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg described by Owen (1999, 2000). Larva described/keyed by Steinhausen (1994); Zaitsev & Medvedev (2009). Egg and larva described with photographs by Pendleton & Pendleton (2013b).

Distribution Restricted to a few sites in Surrey, Lincolnshire, Nottinghamshire, Berkshire and Hampshire, following a serious decline since the 1950s.

Habitat and ecology Usually recorded on young birch *Betula*, sometimes on a range of other trees such as alders *Alnus*, hazel *Corylus avellana*, hawthorn *Crataegus monogyna*,

pedunculate oak *Quercus robur* and willows *Salix*. In clearing and ride margins in broadleaved woodland on south-facing slopes, chalk downland, and moors/heathland. Adults feed on leaves of birches *Betula* and other trees, larvae feed on fallen tree leaves and possibly fallen catkins. Recent survey work (Pendleton & Pendleton, 2013a) suggests that the 'traditional' association with young birch may not be entirely correct as tree-top surveys found that branches of thicker foliage, with a sunny aspect and around 30 feet above the ground were favoured, with lower-level vegetation possibly used by newly emerged adults prior to their first flight, as well as being easier to search. Leaf quality appears important as no adults were found at the top of the largest birches (around 50 feet) where foliage was noticeably poor.

Status Previously widely scattered from southern England to Inverness, Scotland, the beetle declined to a small number of sites in southern and central-eastern England. It was found in a total of fifteen hectads prior to 1990 and five hectads post 1990, and known recently from only four sites. The AOO is well below 500km^2. Records from Sherwood Forest existed until the 1940s and it was rediscovered there in 2008 with good numbers found in 2011 and 2012, and ongoing survey work there (including tree-top surveys) provides data on their distribution and dynamics (Pendleton & Pendleton, 2013a). In July 2013, a single male was found on heathland in Clumber Park, Nottinghamshire and this is a new site for the species. Two females were also found at Whisby, Lincolnshire in 2013; this was the site of a release scheme in 2000 and it was thought that the beetle had died out there until this discovery. Cox (2007) reports good numbers at one other site, Linwood Warren, Lincolnshire, but there have been no records from any Lincolnshire site other than Whisby since 2007. It is believed to be present at Box Hill and Headley Warren in Surrey but there have been no targeted surveys in the last few years. Also, despite further searches, there have been no records from Woolmer Forest, Hampshire since it was found there for the first time in 2002. With tree-top survey proving so fruitful, it is possible that it exists at such sites but has been overlooked by ground-level efforts.

Threats Loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest.

Management and Conservation Rotational cutting of glades and rides/ride margins to maintain a diversity of vegetation structure as adults tend to be found along the margins of such open structures where canopy branches are sunny. The Sherwood Forest study suggests slightly damper soil with a mixture of coarser grasses, rosebay willowherb *Chamerion angustifolium* and umbellifers may be key for larval development, with areas of finer Poaceae such as fescues *Festuca* on drier soils being less suitable unless left undisturbed.

Published sources Cox (2007), Hubble (2012), Owen (1999, 2000), Pendleton & Pendleton (2013a, 2013b), Steinhausen (1994), Zaitsev & Medvedev (2009).

CRYPTOCEPHALUS DECEMMACULATUS
ENDANGERED B2, bii, biv
Ten-spotted pot beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus decemmaculatus (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg 1.42mm x 0.78mm (Cox, pers. obs.). Larva described/keyed by Ogloblin & Medvedev (1971); Bienkowski (1999); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Two widely separated populations (Rannoch, Perthshire and Wybunbury Moss, south Cheshire) and a decline in hectads. Searches at Chartley Moss, Staffordshire suggest that population probably became extinct in the 1980s. See http://jncc.defra.gov.uk/_speciespages/247.pdf.

Habitat and ecology On various willows/sallows *Salix*, also alders *Alnus* in broadleaved woodland (sometimes Caledonian pine), especially on wet hillsides or quaking bogs. It may need host plants to be on south-facing slopes surrounded by taller vegetation forming windbreaks. Adults feed on leaves of willows/sallows and some other trees, larvae feed on fallen leaves and petioles.

Status Historical records indicate this has always been a scarce and localised species, but a decline has reduced its range further, and the status of the Scottish population in particular is uncertain. This declining species is known from two locations and has an AOO estimated at 4km^2.

Threats Loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest.

Management and Conservation Survey work is needed to find any new sites, along with monitoring to understand the status at the two known existing sites. Rotational cutting of glades and rides/ride margins to maintain a diversity of vegetation structure.

Published sources Bienkowski (1999), Cox (2007), Hubble (2012), Ogloblin & Medvedev (1971), Zaitsev & Medvedev (2009).

CRYPTOCEPHALUS EXIGUUS
CRITICALLY ENDANGERED (POSSIBLY EXTINCT) B2a, bii, biii biv
Pashford pot beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus exiguus Schneider, 1792

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Recent records only from Pashford Poors Fen, Suffolk.

Habitat and ecology On various possible host plants (including sorrels *Rumex*, catchflies *Lychnis*, thistles *Carduus* and *Cirsium*), birches *Betula* and Grey Willow *Salix cinerea*) in wetlands, particularly mixed fen or fen meadow. Adults feed on leaves and fruit of common sorrel *Rumex acetosa* and possibly other plants, larvae feed on empty seed cases in sorrel seed-heads (and, in spring, possibly other foods).

Status Historically known from a small number of scattered sites in eastern England and also Somerset, but recent records only from Pashford Poors Fen, Suffolk where habitat degradation through drying has raised concerns that it may be extinct, given that suitable-quality habitat no longer exists at this location, and targeted surveys have not found it there since 2000. Given its probable loss from Pashford Poors Fen, it may be extinct in Britain, unless present at undiscovered sites.

Threats Habitat loss due to lowering of the water table caused by borehole abstraction adjacent to its only recently confirmed site. Prior to this, decline caused by drainage, wider water abstraction, improvement and conversion to arable use.

Management and Conservation Pashford Poors Fen is a designated SSSI and Suffolk Wildlife Trust reserve. High water levels need to be maintained to prevent drying of habitat. With Pashford Poors Fen surrounded by intensive land use and directly impacted by the associated adjacent water abstraction, it is clear that landscape-scale conservation management is required and that abstraction licensing needs to take this into account. Also, rotational grazing may be needed to maintain open conditions.

Published sources Hubble (2012), Zaitsev & Medvedev (2009).

CRYPTOCEPHALUS FRONTALIS
NEAR THREATENED B2, bii
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus frontalis Marsham, 1802

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Scattered in England south of the River Humber.

Habitat and ecology Mainly in mature hedgerows in farmland, grassland and along roadsides, especially on hawthorn *Crataegus*. Also ancient mixed woodland with hawthorn. Adults and larvae feed mainly on hawthorn leaves, also grey willow *Salix cinerea*.

Status Previously widespread in southern England, and scattered as far north as Lincolnshire. Following a marked decline (reduced from thirty hectads to thirteen hectads after 1990 – hectads equate well to locations for this species), now known from a small number of locations in the south.

Threats Removal of hedgerows, scrub and broad-leaved woodland, the latter through clear-felling and conversion to conifer forestry. Pesticide use and mechanised hedge-cutting (i.e. flailing) are likely to have an additional impact. Being localised in an unprotected area, the population is vulnerable to changes in farming and other land use (Piper, 2002).

Management and Conservation Where cutting of hedges and scrub is required, this should be rotational. Similarly, rides/ride margins and glades should be maintained in woodlands to ensure a diversity of vegetation structure. Hedge-cutting by flailing or similar means should be avoided in favour of more sensitive management.

Published sources Cox (2007), Hubble (2012), Piper (2002).

CRYPTOCEPHALUS NITIDULUS
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus nitidulus Fabricius, 1787

Identification The adult is keyed by Hubble (2012). Egg described by Owen (2003). Larva described/keyed by Steinhausen (1994); Owen (2003); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Recent records only from a few sites in Surrey.

Habitat and ecology On a variety of smaller tree species (e.g. birch, hazel and hawthorn) in downland scrub or along woodland rides. Host plants must be south-facing, at the transition between woodland and either grassland or heath, and there must be windbreaks of taller vegetation all round. Adults feed on leaves and possibly pollen of birches *Betula* and other scrubby trees, larvae also on leaves.

Status Previously widespread in southern England, and scattered as far north as Nottinghamshire. Following a marked decline from the middle of the 20th century, now known from a small number of locations in Surrey. It has reduced from ten hectads prior to 1990 to four hectads since 1990 (in this instance, hectads equate well to locations). With an estaimted AOO of less than 500km^2 and its ongoing decline, this species is categorised as Endangered.

Threats Loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest.

Management and Conservation Listed as a UK BAP species. Rides/ride margins and glades should be cut in rotation in broad-leaved woodlands to ensure a diversity of vegetation structure.

Published sources Cox (2007), Hubble (2012), Owen (2003), Steinhausen (1994), Zaitsev & Medvedev (2009).

CRYPTOCEPHALUS PRIMARIUS
ENDANGERED B2a, bii, biv
Rock-rose pot beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus primarius Harold, 1872

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Records from one site Gloucestershire and two sites in Dorset.

Habitat and ecology On chalk grassland, especially in warm, dry, sheltered conditions on south-facing slopes. Usually on common rock-rose *Helianthemum nummularium*, possibly on other plants including trees. Adults feed on petals, anthers and pollen of common rock-rose, larvae feed on the stems and leaves.

Status Always scarce and scattered, including an old record from Perthshire, now declined to only two known sites. The decline and number of locations (three), coupled with the small AOO (possibly as low as 4km^2) classes this species into the Endangered category.

Threats Decline caused by loss of habitat due to improvement (reseeding and/or fertiliser application) and conversion to arable use. Further habitat loss or degradation due to succession/neglect. For example, habitat quality at its main site (Stinchcombe Hill, Gloucestershire) has become increasingly poor due to lack of appropriate management.

Management and Conservation Survey work is needed to find any new sites, along with monitoring to clarify its status at existing sites. Rotational grazing or cutting needed to maintain open conditions.

Published sources Cox (2007), Hubble (2012).

CRYPTOCEPHALUS PUNCTIGER
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus punctiger Paykull, 1799

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution A few sites in south-east England, especially Sussex.

Habitat and ecology Broadleaved woodland and commons. Adults probably feed on the foliage of young birches *Betula* and other trees, larval life cycle unknown.

Status Previously widely scattered as far north as Inverness, now declined to a small number of sites in the south-east. There is a stronghold of records from Sussex and three outlying sites. It has declined from sixteen hectads prior to 1990 to eight hectads post 1990, is still declining and has an estinmated AOO of less than 2,000km^2.

Threats Loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest. Previously strong populations, particularly in Sussex, appear to be suffering a major decline and are under serious threat due to scrub removal and a lack of appropriate management.

Management and Conservation. Survey work is needed to find any new sites, along with monitoring to clarify its status at existing sites. Rides/ride margins and glades should be cut in rotation in broad-leaved woodlands to ensure a diversity of vegetation structure. Scrub removal should be avoided.

Published sources Cox (2007), Hubble (2012).

CRYPTOCEPHALUS QUERCETI
ENDANGERED B2a, bii, biv
Oak pot beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus querceti Suffrian, 1848

Identification The adult is keyed by Hubble (2012). Egg and larva described with photographs by Pendleton & Pendleton (2013b).

Distribution Windsor Great Park, Berkshire, Donington Park, Leicestershire and Sherwood Forest, Nottinghamshire.

Habitat and ecology On mainly mature oaks *Quercus*, sometimes hawthorn *Crataegus* and possibly birches *Betula*. In ancient broadleaved pasture-woodland, parkland and forests, favouring open parkland over woodland with a closed canopy. Adults feed on oak leaves particularly when fresh and tender and are known from epicormic growth, larvae feed on debris such as oak litter in holes within the oak bole.

Status Previously scattered in England with records as far north as Lancashire. Now declined to just three sites. There is an old record from Cannock Chase but the beetle has not been found again at this site despite searching. With an estimated AOO is less than 500km^2, the decline in locations where it can be found and the fact that it is is known from only three sites means it is classed as Endangered.

Threats Loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest. Further habitat loss through the felling of old oaks for reasons of ‘tidiness’, safety or firewood. Large amounts of bracken *Pteridium aquilinum* may reduce habitat quality and this has been cited as a reason

why fewer *C. querceti* are known from Sherwood Forest than Windsor Great Park (Pendleton & Pendleton, 2013c).

Management and Conservation Retain ancient oaks. Identify gaps in the age structure of the population of trees and fill these via regeneration, appropriate planting and possibly pollarding in order to ensure continuity. Bracken management may be required to ensure a wood-pasture structure is retained – ongoing survey and monitoring work at Sherwood Forest may help to clarify the importance of bracken. Windsor Great Park and much of Sherwood Forest are SSSIs and the latter is also an NNR.

Published sources Hubble (2012), Pendleton & Pendleton (2013b, c).

CRYPTOCEPHALUS SEXPUNCTATUS
ENDANGERED B2a, bii, biv, bv
Six-spotted pot beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus sexpunctatus (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed, although Owen (1997) does include a photograph of the egg.

Distribution Three widely separated sites – Kirkconnell Flow NNR, Kirkcudbrightshire, Shrawley Wood, Worcestershire and Stockbridge Down, Hampshire.

Habitat and ecology On a variety of plants, including scrubby trees, broom *Cytisus scoparius*, wood spurge *Euphorbia amygdaloides* and yellow Asteraceae. Found on chalk grassland with dense scrub, especially on west-facing slopes, and in broadleaved woodland. Adults feed on leaves (and possibly pollen) of various scrub trees, larvae probably feed on low-growing plants.

Status Previously widespread in southern England with scattered records as far north as Ayrshire. Following a decline, recent records only from three widely separated sites. The current status, especially of the Scottish site is uncertain, and at Stockbridge Down only a few individuals have been recorded since 1990 despite repeated searches. A single female was recorded from low trackside vegetation in Shrawley Wood in 2008 (Piper, 2008) although it is unknown whether this represents an individual from a viable population. It qualifies as Endangered under B2, as it has severely fragmented populations, an AoO of far less then 500km^2 and shows a recent decline in locations and is known from only three sites.

Threats Loss of habitat through clear-felling and conversion to conifer forestry. Also, habitat degradation through neglect and cessation of coppicing leading to development into high forest (Piper, 2002). At Stockbridge Down, there may also be possible reproductive failure due to an excessively small population with less than 50 individuals estimated, noting that ova obtained in 2002 and 2003 were not viable and failed to hatch (JNCC, 2010).

Management and Conservation Survey work is needed to find any new sites, along with monitoring to clarify its status at existing sites. Rides/ride margins and glades should be cut in rotation in broad-leaved woodlands to ensure a diversity of vegetation structure. The precise balance between chalk grassland and scrub as a requirement for this species is not well known, but scrub management should be sympathetic. If viable ova can be found, captive breeding may be appropriate and/or reintroduction although the species is also Red-listed in Denmark, Germany and Sweden, and noted as being very rare in Spain.

Published sources Hubble (2012), JNCC (2010), Owen (1997), Piper (2002, 2008).

CRYPTOCEPHALUS VIOLACEUS
REGIONALLY EXTINCT
Order COLEOPTERA
Family CHRYSOMELIDAE

Cryptocephalus violaceus Laicharting, 1781

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described by Steinhausen (1995). Pupa undescribed.

Distribution Previously known from Folkestone, Kent and Cambridge.

Habitat and ecology On various plants in deciduous woodland but life cycle unknown.

Status Last recorded in 1864.

Threats Cause of loss unknown.

Management and Conservation None, although as it is a widespread Palaearctic species (including France), recolonisation is possible.

Published sources Hubble (2012), Steinhausen (1995).

LABIDOSTOMIS TRIDENTATA C1, C2a(i), D
CRITICALLY ENDANGERED (POSSIBLY EXTINCT) Order COLEOPTERA
Family CHRYSOMELIDAE

Labidostomis tridentata (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Donisthorpe (1908); Cox (1994); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Known only from a few scattered sites in Hampshire, Kent, Sussex, Worcestershire & Yorkshire.

Habitat and ecology Rough open ground in woodland; adults usually on birch *Betula*, especially 5-year old saplings, and also some other trees. Adults feed on leaves, larvae feed on algae on tree bark and may be associated (at least some of the time) with ant nests, although they probably do not live within them (Fowler & Donisthorpe, 1913), instead living in leaf litter or under stones (Jolivet, 1952).

Status Previously likely to have been under-recorded, but now not recorded since the 1950s despite “sufficient” “adequate” searches for this species. This species is considered 'Possibly Extinct' as it has not been seen for decades and would qualify as CR(PE) C1, C2a(i), D on the basis that it is likely or there is a strong presumption that to have populations less than 50 mature individuals and have declined over the stated period.

Threats Decline probably due to loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest, particularly following cessation of coppice management and loss of sunny glades and rides.

Management and Conservation None, although as it is a widespread Palaearctic species, recolonisation is possible.

Published sources Cox (1994), Donisthorpe (1908), Fowler & Donisthorpe (1913), Hubble (2012), Jolivet (1952), Zaitsev & Medvedev (2009).

SMARAGDINA AFFINIS
CRITICALLY ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Smaragdina affinis (Illiger, 1794)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Known only from a few sites in Oxfordshire & Gloucestershire.

Habitat and ecology On hazels *Corylus*, sometimes birches *Betula* and Asteraceae in broad-leaved woodland and marshy thickets near rivers. Adults probably feed on the leaves of trees especially hazels *Corylus* and less often birches *Betula*, larval biology/ecology poorly known but most likely develop in either ant nests or leaf litter

Status Probably under-recorded though not recorded since 1965 at Brassey Reserve (SSSI), Gloucestershire. It has been recorded from three post-1900 hectads but has declined to only one hectad. It qualifies as Critically Endangered as it is present in less than 10km^2, found at only one location and has declined.

Threats Loss of habitat through clear-felling and conversion to conifer forestry, also habitat degradation through neglect leading to development into high forest.

Management and Conservation Survey work is needed to find any new sites, along with monitoring to clarify its status at existing sites. Rides/ride margins and glades should be cut in rotation in broad-leaved woodlands to ensure a diversity of vegetation structure.

Published sources Hubble (2012).

SMARAGDINA SALICINA
DATA DEFICIENT
Order COLEOPTERA
Family CHRYSOMELIDAE

Smaragdina salicina (Scopoli, 1763)

Identification The adult is keyed by Hubble (2012). Egg briefly described, and larva keyed, by Ogloblin & Medvedev (1971). Pupa undescribed.

Distribution Known from a single specimen collected by sweeping in Buckinghamshire in 2010

Habitat and ecology In Britain, known only from mixed deciduous scrub and hedgerow on a sunny SW-facing chalk grassland hillside (Hubble & Murray, 2011). adults feed on foliage and possibly flowers, larval biology/ecology poorly understood and. In continental Europe, associated with a wide range of scrub tree species, as well as abandoned orchards (Vig & Markó, 2006).

Status As yet no evidence of breeding in the UK.

Threats None as it is not yet established.

Management and Conservation Further searching or *ad hoc* recording to determine whether the species has established.

Published sources Hubble (2012), Hubble & Murray (2011), Ogloblin & Medvedev (1971), Vig & Markó (2006).

13.6 Chrysomelinae

The chrysomelines are the 'typical' (i.e. domed, relatively large and often metallic in colour) leaf beetles including many of the more charismatic species within the British chrysomelid fauna.

CHRYSOLINA CEREALIS
ENDANGERED B2a, bii
Rainbow leaf beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Chrysolina cerealis (Linnaeus, 1767)

Identification The adult is keyed by Hubble (2012). Egg chocolate-brown to orange with rounded ends, mean 1.9mm x 0.9mm (Cox, pers. obs.). Larva described/keyed by Brovdii (1977); Marshall (1979); Zaitsev & Medvedev (2009). Pupa briefly described by Steinhausen (1996).

Distribution Known from only two sites (Snowdon and Cwm Idwal, though not reported from the latter since 1980) in Snowdonia.

Habitat and ecology Montane grassland in Snowdonia; adults and larvae feed on the flowers and (to a lesser extent) leaves of wild thyme *Thymus polytrichus.*

Status Highly localised and, in recent times, never numerous. It has declined from two to one extant locations and its AOO is far less than 500km^2. Since 1886 the most recorded in a single day is 13 (on two occasions), and no more than 5 have been seen in a single day since 1978. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the restricted distribution is real and well understood.

Threats Climate change due to the montane habitat requirements of this species (Buse, 1993; Buse & Morris, 1995). Also, erosion of montane habitat where hill-walking is popular and/or livestock density is too high are potential issues.

Management and Conservation Both known sites are within National Nature Reserves. Protected under Schedule 5 of the Wildlife & Countryside Act 1981.

Published sources Buse (1993), Buse & Morris (1995), Brovdii (1977), Cox (2007), Hubble (2012), Marshall (1979), Steinhausen (1996), Zaitsev & Medvedev (2009).

CHRYSOLINA GRAMINIS
ENDANGERED B2a, bii, biv
Tansy leaf beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Chrysolina graminis (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg creamy-white and elongate-oval, 2.25mm x 1mm (Cox, pers. obs.). Larva described/keyed by Marshall (1979); Zaitsev & Medvedev (2009). Pupa described by Cox (1996).

Distribution Recent records mainly in Yorkshire and a recent record from Woodwalton Fen (2014, Alan Bowley pers comm).

Habitat and ecology Tansy *Tanacetum vulgare* and water mint *Mentha aquatica* in fens and the banks of rivers with broad floodplains. Adults and larvae feed on the leaves.

Status Marked decline and reduction in range; although the number of hectads covers several sites, they are all along a single stretch of one river and therefore are seen as a single locality. Currently only confirmed in any numbers from the area around York where it is also in decline, existing as a series of sub-populations along approximately 45km of the River Ouse (Oxford *et al*., 2003; Sivell, 2003; Oxford & Millington, 2013). All the records are riparian along an approximately 45km stretch of river. Assuming this is a 100m 'corridor' (a generous assumption as it is probably less), the AoO is less than 500km^2). Lost from Wicken Fen with no records there since 1981 despite searching indicating both a decline and loss of locations. It has also recently been found in Woodwalton Fen, but despite this, the species is very restricted in distribution and has undergone a steep decline.

Threats The decline in *C. graminis* is likely to be due to habitat loss such as improvement and arable conversion, over-grazing, development, drainage and lowering of water-tables due to over-abstraction. Succession/neglect may also lead to loss or degradation of habitat e.g. through over-shading or competition of food-plants with invasive species such as Himalayan balsam *Impatiens glandulifera*. Flood-bank works may deplete or destroy local sub-populations.

The severe floods during the winter of 2013/14 may have impacted the entire extended population along the stretch of the R. Ouse where this species is found and this has been treated as a single site for the purposes of applying IUCN criteria. Although hibernating adults are known to be able to survive winter inundation (Oxford & Millington, 2013), the extent and duration of this flooding event are considerably greater than usual and there is the potential for loss of some or all of the national population. Thus *C. graminis* has been assessed as EN due to its presence on two sites.

Management and Conservation Listed as a UK BAP species. Yearly surveys to monitor populations, especially at sites on the River Ouse within the historical range of the beetle. There is the possibility of captive breeding the beetles and investigating reintroduction to the Fens in East Anglia. Sympathetic conservation management measures include:

- Removal of riverside Himalayan balsam (and if shading is excessive, willow) to enhance tansy growth.
- Planting clumps of tansy to help infill large gaps, as the beetles can only walk a maximum of 200 metres. Although they are fully winged and capable of flight (Beenen & Winkelman, 2001), they appear not to do so.

- Creating safe refuges away from rivers, so that the beetles can be protected from summer floods, a major cause of mortality.
- Reducing grazing pressure on tansy by using short-term fencing and managing livestock appropriately.
- Ensuring that during ragwort control work, riverside landowners and workers/volunteers know the difference between tansy and ragwort.

Published sources Beenen & Winkelman (2001), Cox (1996), Hubble (2012), Marshall (1979), Oxford & Millington (2013), Oxford *et al*. (2003), Sivell (2003), Zaitsev & Medvedev (2009).

CHRYSOLINA LATECINCTA
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Chrysolina latecincta (Demaison, 1896), with subspecies *intermedia* (Franz, 1938)

Identification The adult is keyed by Hubble (2012). Egg pale brick-red, elongate with rounded ends, 1.85mm x 0.92mm (Cox, pers. obs.). Larva undescribed. Pupa described by Owen (1993); Cox (1996).

Distribution Known only from Orkney cliff-tops and an Argyll saltmarsh (Loch Etive).

Habitat and ecology Grassy, salty cliff-top vegetation, and cliff edges with small patches of vegetation among bare earth and rocks/rubble, also an old cliff-edge sandstone quarry and a saltmarsh. Adults and larvae feed on the leaves of several herbaceous plant species - several plantains *Plantago* and toadflaxes *Linaria*, ivy-leaved toadflax *Cymbalaria muralis* and snapdragon *Antirrhinum majus*.

Status Declined from six locations before 1990 to four locations after 1990. Only found on cliff top vegetation spreading inland for 500m or so at maximum, the estimated AOO being well below 500km^2. Orkney populations may be numerous though highly localised. Previous records from elsewhere in mainland Scotland, also from Shetland in 1975. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the restricted distribution is real.

Threats Cliff-top grassland may be reduced in extent and quality by erosion, and saltmarsh habitat is potentially vulnerable to sea-level rise. Grassland may be reduced in suitability by succession/neglect. Coastal development may reduce the quantity of habitat.

Management and Conservation If required to maintain open conditions, use rotational disturbance. Avoid activities which change the rate of erosion, as the current dynamic balance is required to maintain a mosaic of vegetation patches among bare earth, rocks and crevices.

Published sources Cox (1996, 2007), Hubble (2012), Owen (1993).

CHRYSOLINA MARGINATA
NEAR THREATENED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Chrysolina marginata (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg reddish-brown to dark brown, elongate-oval, 1.2mm x 0.3mm (Cox, pers. obs.). Larva described/keyed by Marshall (1979); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Widespread but very scattered.

Habitat and ecology Open grasslands, heaths, sand pits, alluvial grassland, sandy slopes, and sandy grassland near rivers/streams. Adults and larvae feed on the leaves of yarrow *Achillea millefolium* - adults feed nocturnally (hiding at the base of the plants during the day) and may also feed on pollen of other species.

Status Large reduction in range, though possibly under-recorded as it is nocturnal. There are recent records from eastern England which are not on NBN, but the lack of records from previously known areas such as Orkney suggests there is a real and highly significant decline, especially given the increased survey effort associated with publication of the Atlas (Cox, 2007). Large reduction in hectads from 33 to 11, though possibly under-recorded as it is nocturnal. There are recent records from eastern England which are not on the NBN, but the lack of records from previously known areas such as the Orkneys suggests there is a real and highly significant decline.Therefore, the total of 11 post-1990 hectads suggest the Near Threatened category is appropriate.

Threats Loss of habitat through improvement, application of fertiliser and conversion to agriculture or forestry use. Succession/neglect may also lead of loss or degradation of habitat.

Management and Conservation Rotational disturbance such as cutting or grazing may be required to maintain open conditions.

Published sources Cox (2007), Hubble (2012), Marshall (1979), Zaitsev & Medvedev (2009).

CHRYSOMELA TREMULA C1, C2a(i), D
CRITICALLY ENDANGERED (POSSIBLY EXTINCT)
Order COLEOPTERA
Family CHRYSOMELIDAE

Chrysomela tremula Fabricius, 1787

Identification The adult is keyed by Hubble (2012). Egg described by Klausnitzer & Forster (1971); Maisner (1974). Larva described by Steinhausen (1994). Pupa described by Steinhausen (1996).

Distribution Previously widespread in southern Britain as far north as Lincolnshire.

Habitat and ecology Usually on poplar *Populus* saplings and willows *Salix* in broadleaved woodlands and commons. Adults and larvae feed on leaves of aspen *Populus tremula* and other poplars *Populus*.

Status Following a rapid decline from the 1940s, last confirmed record in 1958 (Tile Hill Wood, Warwickshire) despite targeted surveys. This species is considered 'Possibly Extinct' as it has not been seen for decades and qualifies as CR(PE) C1, C2a(i), D on the basis that it is likely or there is a strong presumption that there are less than 50 mature individuals and it has declined over the stated period. It is a large and attractive species, not easily missed, hence the classification that it is Possibly Extinct.

Threats The decline is likely to be due to loss of suitable woodland and conversion to other land use types, removal of aspen, and woodland neglect leading to development of high forest without the required aspen saplings.

Management and Conservation None unless it is reintroduced or recolonises – a widespread Palaearctic species known from France, it has also been introduced into North America.

Published sources Hubble (2012), Klausnitzer & Forster (1971), Maisner (1974), Steinhausen (1994, 1996).

HYDROTHASSA HANNOVERIANA
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Hydrothassa hannoveriana (Fabricius, 1775)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Cox (1982); Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Cox (1996).

Distribution Very local, having declined to a small number of widely scattered locations from Hampshire to Scotland, with most records from northern England and none between the northern and southern populations.

Habitat and ecology Usually on marsh-marigold *Caltha palustris* in tarns, marshes and peat bogs (sometimes in forests). Adults feed on leaves and possibly flowers of the food-plant among deep moss or in shallow gulleys, larvae feed on the lower epidermis of larger leaves.

Status A decline from fourteen hectads before 1990 to seven hectads post-1990 (for this species hectads broadly equates to locations) shows a continuing decline. The AOO is estimated to be well below the threshold of 2,000km^2.

Threats Drainage for agriculture and development leading to loss of wetland habitat. Also falling water tables due to over-abstraction, and erosion where livestock density is too high.

Management and Conservation Maintain high water levels, ensure livestock densities are not too high.

Published sources Cox (1982, 1996, 2007), Hubble (2012), Steinhausen (1994), Zaitsev & Medvedev (2009).

PHRATORA POLARIS
NEAR THREATENED B2a, biii
Order COLEOPTERA
Family CHRYSOMELIDAE

Phratora polaris Schneider, 1886

Identification The adult is keyed by Hubble (2012). Egg described by Klausnitzer & Forster (1971). Larva described/keyed by Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa undescribed.

Distribution Restricted to mountains between 700 m and 1100 m in north and west Scotland in grassland on dolomitic limestone outcrops where shoots of *S. herbacea* wind through the *Racomitrium* moss.

Habitat and ecology Under stones among dwarf willow *Salix herbacea* or associated with a thick layer of woolly fringe-moss *Racomitrium lanuginosum*. Adults and larvae feed on dwarf willow leaves.

Status Likely to be under-recorded due to the inaccessible nature of the habitat, but the available habitat is restricted and thus this effect likely to be minimal Apparent increase in hectads from one to eight due to survey effort rather than an actual increase.

Threats Climate change may impact on habitat as this is an Angarian (East Siberian) species found across northern Eurasia i.e. if increased mean temperatures allow competitor species to survive at higher altitudes. Also, erosion from hill-walkers and excessive livestock density may damage or destroy habitat, including the moss layer which is likely to provide shelter from harsh conditions.

Management and Conservation In the short term, it is possible that climate change impacts cannot be mitigated. However, fencing (either long-term or temporary) may help to reduce the impacts of walkers and livestock, as may avoiding excessively high livestock densities.

Published sources Cox (2007), Hubble (2012), Klausnitzer & Forster (1971), Steinhausen (1994), Zaitsev & Medvedev (2009).

13.7 Eumolpinae

A small subfamily known by a single species in Britain.

BROMIUS OBSCURUS
CRITICALLY ENDANGERED B2a, bii
Western grape rootworm
Order COLEOPTERA
Family CHRYSOMELIDAE

Bromius obscurus (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Eggs bright yellow, 1mm x 0.5mm (Cox, pers. obs.). Larva described/keyed by Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Quayle (1908).

Distribution Historically known from a single 10km^2 on the Cheshire-Staffordshire border around the River Dane at Hugbridge near Bosley but this has not been recorded here since 1992. Very recently found at Jupiter in Scotland (Steve Falk / Craig MacAdam pers. comm. 2014) in very low numbers. This remains its only current known location.

Habitat and ecology. Mainly on rosebay willowherb *Chamerion angustifolium* and some other plants. Adults feed on the leaves of various willowherbs, making 'scribbling' marks, larvae on the roots.

Status Currently only recorded from one site in Scotland after a marked historic decline. It has an AoO of less than 10km^2.

Threats Unknown – possibly habitat loss or degradation through land use change, development or succession/neglect.

Management and Conservation Rotational disturbance such as cutting or grazing to prevent excessive scrub encroachment and maintain open conditions. The common name derives from its sometimes-pest status in North America.

Published sources Hubble (2012), Quayle (1908), Steinhausen (1994), Zaitsev & Medvedev (2009).

13.8 Galerucinae

This large subfamily comprises two tribes, the Galerucini and Alticini, both of which have previously been considered separate subfamilies. The Alticini are known as 'flea beetles' because of their well-developed flea-like jumping abilities and have been known as both the Halticinae e.g. Mohr (1966) and more recently Alticinae e.g. Gruev & Döberl (1997); Čižek & Doguet (2008).

AGELASTICA ALNI
DATA DEFICIENT
Alder flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Agelastica alni (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg described by Zucht (1934); Klausnitzer & Forster (1971); Maisner (1974). Larva described/keyed by Zucht (1934); Marshall (1980); Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Zucht (1934); Cox (1996); Steinhausen (1996).

Distribution Recently re-established in NW England (Lancashire and Cheshire) and Wales.

Habitat and ecology Open sunny locations in wetlands, especially alder carr and also river banks and wet woodland flushes. On young alder alder *Alnus glutinosa* and grey alder *A. incana*, sometimes hazel *Corylus avellana*, hybrid black-poplars *Populus* x *canadensis* and goat willow *Salix caprea*.; also a recent record of feeding damage on silver birch *Betula pendula* (Ramsay, 2009).

Status Previously considered extinct but found in the Manchester area in 2004, with a series of records since then from Lancashire and Cheshire (Stenhouse, 2006) indicating a population has re-established in NW England. Although there are still few records, it seems to be expanding its range rapidly in NW England and was found in Wales in 2013 (Formstone 2014).

Threats Unknown but possibly loss or degradation of wet and woodland habitats.

Management and Conservation Unknown but possibly rotational woodland, wetland and riverbank management to maintain areas with open, sunny conditions.

Published sources Cox (1996), Hubble (2012), Klausnitzer & Forster (1971), Maisner (1974), Marshall (1980), Ramsay (2009), Steinhausen (1994, 1996), Stenhouse (2006), Zaitsev & Medvedev (2009), Zucht (1934).

APHTHONA PALLIDA
DATA DEFICIENT
Order COLEOPTERA

Family CHRYSOMELIDAE

Aphthona pallida (Bach, 1856)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Recorded on *Geranium pratense* in Scotland and Yorkshire, but wider range uncertain due to prior confusion with *nigriceps*.

Habitat and ecology Near waterways, on meadow crane's-bill *Geranium pratense*.

Status First recorded in Britain in 2007 and subsequently found in a small number of other locations, although some specimens of *'A. nigriceps*' have since been found to actually be *A. pallida* and it is likely that others await re-identification (Sinclair & Hutchins, 2009; Jobe & Marsh, 2012).

Threats Unknown.

Management and Conservation Unknown.

Published sources Hubble (2012), Jobe & Marsh (2012), Sinclair & Hutchins (2009).

APTEROPEDA SPLENDIDA
CRITICALLY ENDANGERED (POSSIBLY EXTINCT) C1, C2a(i), D
Order COLEOPTERA
Family CHRYSOMELIDAE

Apteropeda splendida Allard, 1860

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described by Steinhausen (1994). Pupa undescribed.

Distribution Previously known from a few counties in southern and eastern England, and in Wales. Last recorded in Ashdown Forest, East Sussex in 1931 (in the Burren, Ireland in 1987).

Habitat and ecology On bugle *Ajuga reptans*, speedwells *Veronica* spp. and plantains *Plantago* spp. in wetlands, woodlands, grasslands and sand dunes. Adults feed on leaves, larvae are leaf-miners.

Status Last recorded in Ashdown Forest, East Sussex in 1931 (in the Burren, Ireland in 1987). Last recorded in four hectads in 1931. It has not been seen post 1950 having declined from four hectads to probably none over the past century. Both criteria C & D require a population size of less than 250 (C) or 50 (D) individuals to qualify as CR and, as the belief is that there are no individuals left, then both should apply. It meets the criteria for CR and is now presumed extinct.

Threats Uncertain, but possibly loss and degradation of habitat through improvement and conversion to arable or forestry use, development, drainage and succession/neglect.

Management and Conservation Unknown, but possibly maintenance of high water levels at wetland sites, and rotational disturbance to promote diversity of plant species/vegetation structure in grassland and woodland habitats. Avoidance of excessive erosion (e.g. due to trampling) at sand dune sites.

Published sources Hubble (2012), Steinhausen (1994).

CHAETOCNEMA AEROSA
CRITICALLY ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Chaetocnema aerosa (Letzner, 1847)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Rare and localised in southern and eastern England.

Habitat and ecology On spike-rushes *Eleocharis* (especially common spike-rush *E. palustris*) in wet habitats. Adults feed on host-plants, larvae undescribed and feeding unknown but probably develop during the summer.

Status Last recorded in 1961 at Bookham Common, Surrey. Previously known from Wicken Fen, Cambridgeshire in 1950 and the New Forest, Hampshire in 1889. Qualifies as Critically Endangered as its AoO is less than 10km^2, it is known from only one site and has declined from 3 sites to one. It has not been recorded for over 50 years and may be extinct.

Threats Possibly loss or degradation of wetland habitat through drainage and over-abstraction of water.

Management and Conservation Possibly extinct but targeted surveys should be undertaken at prior sites where suitable habitat remains e.g. Wicken Fen. Maintain high water levels.

Published sources Hubble (2012).

CHAETOCNEMA SAHLBERGII
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Chaetocnema sahlbergii (Gyllenhal, 1827)

Identification The adult is keyed by Hubble (2012). Egg pale yellow, 0.87mm x 0.47mm (Cox, pers. obs.). Larva and pupa undescribed.

Distribution Widely scattered and very local in only a few locations, mainly coastal.

Habitat and ecology A range of usually coastal habitats (especially estuaries and saltmarshes) on sedges *Carex*, rushes *Juncus* and sea-milkwort *Glaux maritima*. Also a range of other wet/damp habitats. Adults probably feed on sedges and/or rushes and possibly also other plants, larvae undescribed and larval feeding unknown.

Status Previously widespread (though scattered) in southern England, with records as far north as Cumberland. Following a large decline, now scattered in around seven widely separated locations. Prior to 1990 it has been recorded in twenty three hectads; since 1990 it has been found in ten scattered locations. The estimated AOO is less than 2,000km^2 making it appropriate for the Vulnerable category.

Threats Habitat loss and degradation through coastal developments including reclamation, erosion and sea defence works. Also, habitat degradation through overgrazing, and possibly further habitat loss due to sea level rise.

Management and Conservation Promotion of soft sea defences. Where saltmarshes are grazed, the intensity should not be too high; where they are not grazed, grazing should be avoided. Avoid activities which accelerate erosion.

Published sources Cox (2007), Hubble (2012).

DIBOLIA CYNOGLOSSI
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Dibolia cynoglossi (Koch, J.D.W., 1803)

Identification The adult is keyed by Hubble (2012). Egg creamy-white and slightly more pointed at one end, 0.69mm x 0.33mm (Cox, pers. obs.). Larva described/keyed by Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Cox (1996).

Distribution Recent records from only two sites in south-east England, both SSSIs – Rye Harbour, East Sussex and Dungeness, Kent.

Habitat and ecology On Lamiaceae in woodland rides, clearings and margins, on chalk hillsides and on coastal shingle. Adults feed on leaves, larvae are leaf-miners.

Status Previously known from a small number of sites in southern and eastern England. Now declined to only two recent sites, both on shingle – a decline from five hectads prior to 1990. The estimated AOO is under 500km^2.

Threats Habitat loss and degradation through gravel extraction and possibly neglect/succession. Woodland loss through clear-felling and conversion to other uses. Possibly further habitat loss due to sea level rise.

Management and Conservation Ensure gravel extraction licensing takes habitat requirements into account and avoid disturbance of coastal shingle. Cut woodland glades and rides/ride-margins on rotation to maintain a diversity of vegetation structure. Both recent sites are designated as SSSIs.

Published sources Cox (1996, 2007), Hubble (2012), Steinhausen (1994); Zaitsev & Medvedev (2009).

GALERUCA LATICOLLIS
CRITICALLY ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Galeruca laticollis (Sahlberg, C.R., 1838)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Böving (1929); Laboissiere (1934); Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Cox (1996).

Distribution Recent records from a single site in the Norfolk Broads.

Habitat and ecology Fens and coppices. Adults feed on leaves of thistles *Cirsium*, larvae on meadow-rues *Thalictrum.*

Status Previously known from a small number of scattered locations in southern and eastern England, it was believed to be extinct until rediscovered in good numbers at Wheatfen Broad, Norfolk in 1996. It qualifies as having a current AoO of less than 10km^2, is found in only one location and has suffered from a strong decline.

Threats Restricted to a small area and thus vulnerable to over-collecting, changes in habitat quality or single harmful events.

Management and Conservation Re-examine specimens prior to 1996 to determine whether any are overlooked/misidentified *G. laticollis* as some have previously been misattributed to *G. interrupta* (Collier, 1997). Avoid over-collecting (close key areas to public access if required), ensure water levels are maintained appropriately high and that coppices are cut in rotation.

Published sources Böving (1929), Collier (1997), Cox (1996), Hubble (2012), Laboissiere (1934); Steinhausen (1994), Zaitsev & Medvedev (2009).

LONGITARSUS ABSYNTHII
VULNERABLE B2a, bii, biv
Wormwood flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus absynthii Kutschera, 1862

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Coastal/near-coastal habitats in a small part of SE England, mainly around the Thames estuary.

Habitat and ecology on sea wormwood *Seriphidium maritimum* and mugworts *Artemisia* especially wormwood *A. absinthium* (sometimes yarrow *Achillea millefolium* and tansy *Tanacetum vulgare*) in coastal habitats – river banks, estuaries, saltmarshes, cliffs and rough ground. Adults feed on leaves, larvae feed at the roots.

Status Previously known from a number of locations in southern and SE England, now a similar but more localised distribution following a decline. Only in coastal/near-coastal habitats in a small part of SE England, mainly around the Thames estuary. Vulnerable to habitat loss or degradation e.g. through sea-level rise or development, and has shown a decline with losses from several locations It has declined from twelve to eight hectads, all well separated and equating to locations with an AoO of far less then 500km^2.

Threats Habitat loss and degradation through coastal developments including reclamation, erosion and sea defence works. Also, habitat degradation through overgrazing, and possibly further habitat loss due to sea level rise.

Management and Conservation Promotion of soft sea defences. Where saltmarshes are grazed, the intensity should not be too high; where they are not grazed, grazing should be avoided. Avoid activities which accelerate erosion.

Published sources Cox (2007), Hubble (2012).

LONGITARSUS AERUGINOSUS C1, C2a(i), D
CRYTICALLY ENDANGERED (POSSIBLY EXTINCT)
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus aeruginosus (Foudras, 1860)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Last recorded from Charmouth, Dorset in 1925.

Habitat and ecology On hemp-agrimony *Eupatorium cannabinum* and common comfrey *Symphytum officinale* in coastal and riverbank habitats. Adults feed on leaves, larvae at the roots.

Status Previously extremely localised in southern England, known from Dorset, the Isle of Wight, Hampshire and Surrey. Last recorded in 1925. There have been “sufficient” “adequate” searches for this species. This species is considered 'Possibly Extinct' as it hasn't been seen for decades and would qualify as CR(PE) C1, C2a(i), D on the basis that they are likely or there is a strong presumption that to have populations less than 50 mature individuals and have declined over the stated period.

Threats Loss of habitat through coastal development, river engineering works, improvement and conversion to other uses.

Management and Conservation None, although as a Western Palaearctic species, recolonisation could occur.

Published sources Hubble (2012).

LONGITARSUS FERRUGINEUS
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus ferrugineus (Foudras, 1860)

Identification The adult is keyed by Hubble (2012). Egg elongate-oval 0.63mm x 0.26mm (Cox, pers. obs.). Larva and pupa undescribed.

Distribution Sparsely scattered in a few locations in southern England as far north as the Wash, with recent records from Grays, Essex in 1996 and RAF Mildenhall, Suffolk in 1998.

Habitat and ecology Various, usually damp, habitats, usually on mints *Mentha*, sometimes on gypsyworts *Lycopus* and germanders *Teucrium*. Adults feed on the leaves of host-plants, larvae on the roots of mints.

Status Previously widespread in southern England as far north as Lincolnshire. Following a large decline now known from a small number of locations in southern and SE England. It has declined from twenty seven hectads to five hectads (locations) and has an estimated AOO of well under 500km^2.

Threats Probably loss of habitat e.g. through conversion to other uses.

Management and Conservation Uncertain, but maintenance of appropriately high water levels may be needed in wetland habitats, and possibly rotational disturbance to maintain open conditions such as in rides/ride margins, woodland margins and clearings.

Published sources Cox (2007), Hubble (2012).

LONGITARSUS LONGISETA
CRITICALLY ENDANGERED B2a, bii
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus longiseta Weise, 1889

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Rare in SE England with few verified sites – Blean, Kent in 1951 and several locations in Sussex between 1992 and 1994. Has not been recorded since 1994.

Habitat and ecology On speedwells *Veronica* (possibly preferring heath speedwell *V. officinalis*) in woodland clearings, shady grassland and fallow fields, especially bordering woodland. Adults feed on leaves of host-plants, larvae probably develop at the roots (though its biology and ecology are poorly understood).

Status Several records in the early 1990s but from only two hectads in the South East. Subsequent habitat degradation has occurred in at least one of the Sussex sites. It may be under-recorded as it can be difficult to identify and thus some specimens may have been attributed to other species and require re-examination. It was last recorded from a single site in 1994 (Booth) having declined from two hectads to one over the last decade and qualifies for CR as it has an AoO of less than $10km^2$, is declining and is found in only one location. It has not been recorded for 20 years.

Threats Habitat degradation through succession/neglect and subsequent scrub invasion.

Management and Conservation Cutting such as scrub management to maintain open conditions. Re-examine existing specimens to determine if any are misidentified *L. longiseta*.

Published sources Booth (1994), Cox (2007), Hubble (2012).

LONGITARSUS MINUSCULUS
DATA DEFICIENT
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus minusculus (Foudras, 1860)

Identification The adult is keyed by Mohr (1966); Doguet (1994); Warchałowski (2003); Bieńkowski (2004); Čižek & Doguet (2008), and described, with comparison to selected *Longitarsus* species, by Cox & Duff (2013). Juvenile stages undescribed.

Distribution Two locations in Dorset.

Habitat and ecology Chalk downland/grassland, on various Lamiaceae – known host-plants that occur in Britain are black horehound *Ballota nigra*, betony *Stachys officinalis*, perennial yellow-woundwort *S. recta* (an introduced species), wall garmander *Teucrium chamaedrys* and wood sage *T. scorodonia*. In continental Europe, known from hot dry slopes of the Jura, fallow land, hillsides and other well exposed sites (Doguet, 1994).

Status Two specimens from Dorset in 2002 have been confirmed; other museum specimens from the UK are misidentified *L. membranaceus* (Cox & Duff, 2013).

Threats Unknown – it may be a recent colonist or overlooked native.

Management and Conservation Unknown – further specimens and populations should be sought.

Published sources Bieńkowski (2004), Čižek & Doguet (2008), Cox & Duff (2013), Doguet (1994), Mohr (1966), Warchałowski (2003).

LONGITARSUS NIGERRIMUS
VULNERABLE, D2
Very black flea beetle/bladderwort flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus nigerrimus (Gyllenhal, 1827)

Identification The adult is keyed by Hubble (2012). Egg (briefly) and larva described by Booth (1997). Pupa undescribed.

Distribution A few locations in the New Forest and east Dorset.

Habitat and ecology Shallow boggy pools/pits and peat bogs with bladderworts *Utricularia*. May also be on purple moor-grass *Molinia caerulea* and cottongrasses *Eriophorum* by boggy pools. Adults feed above the water surface on the fine leaves and stems of bladderworts especially lesser bladderwort *U. minor*, larvae feed on the leaves and stems wholly or partly submerged (sometimes with the rear of the abdomen exposed to the air).

Status Restricted mainly to a few locations (recorded at four hectads post 1990) in a small area of the New Forest. This species is declining. It is classed as Vulnerbale under the D2 criterion as it is found in less than 5 locations (AoO less than 500km^2).

Threats Habitat loss and degradation though development, drainage and agricultural improvement, also lowering of water tables due to over-abstraction, river engineering works, pollution (including eutrophication), infilling of ponds and succession/neglect.

Management and Conservation Maintain high water level. Avoid insensitive river engineering works and excessive water abstraction (e.g. through inclusion of habitat

requirements during licensing). Isolate water-bodies from pollution (including nutrients). Avoid infilling of ponds and create new ponds where appropriate.

Published sources Booth (1997), Hubble (2012).

LONGITARSUS NIGROFASCIATUS
NEAR THREATENED B2, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus nigrofasciatus (Goeze, 1777)

Identification The adult is keyed by Hubble (2012). Egg 0.67mm x 0.26mm (Cox, pers. obs.). Larva and pupa undescribed.

Distribution Scattered and very local in SE England and on Lundy.

Habitat and ecology Calcareous (mainly chalk) and unimproved grassland, and maritime cliffs. Adults feed on leaves of Scrophulariaceae, larvae at the roots.

Status Previously widespread in England as far north as Yorkshire and Cumberland, and also known from Wales. Following a marked decline (including loss from Cumbria), now scattered and local in England and lost from Wales. It has declined from twenty four hectads prior to 1990 to eleven hectads post 1990.

Threats Loss of habitat through improvement, reseeding or fertiliser application, or conversion to arable use. Further loss or degradation though succession/neglect.

Management and Conservation Rotational disturbance such as grazing or cutting to maintain open conditions and diversity of vegetation structure.

Published sources Cox (2007), Hubble (2012)

LONGITARSUS OBLITERATOIDES
DATA DEFICIENT

Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus obliteratoides Gruev, 1973

Identification The adult is keyed by Hubble (2012). Egg pale yellow, 0.59 x 0.21mm (Cox, pers. obs.). Larva and pupa undescribed.

Distribution Very local, only recorded from a few coastal sites in the far south-west of England, Pembrokeshire and north Wales. However, there is considerable available habitat that has not been surveyed.

Habitat and ecology Usually on wild (sometimes known as 'Breckland') thyme *Thymus serpyllum* on sea cliffs, limestone grassland and sandy beaches. Adults feed on the leaves of *T. serpyllum* and possibly other thymes, and rosemary *Rosmarinus officinalis*, larvae develop at the roots.

Status First described in 1973 and first recognised in Britain in 1992. Subsequently found as specimens attributed to *L. obliteratus* dating back to 1964 and there are possibly other specimens needing reidentification but still likely to be restricted to a small number of coastal sites.

Threats Coastal sites may be threatened by development, sea defence works, over-disturbance, erosion, succession/neglect and sea level rise. Grassland habitats may be lost or degraded by improvement, reseeding or fertiliser application, overgrazing or succession/neglect.

Management and Conservation Promote soft coastal defences. Rotational disturbance such as grazing or cutting to maintain open conditions and diversity of vegetation structure. Avoid overgrazing if stocked; also avoid activities which accelerate erosion.

Published sources Hubble (2012).

LONGITARSUS SYMPHYTI
DATA DEFICIENT
Order COLEOPTERA
Family CHRYSOMELIDAE

Longitarsus symphyti (Heikertinger, 1912)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution First recorded in Berkshire in 2009 and not known to have spread significantly.

Habitat and ecology River-banks (and possibly other habitats). Adults feed on leaves of comfrey *Symphytum officinale*, larvae probably feed at the roots.

Status First recorded in Britain in Berkshire in 2009 with several specimens found on riverside comfrey *Symphytum officinale* among *Phragmites* reeds and *Urtica* nettles. All specimens checked were wingless and thus dispersal may be slow (Harrison, 2010). The species is restricted to *S. officinale* across its broad European range (Kippenberg, 1994).

Threats Unknown, but possibly riverbank/river engineering works.

Management and Conservation Survey work to clarify the status of the species. Avoid insensitive river works.

Published sources Harrison (2010), Hubble (2012), Kippenberg (1994).

OCHROSIS VENTRALIS
VULNERABLE B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Ochrosis ventralis (Illiger, 1807)

Identification The adult is keyed by Hubble (2012). Juvenile stages undescribed.

Distribution Sparsely scattered and very local in a small number of widely separated locations.

Habitat and ecology Lakesides, downs, grassy leys, coastal bays and cliffs - probably also on disturbed chalky or sandy (i.e. free-draining) ground. Adults feed on leaves of nightshades *Solanum* and possibly various other plants such as mayweeds *Matricaria*, sea campion *Silene uniflora* and scarlet pimpernel *Anagallis arvensis*, larvae at the roots.

Status Previously widespread in southern England and Wales with scattered records as far north as Cumberland. Following a marked decline throughout its range, now sparsely scattered and very local in a small number of widely separated locations. It has declined from twenty four hectads prior to 1990 to nine hectads post 1990 (hectads equate to locations for this species) with an AOO of well under 2,000km^2.

Threats Habitat loss through development, improvement and conversion to arable use. Also, loss and degradation of habitat through succession/neglect.

Management and Conservation Maintain open conditions using rotational disturbance such as cutting or grazing, and possibly rotavation to disturb the soil itself.

Published sources Cox (2007), Hubble (2012).

PHYLLOTRETA STRIOLATA
VULNERABLE B2a, bii, biv
Striped turnip flea beetle, striped flea beetle, turnip flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Phyllotreta striolata (Fabricius, 1803)

Identification The adult is keyed by Hubble (2012). Egg creamy-white or yellowish, later white then transparent, oval, 0.42mm x 0.27mm (Cox, pers. obs.). Larva described/keyed by

Harukawa & Takunaga (1938); Vig (1989); Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Harukawa & Takunaga (1938); Cox (1996).

Distribution Widely scattered in a small number of locations in England and Wales.

Habitat and ecology On wild and cultivated Brassicaceae in various habitats. Adults feed on the leaves of Brassicaceae and may damage crop seedlings, larvae feed at the roots and underground stems. In some other countries a pest of brassica crops.

Status Previously widespread in England and recorded in Wales and as far north as Dunbartonshire, Scotland. Following a marked decline throughout its range, now sparsely scattered and in a small number of locations. It has declined from twenty eight hectads prior to 1990 to ten hectads (hectads equate to locations for this species) post 1990. It qualifies by showing decline, can be found in only 10 locations and has an AoO of less than 2,000km^2.

Threats Use of pesticides and herbicides, river engineering works and succession/neglect.

Management and Conservation Maintain open conditions using rotational disturbance such as cutting or grazing. Avoid unsympathetic river works, especially those that impede water flow i.e. ensure the mobility of river shingle remains. Avoid the use of the relevant pesticides and herbicides. Not a pest species in Britain.

Published sources Cox (1996, 2007), Harukawa & Takunaga (1938), Hubble (2012), Steinhausen (1994), Vig (1989), Zaitsev & Medvedev (2009).

PSYLLIODES ATTENUATA
ENDANGERED B2a, bii, biv
Hop flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Psylliodes attenuata (Koch, J.D.W., 1803)

Identification The adult is keyed by Hubble (2012). Egg pale yellow, oval, 0.48mm x 0.25mm (Cox, pers. obs.). Larva described/keyed by Tolg (1913); Newton (1929); Doguet (1994); Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Tolg (1913); Newton (1929); Cox (1996).

Distribution A small number of widely scattered locations, mainly in Kent, also from Warwickshire and Nottinghamshire.

Habitat and ecology On and around cultivated land especially hop-field and margins, also woodland. Adults feed on leaves, flowers and cones of Cannabaceae especially hop *Humulus lupulus* (also hemp *Cannabis sativa* and common nettle *Urtica dioica*). Early instar larvae mine roots and root-necks, later instars feeding on the outside of roots.

Status Previously widespread in England and Wales, also recorded as far north as Perthshire, Scotland. Following a large decline, now known from a small number of widely scattered locations, mainly in south-east England. It has dropped from fourteen hectads prior to 1990 to three hectads (locations) post 1990. The AOO is below 500km^2.

Threats Reduction in hop cultivation, loss of habitat through improvement and other land use changes, hedgerow removal and mechanised cutting (flailing), and herbicide/pesticide use.

Management and Conservation Rotational management of hedgerows to ensure a variety of vegetation structure, avoiding unsympathetic management such as flailing. Plant/replace hedgerows where appropriate. Avoid the use of the relevant pesticides and herbicides.

Published sources Cox (1996, 2007), Doguet (1994), Hubble (2012), Newton (1929), Steinhausen (1994), Tolg (1913), Zaitsev & Medvedev (2009).

PSYLLIODES HYOSCYAMI C1, C2a(i), D
CRITICALLY ENGANGERED (POSSIBLY EXTINCT)
Henbane flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Psylliodes hyoscyami (Linnaeus, 1758)

Identification The adult is keyed by Hubble (2012). Egg and larva described by Newton (1934). Pupa described by Newton (1934); Cox (1996).

Distribution Last recorded in Oxfordshire in 1930.

Habitat and ecology On Solanaceae, especially henbane *Hyoscyamus niger*, in areas of disturbed ground, particularly where sandy. Previously on commercial crops of henbane *Hyoscyamus niger*, also known on deadly nightshade *Atropa belladonna* and bittersweet *Solanum dulcamara*. Larvae mine petioles and sometimes other parts.

Status Previously widespread in England, also known from Wales and as far north as West Lothian, Scotland. Last recorded in 1930, having declined along with commercial henbane crops. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the decline is real and there have been “sufficient” “adequate” searches for this species. This species is considered 'Possibly Extinct' as it hasn’t been seen for decades and qualifies as CR(PE) C1, C2a(i), D on the basis that it is likely or there is a strong presumption that there are less than 50 mature individuals and it has declined over the stated period.

Threats Decline of henbane cultivation, although as the foodplants still exist in Britain, other factors must have been involved such as coastal development, habitat improvement and conversion to arable use, use of herbicides and succession/neglect.

Management and Conservation None, although recolonisation is possible as the beetle is found across the Palaearctic, including France. If this occurs, then consider rotational

disturbance such as cutting or grazing to maintain open conditions, and possibly rotavation to disturb the soil in suitable locations.

Published sources Cox (1996, 2007), Hubble (2012), Newton (1934).

PSYLLIODES LURIDIPENNIS
CRITICALLY ENDANGERED B2a, bii, biii
Lundy cabbage flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Psylliodes luridipennis Kutschera, 1864

Identification The adult is keyed by Hubble (2012). Egg pale yellow, 1.03mm x 0.48mm (Cox, pers. obs.). Larva described by Cox (1998). Pupa described by Cox (1996).

Distribution Endemic to Lundy Island.

Habitat and ecology Various mainly rocky habitats, only on Lundy Cabbage *Coincya wrightii* (also a Lundy endemic). Adults feed on the leaves, larvae develop in petioles, midribs and stems.

Status Endemic with a single population in one location (Lundy), reliant on its sole food-plant Lundy Cabbage which declined to low but stable abundance by 2001. It qualifies by found in one location, with an AoO of less than 10km^2 and it's foodplant is in decline.

Threats The sole foodplant is threatened by grazing (rabbits and possibly goats, sheep and deer), tourist pressure (e.g. trampling and erosion), and invasive *Rhododendron ponticum.*

Management and Conservation Rhododendron removal. Use appropriate fencing to exclude grazers, and consider grazer control if necessary, noting that rabbit grazing pressure (and thus the populations of *C. wrightii* and *P. luridipennis*) may fluctuate with myxomatosis incidence (Compton *et al*., 2004). Improved visitor information, with exclusion of walkers from key locations. Survey and monitoring of the beetle and foodplant census to ensure up-to-date detailed information on their status.

Published sources Compton *et al*. (2004), Cox (1996, 1998), Hubble (2012).

PSYLLIODES SOPHIAE
ENDANGERED B2a, bii, biv
Flixweed flea beetle
Order COLEOPTERA
Family CHRYSOMELIDAE

Psylliodes sophiae Heikertinger, 1914

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described by Cox (1998). Pupa undescribed.

Distribution Recent records only from west Suffolk and west Norfolk.

Habitat and ecology In disturbed or waste areas, arable fields and margins, grassland and roadside verges (especially on sandy or chalky-sandy Breckland soils), also in fens. Adults feed on leaves of flixweed *Descurainia sophia*, larvae mine the flowering stems. Possibly also on woad *Isatis tinctoria*.

Status Always primarily a Breckland species with a cluster of records from eastern England, now declined to a small number of nearby locations in East Anglia. It has declined from six hectads prior to 1990 to three post 1990. It has an AoO of less than 500km^2. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the decline is real. Some specimens (such as one reported from Bristol) are incorrectly identified *P. chrysocephala* and outside Britain, *P. sophiae* has been confirmed only from Germany, Dagestan and Turkey.

Threats Habitat loss through improvement, development and conversion to arable or forestry use, also habitat degredation through succession/neglect.

Management and Conservation Rotational disturbance such as scraping or rotavation to maintain open conditions (where grazing or cutting are not sufficient).

Published sources Cox (1998, 2007), Hubble (2012).

13.9 Cassidinae

Considered to be a tribe (Cassidini) of the subfamily Hispinae by Cox (2007), the Cassidinae are now given subfamily status and are commonly known as the 'tortoise beetles' due to their dorsally flat-domed and more-or-less rounded appearance.

CASSIDA DENTICOLLIS
ENDANGERED B2a, bii, biv
Order COLEOPTERA
Family CHRYSOMELIDAE

Cassida denticollis Suffrian, 1844

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by van Emden (1962); Steinhausen (1994); Bordy (2000); Zaitsev & Medvedev (2009). Pupa described by Bordy (2000).

Distribution Very sparsely scattered, having declined to a small number of sites in southern England.

Habitat and ecology Roadside verges, water meadows and river margins. Adults and larvae feed on yarrow *Achillea millefolium.*

Status Currently known from only four hectads post 1990 equating to four different locations. This is a decline from seven hectads before 1990. The estimated AOO is well below 500km^2. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the decline is real. Old records exist for SW Scotland and south Wales.

Threats Possibly habitat loss through changes in land use, although this is uncertain.

Management and Conservation Threats and ecological requirements are poorly understood, but ongoing maintenance of water-meadows may be beneficial. Targeted surveys would be helpful in confirming the current range.

Published sources Bordy (2000), Cox (2007), van Emden (1962), Hubble (2012), Steinhausen (1994), Zaitsev & Medvedev (2009).

CASSIDA SANGUINOSA
DATA DEFICIENT
Order COLEOPTERA
Family CHRYSOMELIDAE

Cassida sanguinosa Suffrian, 1844

Identification The adult is keyed by Hubble (2012). Egg briefly described by Bordy (2000). Larva described/keyed by van Emden (1962); Steinhausen (1994); Bordy (2000); Zaitsev & Medvedev (2009). Pupa described/keyed by Palij & Klepikova (1957); Bordy (2000).

Distribution Very sparsely scattered across the southernmost counties of England.

Habitat and ecology Various habitats, usually near water, sometimes on farmland. Adults and larvae feed on several species of Asteraceae. Sekerka (2007) discusses the status of this species in a European context and notes that it may have more exacting habitat requirements than its competitors, stating that it is associated with dry sandy habitats and is probably monophagous, at least in the larval stage, on tansy *Tanacetum vulgare* which is one of its food-plants in Britain. With Zaitsev & Medvedev (2009) agreeing more closely with the British requirement by indicating an association with marshy land and wet meadows, the reported difference between British and continental European habitat requirements is not understood and may be incorrect.

Status Most records are post-1980 and it may be expanding its range, but this, unlike its current scarcity, is uncertain and it is still known from only a small number of sites in southern England. The increased survey effort associated with publication of the Atlas (Cox, 2007) suggests the scattered and restricted distribution is real.

Threats Unknown.

Management and Conservation Unknown.

Published sources Bordy (2000), Cox (2007), van Emden (1962), Hubble (2012), Palij & Klepikova (1957), Steinhausen (1994), Zaitsev & Medvedev (2009).

HYPOCASSIDA SUBFERRUGINEA
REGIONALLY EXTINCT
Order COLEOPTERA
Family CHRYSOMELIDAE

Hypocassida subferruginea (Schrank, 1776)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by van Emden (1962); Steinhausen (1994); Zaitsev & Medvedev (2009). Pupa described by Palij & Klepikova (1957).

Distribution Recorded only from 'Devon' and Glamorgan.

Habitat and ecology Poorly understood, and associated with a wide range of habitats across its Palaearctic range In Britain it is probably associated with field margins, disturbed ground and wetlands, possibly also coastal habitats. Adults and larvae feed on Convolvulaceae bindweeds.

Status Last recorded in the 19th century.

Threats Unknown.

Management and Conservation Unknown.

Published sources van Emden (1962), Hubble (2012), Palij & Klepikova (1957), Steinhausen (1994), Zaitsev & Medvedev (2009).

PILEMOSTOMA FASTUOSA
NEAR THREATENED B2a
Order COLEOPTERA
Family CHRYSOMELIDAE

Pilemostoma fastuosa (Schaller, 1783)

Identification The adult is keyed by Hubble (2012). Egg undescribed. Larva described/keyed by Maulik (1949); van Emden (1962); Steinhausen (1994); Bordy (2000); Zaitsev & Medvedev (2009). Pupa described/keyed by Palij & Klepikova (1957); Bordy (2000).

Distribution Scattered in southern England and southern Wales.

Habitat and ecology Various habitats, especially open or lightly shaded slopes on calcareous soils. Adults and larvae (on the undersides) feed on leaves of a range of Asteraceae especially ploughman's-spikenard *Inula conyza* and common fleabane *Pulicaria dysenterica*, sometimes common ragwort *Senecio jacobaea*, possibly also on mints *Mentha*.

Status Currently recorded from 12 hectads that are equatable to locations; historically recorded from 16, this species is declining but does not quite meet the threshold for inclusion as Vulnerable. Historically widespread in southern England and south Wales with an old record from Lancashire. Has now declined to be scarce and localised.

Threats Loss of unimproved grassland through fertiliser application, reseeding and conversion to arable use. Habitat losses and degradation have also occurred due to development and neglect/succession.

Management and Conservation Maintenance of open conditions is required through rotational grazing, cutting or other form of disturbance.

Published sources Bordy (2000), Cox (2007), van Emden (1962), Hubble (2012), Maulik (1949), Palij & Klepikova (1957), Steinhausen (1994), Zaitsev & Medvedev (2009).

14. References

Andrews, J. (1995). Waterbodies. In: Sutherland, W.J. & Hill, D.A. (eds.) *Managing Habitats for Conservation*, pp. 121-148. CUP, Cambridge.

Baker, J., Beebee, T., Buckley, J., Gent, T. & Orchard, D. (2011). *Amphibian Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.

Beenen, R. & Winkelman, J.K. (2001). Aantekeningen over Chrysomelidae in Nederland 5. *Entomologische Berichten* **61**: 63-67.

Bienkowski, A.O. (1992). New data on morphology and systematics of the larvae of Donaciinae (Coleoptera Chrysomelidae) from Palaearctic. *Russian Entomological Journal* **1**: 3-15.

Bienkowski, A.O. (1999). Morphology and systematic position of the larvae of *Cryptocephalus octacosmus* and *C. semiargenteus* with special reference to the age variation of *Cryptocephalus* larvae (Coleoptera: Chrysomelidae: Cryptocephalinae). *Genus (Wroclaw)* **10**: 403-413.

Bienkowski, A.O. (2004). *Leaf-beetles (Coleoptera: Chrysomelidae) of the Eastern Europe: new key to subfamilies, genera and species*. Mikron-print, Moscow.

Booth, R.G. (1994). *Longitarsus longiseta* Weise rediscovered and *Longitarsus obliteratoides* Gruev (Chrysomelidae) new to Britain. *The Coleopterist* **3**: 4-5.

Booth, R.G. (1997). *The Very Black Flea Beetle* Longitarsus nigerrimus *in Britain*. Report to English Nature, Contribution Contract-Fin/Cont/VT7.1A(8).

Bordy, B. (2000). Coleopteres Chrysomelidae. Volume 3. Hispinae et Cassidinae. *Faune de France* **85**: 250 pp. + 26 plates.

Böving, A.G. (1929). Beetle larvae of the subfamily Galerucinae. *Proceedings of the US National Museum* **75**: 1-49.

Brovdii, V.M. (1977). Larvae of three species of the genus *Chrysolina* (Coleoptera, Chrysomelidae). *Entomological Review* **56**: 120-123.

Burgess, N., Ward, D., Hobbs, R. & Bellamy, D. (1995). Reedbeds, fens and acid bogs. In: Sutherland, W.J. & Hill, D.A. (eds.) *Managing Habitats for Conservation*, pp. 149-196. CUP, Cambridge.

Buse, A. (1993). Life-cycle and behaviour of the British population of *Chrysolina cerealis* (Coleoptera: Chrysomelidae): the implications for survival. *Entomologist*, **112**: 105-117.

Buse, A. & Morris, M.G. (1995). The responses of montane beetles (Coleoptera) to climatic change. In: *Mountain zonality facing global change.* Ed. A. Breymeyer, pp. 59-67. Warsaw, Institute of Geography and Spatial Organization, Polish Academy of Sciences.

Čižek, P. & Doguet, S. (2008). *Klíč k určování dřepčíků (Coleoptera: Chrysomelidae: Alticinae) Česka a Slovenska*. Městské Muzeum, Nové Město nad Metují.

Collier, M. (1997). *Galeruca interrupta sensu auct*. Brit. (Chrysomelidae) rediscovered in Britain. *The Coleopterist* **5**: 93.

Compton, S.G., Key, R.S. & Key, R.J.D. (2004). Lundy cabbage population peaks – are they driven by rabbits and myxomatosis? *Reports of the Lundy Field Society* **53**: 50-56.

Cox, M.L. (1982). Larvae of the British genera of chrysomeline beetles (Coleoptera, Chrysomelidae). *Systematic Entomology* **7**: 297-301.

Cox, M.L. (1994). Egg bursters in the Chrysomelidae, with a review of their occurrence in the Chrysomeloidea (Coleoptera). In: Jolivet, P.H.A., Cox, M.L. & Petitpierre, E. (eds.) *Novel Aspects of the Biology of Chrysomelidae*, pp. 75-110. Kluwer, Dordrecht.

Cox, M.L. (1996). The pupae of Chrysomeloidea. In: Jolivet, P.H.A. & Cox, M.L. (eds.) *Chrysomelidae Biology, Vol. 1: The Classification, Phylogeny & Genetics*, pp. 119-265. SPB Academic, Amsterdam.

Cox, M.L. (1998). The genus *Psylliodes* Latreille (Chrysomelidae: Alticinae) in the UK. *The Coleopterist* **7**: 33-65.

Cox, M.L. (2007). *Atlas of the Seed and Leaf Beetles of Britain and Ireland*. Pisces, Newbury.

Cox, M.L. & Duff, A.G. (2013). *Longitarsus minusculus* (Foudras, 1860) (Chrysomelidae) new to the British Isles. *The Coleopterist* **22(2)**: 55-61.

Crofts, A. & Jefferson, R.G. (eds.) (1994). *The Lowland Grassland Management Handbook*. English Nature, Peterborough/The Wildlife Trusts, Lincoln.

Dandy, J.E. (1969). *Watsonian vice-counties of Great Britain*. London, Ray Society.

Doguet, S. (1994). Coléoptères Chrysomelidae. Volume 2. Alticinae. *Faune de France* **80**: 1-694.

Donisthorpe, H.St.J.K. (1908). Notes on the life-histories of two supposed ants'-nest beetles (with plate). *Entomologist's Record* 20: 108-110.

Duff, A.G. (1993). *Beetles of Somerset*. Somerset Archaeological and Natural History Society, Taunton.

Duff, A.G. (2012). *Checklist of Beetles of the British Isles*. Revised edition. Pemberley Books (Publishing), Iver.

Edgar, P. Foster, J. & Baker, J. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.

van Emden, H.F. (1962). Key to species of British Cassidinae larvae (Col., Chrysomelidae). *Entomologist's Monthly Magazine* **265**: 33-36.

Formstone, B. (2014). Agelastica alni (Linnaeus) (Chrysomelidae) and Stenus contumax Assing (Staphylinidae) new to Wales. *The Coleopterist* **23**(1): 36.

Foster, G. (2010). *A review of the scarce and threatened Coleoptera of Great Britain. Part 3: Water Beetles of Great Britain*. JNCC, Peterborough.

Fowler, W.W. (1890). *The Coleoptera of the British islands. Vol. 4. Lamellicornia-Serricornia-Longicornia-Phytophaga*. Lovell Reeve, London.

Fowler, W.W. & Donisthorpe, H. St. J. (1913). *The Coleoptera of the British Islands. Volume VI: Supplement*. Lovell Reeve, London.

Francis, S.A. (2009). *British Field Crops. A Pocket Guide to the Identification, History and Uses of Arable Crops in Great Britain* (2nd ed.). Self-published.

Frid, C.L.J. & Evans, P.R. (1995). Coastal habitats. In: Sutherland, W.J. & Hill, D.A. (eds.) *Managing Habitats for Conservation*, pp. 59-83. CUP, Cambridge.

Fry, R. & Lonsdale, D. (eds.) (1991). Habitat conservation for insects – a neglected green issue. *The Amateur Entomologist* **21**: i-xvi, 1-262.

Gruev, B. & Döberl, M. (1997). General distribution of the flea beetles in the Palaearctic subregion (Coleoptera, Chrysomelidae: Alticinae). *Scopolia* **37**: 1-496.

Harde, K.W. (1984). *A Field Guide in Colour to Beetles* (English Edition). London: Octopus Books.

Harrison, T. (2010). *Longitarsus symphyti* Heikertinger, 1912 (Chrysomelidae) new to Britain. *The Coleopterist* **18(2)**: 41-43.

Harukawa, C. & Takunaga, M. (1938). Studies on the life history and bionomics of *Phyllotreta vittata* Fabricius 1. Life history of *Phyllotreta vittata* Fabricius. *Memoirs of the College of Agriculture, Kyoto Imperial University* **44**: 1-48.

Haskins, L. (2000). Heathlands in an urban setting – effects of urban development on heathlands of south-east Dorset. *British Wildlife* **11(4)**: 229-237.

Henriksen, K. (1927). Larver. Chrysomelidae. In: Hansen, V. (ed.) *Biller VII. Chrysomelidae & Lariidae*, pp. 290-376. GEC Gads Forlag, Kobenhavn.

Hodge, P.J. (2012). *Bruchidius imbricornis* (Panzer, 1795) (Chrysomelidae) new to the British Isles. *The Coleopterist* **21(3)**: 136-139.

Hodge, P.J. & Jones, R.A. (1995). *New British Beetles. Species not in Joy's Practical Handbook*. British Entomological & Natural History Society, Reading.

Howe, M. (2003). Coastal soft cliffs and their importance for invertebrates. *British Wildlife* **14(5)**: 323-331.

Hubble, D. (2012). *Keys to the Adults of Seed and Leaf Beetles of Britain and Ireland*. FSC, Telford.

Hubble, D. & Murray, D. (2011). First British record of *Smaragdina salicina* (Scopoli, 1763) (Chrysomelidae). *The Coleopterist* **20(1)**: 1-3.

Hyman, P.S. (1986). *A review of the scarce and threatened Coleoptera of Great Britain. Part 1*. JNCC, Peterborough.

Hyman, P.S. & Parsons, M.S. (1992). *A review of the scarce and threatened Coleoptera of Great Britain. Part 1*. JNCC, Peterborough.

Hyman, P.S. & Parsons, M.S. (1994). *A review of the scarce and threatened Coleoptera of Great Britain. Part 2*. JNCC, Peterborough.

IUCN (2012a). *IUCN Red List Categories and Criteria*. Version 3.1. 2nd Edition, IUCN Species Survival Commission. IUCN, Gland.

IUCN (2012b). *Guidelines for Application of IUCN Red List Criteria at Regional and National Levels*. Version 4.0, IUCN Species Survival Commission. IUCN, Gland.

IUCN (2013). *Guidelines for Using the IUCN Red List Categories and Criteria*. Version 10, IUCN Species Survival Commission. IUCN, Gland.

JNCC (2010). UK Priority Species data collation *Cryptocephalus sexpunctatus* version 2. http://jncc.defra.gov.uk/_speciespages/251.pdf [accessed 13/02/2014].

Jobe, J.B. & Marsh, R.J. (2012). The status of *Aphthona pallida* (Bach) (Chrysomelidae) in Yorkshire. *The Coleopterist* **21(1)**: 19-20.

Jolivet, P. (1952). Quelques données sur la myrmécophile des Clytrides (Col. Chrysomeloidea). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique* **28**: 1-12.

Joy, N.H. (1932). *A Practical handbook of British Beetles*. 2 volumes. H.F. & G. Witherby [1976 reprint, E.W.Classey Ltd].

Kingsolver, J.M. (2002). Bruchidae Latreille 1802. In: Arnett, R.H., Thomas, M.C., Skelley, P.E. & Frank, J.H. (eds.). *American Beetles, Volume 2: Polyphaga: Scarabaeoidea through Curculionoidea*, pp. 602-608. CRC Press, Boca Raton, FL.

Kippenberg, H. (1994). Familie Chrysomelidae. In: Lohse, G.A. & Lucht, W.H. (eds.) *Die Kafer Mitteleuropas Band 14*. Goecke & Evers, Krefeld.

Kirby, P. (2001). *Habitat Management for Invertebrates: a Practical Handbook*. RSPB, Sandy.

Klausnitzer, B. & Förster, G. (1971). Zur Eimorphologie einiger mitteleuropaischer Chrysomelidae (Coleoptera). *Polskie Pismo Entomologiczne* **41**: 429-437.

Laboissière, V. (1934). Galerucinae de la faune Française (Coléoptères). *Annales de la Société Entomologique de France, (CIII)* **103**: 13, 14, 24-26 & 90.

Lopatin, I.K. (1984). *Leaf Beetles (Chrysomelidae) of Central Asia and Kazakhstan*. Amerind, New Delhi.

Mace, G.M. & Lande, R. (1991). Assessing extinction threats: toward a re-evaluation of IUCN threatened species categories. *Conservation Biology* **5**: 148-157.

Maisner, N. (1974). Chrysomelidae. In: Schwenke, W. (ed.) *Die Forstschädlinge Europas Ein Handbuch in funf Banden. Zweiter Band Käfer*, pp. 202-236. Verlag Paul Parey, Hamburg/Berlin.

Marshall, J.E. (1979). The larvae of the British species of *Chrysolina* (Chrysomelidae). *Systematic Entomology* **4**: 409-417.

Marshall, J.E. (1980). A key to some larvae of the British Galerucinae and Halticinae (Coleoptera: Chrysomelidae). *Entomologist's Gazette* **31**: 275-283.

Maulik, S. (1949). LII. Immature stages of the British chrysomelid Coleoptera. -1. Pilemostoma fastuosa (Schaller), 1783, Cassidinae. *Annals and Magazine of Natural History; including Zoology, Botany and Geology. London* **12**: 633-638.

Medvedev, L.N. & Zaitsev, Y.M. (1978). *Larven der Blattkäfer aus dem ostlichen Teil der USSR*. Moscow. [In Russian]

Mendel, H. & Hatton, J. (2012). *Chrysomela tremula* Fabricius (Chrysomelidae) rediscovered in Britain. *The Coleopterist* **21(3)**: 132-135.

Mendel, H. & Hatton, J. (2013). Correction: *Chrysomela saliceti* Suffrian (new to Britain) not *Chrysomela tremula* Fabricius (Chrysomelidae) in the Cambridgeshire fens. *The Coleopterist* **22(1)**: 19.

Menzies, I.S. & Cox, M.L. (1996). Notes on the natural history, distribution and identification of British reed beetles. *British Journal of Entomology and Natural History* **9**: 137-162.

Mohr, K.H. (1966). Familie: Chrysomelidae. In: Freude, H., Harde, K.H. & Lohse, G.A. (eds.). *Die Käfer Mitteleuropas. Band 9: Cerambycidae, Chrysomelidae*, pp. 95-280. Goecke & Evers, Krefeld.

National Tree Safety Group. (2011). *Common Sense Risk Management of Trees*. The Forestry Commission, Edinburgh.

Newton, H.C.F. (1929). Observations on the biology of some flea-beetles of economic importance. *Journal of the South-Eastern Agricultural College, Wye, Kent* **26**: 145-164.

Newton, H.C.F. (1934). On the biology of *Psylliodes hyoscyami* Linn. (Chrysomelidae, Coleoptera), the henbane flea-beetle, with descriptions of the larval stage. *Annals of Applied Biology* **21**: 153-161.

Ogloblin, D. A. & Medvedev, L. N. (1971). *Lichinki zhukov-listoyedov (Coleoptera, Chrysomelidae) Evropeiskoi chasti SSSR*. Nauka, Leningrad.

Owen, J.A. (1993). Studies on the life history of *Chrysolina crassicornis* (Helliesin) (Col.: Chrysomelidae). *The Entomologist* **112**: 69-74.

Owen, J.A. (1997). Some notes on the life history of *Cryptocephalus 6-punctatus* L. (Col.: Chrysomelidae). *Entomologist's Record* **109**: 43-48.

Owen, J.A. (1999). Notes on the biology of *Cryptocephalus coryli* (Linnaeus) (Coleoptera: Chrysomelidae). *Entomologist's Gazette* **50**: 199-204.

Owen, J.A. (2000). Adult feeding and egg-laying in *Cryptocephalus coryli* (Linnaeus) (Coleoptera: Chrysomelidae). *Entomologist's Gazette* **51**: 195-201.

Owen, J.A. (2003). Studies on the life-history of *Cryptocephalus nitidulus* Fabricius, 1787 (Coleoptera: Chrysomelidae). *Entomologist's Gazette* **54**: 255-266.

Oxford, G. & Millington, M. (2013). Tansy beetle conservation: Yorkshire data, national implications. *The Naturalist* **138**: 112-122.

Oxford, G.S., Sivell, D., Dytham, C. & Key, R. (2003). The jewel of York - ecology and conservation of the tansy beetle. *British Wildlife* **14(5)**: 332-337.

Palij, V.F. & Klepikova, P.I. (1957). [Cassids (Coleoptera Chrysomelidae) of the central black earth area of the RSFSR, their economic importance and the description of the pupae of the most common species.] *Revue d'Entomologie de l'URSS* **36**: 75-95. [In Russian with English summary]

Pendleton, T. & Pendleton, D. (2013a). *Cryptocephalus coryli* at Sherwood Forest NNR. http://www.eakringbirds.com/eakringbirds6/cryptocephaluscoryli.htm [accessed 18/12/2013].

Pendleton, T. & Pendleton, D. (2013b). Rearing *Cryptocephalus* beetles in captivity. http://www.eakringbirds.com/eakringbirds6/cryptocephaluslifecycles.htm [accessed 18/12/2013].

Pendleton, T. & Pendleton, D. (2013c). *Cryptocephalus querceti* at Sherwood Forest NNR. http://www.eakringbirds.com/eakringbirds4/cryptocephalusquerceti.htm [accessed 18/12/2013].

Piper, R.W. (2002). *Conservation Biology of* Cryptocephalus *Species and Other Threatened UK Beetles*. PhD thesis, University of Leeds, UK.

Piper, R. (2008). *Cryptocephalus sexpunctatus* (Linnaeus, 1758) (Chrysomelidae) in Shrawley Wood, Worcestershire. *Worcestershire Record* **25**: 15-17.

Piper, R. & Hodge, P. (2002). The rare species of UK *Cryptocephalus*: the current state of knowledge. *English Nature Research Reports* **469**: 5-70.

Quayle, H.J. (1908). The California grape root-worm (*Adoxus obscurus* Linn.). *Bulletin of the California Agricultural Experiment Station* **195**: 1-26.

Rackham, O. (2006). *Woodlands*. Collins, London.

Ramsay, A.J. (2009). A new hostplant for *Agelastica alni* (Linnaeus) (Chrysomelidae) in Britain and observations of the species in Cheshire. *The Coleopterist* **18(2)**: 149-151.

Rodwell, J.S. (ed.) (1991). *British Plant Communities 2: Mires and Heaths*. CUP, Cambridge.

Rodwell, J.S. (ed.) (1995). *British Plant Communities 4: Aquatic Communities, Swamps and Tall-Herb Fens*. CUP, Cambridge.

Rowell, T.A. (1986). The history of drainage at Wicken Fen, Cambridgeshire, England, and its relevance to conservation. *Biological Conservation* **35**: 111-142.

Sekerka, L. (2007). Detailed distribution of *Cassida sanguinosa* and *C. leucanthemi* (Coleoptera: Chrysomelidae: Cassidinae: Cassidini). *Acta Entomologica Musei Nationalis Pragae* **47**: 203-209.

Shaw, M.R. 1980. 1979. Annual Exhibition: Coleoptera. Proceedings & Transactions of the British Entomological & Natural History Society 13: 11.

Shirt, D.B. (ed.) (1987). *British Red Data Books: 2. Insects*. NCC, Peterborough.

Shute, S.L. (1980). Wing-polymorphism in British species of Longitarsus beetles (Chrysomelidae: Alticinae). *Systematic Entomology* **5**: 437-448.

Sinclair, M. & Hutchins, D. (2009). *Aphthona pallida* (Bach, 1856) (Chrysomelidae) is a British species. *The Coleopterist* **18(3)**: 155-157.

Sivell, D. (2003). *The ecology and conservation of the tansy beetle,* Chrysolina graminis. Unpublished PhD thesis, University of York.

Smart, S.M., Bunce, R.G.H., Black, H.J., Ray, N., Bunce, F., Kirby, K., Watson, R. & Singleton, D. (2001). Measuring long term ecological change in British woodlands (1971-2000) (2 vols.). *English Nature Research Reports* **461**: 1-217.

Stace, C. (1997). *New Flora of the British Isles* (2nd ed.). CUP, Cambridge.

Steinhausen, W.R. (1994). Chrysomelidae Larven. In: Klausnitzer, B. (ed.) *Die Larven der Käfer Mitteleuropas 2. Band Myxophaga Polyphaga Teil 1. 17. Überfamilie Chrysomeloidea 116. Familie: Chrysomelidae*, pp. 231-314. Keltern, Germany.

Steinhausen, W.R. (1995). Neue Blattkäfer-Larven (Coleoptera: Chrysomelidae). *Entomologische Nachrichten und Berichte* **39**: 65-67.

Steinhausen, W.R. (1996). Vergleichende Morphologie der Puppen der Blattkäfer-unterfamilie Chrysomelinae (Col., Chrysomelidae). *Entomologische Nachrichten und Berichte* **40**: 89-98.

Stenhouse, D. (2006). Records of *Agelastica alni* (L.) (Chrysomelidae) in South Lancashire and Cheshire in two successive years. *The Coleopterist*. **15(1)**: 21-24.

Tölg, F. (1913). *Psylliodes attenuata* Koch, der Hopfen-oder Hanf-Erdfloh 1. Teil. Morphologie und Biologie der der Präimaginalstadien. *Verhandlungen des Zoologische-Botanishen Vereins in Wein* **63**: 1-25.

Tomilova, V.N. & Kuznetsova, N.P. (1975). [The mining chrysomelid of poplar]. *Zaschita Rastenii* **9**: 45. [In Russian]

Tubbs, C.R. (2001). *The New Forest: History, Ecology and Conservation*. New Forest Ninth Centenary Trust, Lyndhurst.

Urban, C. (1922). Zur Biologie der *Zeugophora flavicollis* Mrsh. (Col. Chrysom.) *Deutsche Entomologische Zeitschrift* **1922**: 405-408.

Vig, K. (1989). [The morphology of *Phyllotreta* larvae (Col.: Chrysomelidae) and determination keys to larvae of more common species]. *Növényvédelem* **25**: 412-419. [In Hungarian]

Vig, K. & Markó, V. (2006). Species composition of leaf beetle assemblages in deciduous tree canopies in Hungary (Coleoptera: Chrysomelidae). *Bonner Zoologische Beiträge* **54(4)**: 305-312.

Warchałowski, A. (2003). *The Leaf-beetles (Chrysomelidae) of Europe and the Mediterranean Area*. Natura optima dux Foundation, Warsaw.

Wells, S.M., Pyle, R.M. & Collins, N.M. (1983). *The IUCN Invertebrate Red Data Book*. IUCN, Gland.

Xambeu, Captain. (1890). Moeurs et métamorphoses d'insectes. *Donacia aquatica* L. (= *dentipes* Fabr.). *Revue D'Entomologie, Caen* **9**: 283-285.

Zaitsev, Y.M. & Medvedev, L.N. (2009). *Lichinki zhukov-listoedov Rossii*. KMK Scientific Press, Moscow.

Zucht, G. (1934). Zur Biologie von *Agelastica alni* L. *Deutsche Entomologische Zeitschrift* **1934**: 145-218.

Appendix 1. All species reviewed in theMegalopodidae, Orsodacnidae and Chrysomelidae

Table A.

Species name	GB IUCN status	Qualifying criteria	Rationale	GB Rarity status	Presence in England	Presence in Scotland	Presence in Wales	AoO (hectads) <1990	AoO (hectads) 1990-2012	Dual hectads
Zeugophora flavicollis	EN	B2a, bii, biv	Marked decline from a generally widespread distribution (historically undoubtedly present in more hectads than this) to a now-restricted distribution. Although recorded from a new site in 2001 , only two key sites and may be adversely affected by neglect or a lack of appropriate management of woodland.	NR	E			16	4	1
Zeugophora subspinosa	LC		Possibly delining but still widespread.		E	S	W	111	79	30
Zeugophora turneri	VU	B2a, bii	Marked decline and distribution restricted to central/northern Scotland. May be adversely affected by a lack of suitable woodland management.	NR		S		14	7	3
Orsodacne cerasi	LC		Widespread and locally common.	NS	E		W	47	63	16

Orsodacne humeralis	LC	May have disappeared from part of its range; still widespread in S & SE England but scattered and scarce overall.	NS	E		32	29	8
Bruchus atomarius	LC	Widespread in England and Wales.		E	W	103	83	19
Bruchus brachialis	NA	First UK record 2010 in S. Essex.		E		0	4	0
Bruchus ervi	NA	Found breeding in imported lentils in a shop in 1985; no other records but could be reintroduced accidentally.		E		1	0	0
Bruchus loti	LC	Widespread in England and Wales.		E	W	162	292	76
Bruchus pisorum	NA	Marked decline, but widespread and associated with stored/imported dried peas.		E		22	10	3
Bruchus rufimanus	LC	Widespread in England and Wales.		E	W	149	197	56
Bruchus rufipes	LC	Widespread in England and Wales.		E	W	77	133	32
Bruchidius cisti	LC	Widespread in England and Wales.		E	W	84	70	21
Bruchidius imbricornis	NA	First UK record in Essex in 2012.		E		0	1	0
Bruchidius incarnatus	NA	Very rare introduction with dried beans and similar produce.		E		2	0	0
Bruchidius olivaceus	CR(PE)	Last recorded in 1923, its decline likely to be due factors beyond the decline of its food-plant (sainfoin, *Onobrychis viciifolia*).		E		12	0	0
Bruchidius varius	NA	First UK record in 1994, now widely scattered in SE England and the midlands.		E		0	62	0
Bruchidius villosus	LC	Widespread in England and Wales.		E	W	111	163	37
Acanthoscelides obtectus	NA	Imported with stored legumes; not established.		E		9	5	1

Callosobruchus chinensis	NA		Imported with stored legumes; not established.		E			10	2	0
Callosobruchus maculatus	NA		Imported with stored legumes; not established.		E			0	5	0
Zabrotes subfasciatus	NA		Imported with butter beans; not established.		E			1	0	0
Macroplea appendiculata	LC		Decline to 15 post-1990 hectads and significant declines in range, especially in Scotland with losses from sites such as Loch Leven. However, with 93% of recent hectads being newly-discovered sites, either old sites haven't been re-surveyed or records occur randomly, hence LC status.	NS	E	S		28	15	1
Macroplea mutica	EN	B2a, bii, biv	Marked decline to 5 post-1990 hectads, widely scattered around the coast of England, and vulnerable to losses of coastal/estuarine habitats.	NR	E			19	5	3
Donacia aquatica	VU	A2c, B2a, bii	Large decline and reduction in range, now widely scattered and localised.	NS	E	S	W	56	16	6
Donacia bicolora	LC		Marked decline in hectads and large reduction in range alongside this.	NS	E		W	54	33	5
Donacia cinerea	LC		Marked decline in hectads and large reduction in range alongside this.	NS	E		W	56	27	8
Donacia clavipes	LC		Widespread in England and Wales.		E	S	W	93	99	23
Donacia crassipes	LC		Although no marked decline in hectad numbers, mapping shows reduction in range.	NS	E	S	W	48	40	7
Donacia dentata	VU	B2a, bii, biv	Large decline, occupied hectads widespread.	NR	E			41	9	7

Donacia impressa	LC		Widespread.	NS	E	S	W	64	73	18
Donacia marginata	LC		Widespread in England and Wales.		E		W	94	80	27
Donacia obscura	LC		Widely scattered in the N & W of Britain; although hectad numbers suggest an increase, this is not belived to be a genuine trend as there have been losses from many historical locations.	NS	E	S	W	29	49	9
Donacia semicuprea	LC		Widespread, especially in England.		E		W	118	116	44
Donacia simplex	LC		Probably the most widespread Donacia species in Britain, especially in England and Wales.		E	S	W	245	354	84
Donacia sparganii	VU	B2a, bii, biv	Large decline, occupied hectads widespread.	NR	E	S	W	46	9	3
Donacia thalassina	LC		Not as common as hectad numbers suggest; widespread/scattered but with possible declines especially in S & SE England.	NS	E	S	W	92	66	14
Donacia versicolorea	LC		Widespread.		E	S	W	144	141	27
Donacia vulgaris	LC		Widespread.		E	S	W	121	214	38
Plateumaris bracata	LC		Some evidence of a decline and reduction in range, but insufficient to outweigh the hectad threshold in IUCN (Section 10).	NS	E		W	43	25	7
Plateumaris discolor	LC		Widespread.		E	S	W	246	346	75
Plateumaris rustica	LC		Widespread in England and Wales but a marked decline with losses from some locations.	NS	E	S	W	93	40	18
Plateumaris sericea	LC		Widespread.		E	S	W	253	297	88
Lema cyanella	LC		Widespread in England and Wales.		E		W	164	158	38

Oulema erichsoni	CR	B2a, bii, biv	Very few sitess and largely dependant on wet, poorly vegetated peat cuttings. Essentially a single overall location affected by flooding, hence B1 applies.	NR	E			2	3	0
Oulema melanopus	LC		Widespread.		E	S	W	68	193	18
Oulema obscura	LC		Widespread.		E	S	W	313	407	101
Oulema rufocyanea	LC		Widespread.		E	S	W	47	237	23
Crioceris asparagi	LC		Widespread, especially in England.		E		W	102	91	25
Lilioceris lilii	NA		Widespread and extending its range.		E	S	W	28	310	21
Labidostomis tridentata	CR(PE)	C1, C2a(i), D	Known from only a few scattered sites and not recorded since the 1950s.		E			7	0	0
Clytra laeviuscula	RE		Last recorded in 1895.			EXTINCT (E, S)		1	0	0
Clytra quadripunctata	LC		Widespread but uncommon and appears to have declined across many parts of its range even though the total reduction in hectads does not show such a great decrease.	NS	E	S	W	97	68	22
Smaragdina affinis	CR	B2a, bii, biv	Last recorded in 1965.	NR	E			3	0	0
Smaragdina salicina	DD		Single individual found in 2010.		E			0	1	0
Cryptocephalus aureolus	LC		Widespread in England and Wales.		E	S	W	142	137	54
Cryptocephalus biguttatus	VU	B2a, bii, biv	Recent records from Sussex, Dorset and Hampshire, though very few since 2000.	NR	E		W	13	10	4
Cryptocephalus bilineatus	LC		More hectads than the usual threshold for NS, but an aparrent decline due to loss of unimproved grassland.	NS	E			32	26	10
Cryptocephalus bipunctatus	LC		Widespread but localised with some losses.	NS	E	S	W	61	50	15

Cryptocephalus coryli	EN	B2a, bii, biv	Known from a few sites following a serious decline since the 1950s - ongoing survey work in Sherwood Forest provides data on their distribution and dynamics.	NR	E	S		15	5	1
Cryptocephalus decemmaculatus	EN	B2a, bii, biv	Two widely separated populations (Rannoch, Perthshire and Wybunbury Moss, south Cheshire) and a decline in hectads. Chartley Moss, Staffordshire probably extinct since the 1980s..	NR	E	S		6	2	1
Cryptocephalus exiguus	CR(PE)	B2a, bii, biv	Given that suitable-quality habitat no longer exists at its one known site and targeted surveys have not found it there since 2000, it is likely that it is extinct at that site.	NR	E			6	1	0
Cryptocephalus frontalis	NT		Widely scattered in S/SE England following a marked decline, possibly associated with hedgerow management.	NS	E			30	13	1
Cryptocephalus fulvus	LC		Widespread in England and Wales.		E		W	118	205	55
Cryptocephalus hypochaeridis	LC		Widely scattered in England and Wales, especially clustered on the North Downs.	NS	E	S	W	42	42	18
Cryptocephalus labiatus	LC		Widespread; one of the commonest *Cryptocephalus* species.		E	S	W	221	253	84
Cryptocephalus moraei	LC		Widespread in southern England.		E	S	W	83	117	35
Cryptocephalus nitidulus	EN	B2a, bii, biv	Recent records only from a few sites in Surrey.	NR	E			10	4	1
Cryptocephalus parvulus	LC		Widely scattered in England and Wales with some losses.	NS	E	S	W	52	44	14

Cryptocephalus primarius	EN	B2a, bii, biv	Habitat quality at its main site increasingly poor due to lack of management. Also found at Purbeck Ridge East and West SSSIs.	NR	E			7	4	2
Cryptocephalus punctiger	VU	B2a, bii, biv	Decline in range and number of hectads.	NR	E	S		16	8	2
Cryptocephalus pusillus	LC		Widespread in England and Wales		E	S	W	180	280	83
Cryptocephalus querceti	EN	B2a, bii, biv	Small number of sites and a possible reduction. Known to be established in Windsor Great Park, now also confirmed in Nottinghamshire.	NR	E			5	3	2
Cryptocephalus sexpunctatus	EN	B2a, bii, biv, bv	Possible reproductive failure at Stockbridge Down due to excessively small population (estimated <50 individuals).	NR	E	S		20	3	1
Cryptocephalus violaceus	RE		Last recorded in 1864.			EXTINCT (E)		2	0	0
Oomorphus concolor	LC		Widespread in England and Wales (largely coastal).		E	S	W	88	62	15
Bromius obscurus	CR	B2a, bii	Recently recorded in Scotland, confirmed from a single hectad.	NR	E			1	1	1
Timarcha goettingensis	LC		May have declined in parts of England but still widespread.		E		W	137	86	42
Timarcha tenebricosa	LC		May have declined in parts of England but still widespread.		E	S	W	209	203	80
Chrysolina americana	NA		First recorded in 1963, and expanding its range.		E	S	W	1	40	0
Chrysolina banksii	LC		Widespread in England and Wales.		E		W	131	150	64
Chrysolina brunsvicensis	LC		Widespread in England and Wales.		E	S	W	87	74	16

Chrysolina cerealis	EN	B2a, bii	Two sites (Snowdon and Cwm Idwal) in Snowdonia, both within National Nature Reserves, but not seen recently in Cwm Idwal. Protected under Schedule 5 of the Wildlife & Countryside Act 1981. EOO less than 100km2 and AOO less than 10km2, qualifies as CR B1, B2a,bii but downgraded to EN on possibility of populations surviving in Cwm Idwal.	NR			W	2	1	1
Chrysolina coerulans	NA		First recorded in 2003, first breeding record in 2011.		E			0	4	0
Chrysolina fastuosa	LC		Widespread.		E	S	W	113	130	32
Chrysolina graminis	CR	B2a, bii, biv	Marked decline and reduction in range; fewer extant sites than the number of hectads suggest and only confirmed in any numbers from the area around York where it is also in decline.	NR	E			22	9	7
Chrysolina haemoptera	LC		Large decline, especially away from the coast.	NS	E		W	64	27	11
Chrysolina herbacea	LC		Widespread in central/southern England.		E	S		63	114	29
Chrysolina hyperici	LC		Widespread in England and Wales.		E	S	W	138	153	34
Chrysolina latecincta	EN	B2a, bii, biv	Known only from Orkney cliff-tops and an Argyll saltmarsh. Cliff-top grassland reduced by erosion and saltmarsh habitat potentially vulnerable to sea-level rise.	NR		S		6	4	2

Chrysolina marginata	NT	B2a, bii, biv	Large reduction in hectads, though possibly under-recorded as it is nocturnal. There are recent records from eastern England which are not on NBN, but the lack of records from previously known areas such as the Orkneys suggests there is a real and highly significant decline.	NR	E	S		33	11	4
Chrysolina oricalcia	LC		Possible decline in parts of England, but still widespread.		E	S	W	116	100	27
Chrysolina polita	LC		Widespread.		E	S	W	398	647	213
Chrysolina sanguinolenta	LC		Widely scattered in S & E England following a very large decline. As a readily identifiable and charismatic species.	NS	E		W	69	19	7
Chrysolina staphylaea	LC		Widespread.		E	S	W	324	363	91
Chrysolina sturmi	LC		Widespread but scattered following a large decline.	NS	E		W	77	33	13
Chrysolina varians	LC		Possible decline but still widespread.		E	S	W	128	85	16
Gastrophysa polygoni	LC		Widespread.		E	S	W	336	376	112
Gastrophysa viridula	LC		Widespread.		E	S	W	255	645	119
Phaedon armoraciae	LC		Widespread.		E	S	W	256	385	80
Phaedon cochleariae	LC		Widespread.		E	S	W	268	492	116
Phaedon concinnus	LC		Widely scattered around the coast. Just above the hectad threshold for NS, but follows a decline and many habitats vulnerable to sea level rise.	NS	E	S	W	32	21	4
Phaedon tumidulus	LC		Widespread.		E	S	W	356	629	172
Hydrothassa glabra	LC		Possible decline but still widespread.		E	S	W	140	105	21

Hydrothassa hannoveriana	VU	B2 a, bii, biv	Decline to a small number of widely scattered locations.	NR	E	S		14	7	2
Hydrothassa marginella	LC		Widespread.		E	S	W	280	408	89
Prasocuris junci	LC		Widespread.		E	S	W	163	246	41
Prasocuris phellandrii	LC		Widespread.		E	S	W	188	231	43
Plagiodera versicolora	LC		Widespread in central/southern England.		E		W	98	208	52
Chrysomela aenea	LC		Widespread.		E	S	W	68	136	19
Chrysomela populi	LC		Possible decline in the north of its range, but still widespread.		E		W	109	72	31
Chrysomela saliceti	NA		First recorded in 2012, found to be breeding.		E			0	1	0
Chrysomela tremula	CR(PE)		Last confirmed record in 1958 despite targeted surveys.		E		W	43	0	0
Gonioctena decemnotata	LC		Some decline and loss from some locations; widely scattered in S & E England.	NS	E	S		66	40	16
Gonioctena olivacea	LC		Widespread.		E	S	W	125	120	35
Gonioctena pallida	LC		Widely scattered/patchy distribution.		E	S	W	79	75	16
Gonioctena viminalis	LC		Some decline and loss from some locations; widespread in in S England.	NS	E			62	41	21
Phratora laticollis	LC		Widespread.		E	S	W	140	205	35
Phratora polaris	NT	B2a, biii	Restricted to grassland between 700m and 1100m on mountains in NW Scotland. Apparent increase in hectads due to survey effort rather than an actual increase. Probably under-recorded, but climate change may impact on habitat as it is found	NR		S		1	8	0

			across northern Eurasia.							
Phratora vitellinae	LC		Widespread.		E	S	W	297	330	94
Phratora vulgatissima	LC		Widespread.		E	S	W	150	430	66
Galerucella calmariensis	LC		Widespread.		E	S	W	110	175	32
Galerucella lineola	LC		Widespread.		E	S	W	196	408	75
Galerucella nymphaeae	LC		Widespread.		E	S	W	79	114	19
Galerucella pusilla	LC		Widely scattered.		E	S	W	60	94	16
Galerucella sagittariae	LC		Widespread.		E	S	W	189	374	89
Galerucella tenella	LC		Widespread.		E	S	W	198	280	68
Pyrrhalta viburni	LC		Widespread.		E		W	116	164	48
Xanthogaleruca luteola	NA		Occasional imports.		E			2	1	0
Galeruca laticollis	CR	B2a, bii, biv	Believed to be extinct until rediscovered at Wheatfen Broad in 1996. Restricted to a small area and thus vulnerable to over-collecting, changes in habitat quality or single harmful events.	NR	E			4	1	0
Galeruca tanaceti	LC		Possible decline in some parts of its range, but still widespread.		E	S	W	163	125	36
Lochmaea caprea	LC		Widespread.		E	S	W	184	289	77
Lochmaea crataegi	LC		Widespread.		E	S	W	236	459	111
Lochmaea suturalis	LC		Widespread.		E	S	W	292	418	131
Diabrotica virgifera	NA		Accidental import; believed to be extermined but may be present and/or reintroduced.		E			0	2	0
Phyllobrotica quadrimaculata	LC		Widespread.		E	S	W	93	89	21
Luperus flavipes	LC		Large decline and loss from several parts of its range since 1970.	NS	E	S	W	98	37	11
Luperus longicornis	LC		Widespread.		E	S	W	193	269	82

Calomicrus circumfusus	LC	Newly recorded in some locations, lost from others - remains scarce/scattered in S England.	NS	E	S	W	46	37	4
Agelastica alni	DD	Previously believed to be extinct, but rediscovery in 2004 with a series of records from Lancashire and Cheshire indicate a population has re-established in NW England.	NR	E		W	7	3	0
Sermylassa halensis	LC	Widespread in England and Wales.		E	S	W	248	278	104
Luperomorpha xanthodera	NA	Accidental import; uncertain whether it can successfully overwinter outside of heated premises.		E			0	3	0
Phyllotreta atra	LC	Widespread.		E		W	181	191	52
Phyllotreta consobrina	LC	Widely scattered, mainly in S England and shows a significant decline.	NS	E		W	85	43	13
Phyllotreta cruciferae	LC	Widely scattered, mainly in S England and shows a significant decline.	NS	E		W	95	39	11
Phyllotreta diademata	LC	Widely scattered.		E		W	64	75	11
Phyllotreta exclamationis	LC	Widespread.		E		W	121	168	18
Phyllotreta flexuosa	LC	Widespread.		E	S	W	72	112	6
Phyllotreta nemorum	LC	Widespread.		E	S	W	207	125	27
Phyllotreta nigripes	LC	Widespread and appears to be increasing.		E	S	W	145	273	59
Phyllotreta nodicornis	LC	Widespread.		E	S	W	72	112	23
Phyllotreta ochripes	LC	Widespread, mainly in England.		E		W	87	121	17
Phyllotreta punctulata	LC	Widely scattered, though appears to have declined.	NS	E		W	54	35	5

Phyllotreta striolata	VU	B2a, bii, biv	Large decline, now widely scattered in a small number of locations.	NR	E			W	28	10	0
Phyllotreta tetrastigma	LC		Widespread.		E	S		W	101	132	30
Phyllotreta undulata	LC		Widespread.		E	S		W	367	508	150
Phyllotreta vittula	LC		Widespread.		E	S		W	137	108	23
Aphthona ?atratula	LC		Widely scattered.		E			W	60	59	19
Aphthona atrocaerulea	LC		Possible decline in some parts of its range, but still widespread.		E	S		W	102	65	13
Aphthona euphorbiae	LC		Widespread, having increased with expansion in flax/linseed cultivation.		E			W	83	525	55
Aphthona herbigrada	LC		Widely scattered.		E	S		W	74	105	32
Aphthona lutescens	LC		Widespread.		E			W	62	115	19
Aphthona melancholica	LC		Widespread.		E			W	104	93	33
Aphthona nigriceps	LC		Not common, but widespread/scattered, and previously under-recorded.	NS	E	S		W	27	38	2
Aphthona nonstriata	LC		Widespread.		E	S		W	237	312	96
Aphthona pallida	DD		First recorded in 2007 and subsequently found in a small number of other locations, although some specimens of '*A. nigriceps*' have since been found to actually be *A. pallida* and it is likely that others await re-identification.		E				0	1	0
Longitarsus absynthii	VU	B2a, bii, biv	Only in coastal/near-coastal habitats in a small part of SE England, mainly around the Thames estuary. Vulnerable to habitat loss or degradation e.g. through sea-level rise or development, and has shown a	NR	E				12	8	3

			decline with losses from several locations.							
Longitarsus aeneicollis	LC		Although hectad numbers do not show this, appears to be less widespread than previously with losses from a number of locations.	NS	E	S	W	34	34	2
Longitarsus aeruginosus	CR(PE)	C1, C2a(i), D	Last recorded in 1925.		E			2	0	0
Longitarsus agilis	LC		No decline, remains scarce and widely scattered.	NS	E			17	18	3
Longitarsus anchusae	LC		Previously recorded from much further north, now declined and known only from S & E England.	NS	E	S		40	33	6
Longitarsus atricillus	LC		Widespread.		E	S	W	160	179	40
Longitarsus ballotae	LC		Widely scattered in Wales and S England.	NS	E		W	33	35	9
Longitarsus brunneus	LC		Widely scattered, possibly some decline in parts of its range.	NS	E	S	W	27	21	6
Longitarsus curtus	LC		Widely scattered.	NS	E	S	W	26	25	6
Longitarsus dorsalis	LC		Widespread in England south of the Humber.		E			24	115	8
Longitarsus exoletus	LC		Widespread.		E	S	W	78	132	26
Longitarsus ferrugineus	EN	B2a, bii, biv	Large decline, now restricted to a small number of locations.	NR	E			27	5	0
Longitarsus flavicornis	LC		Widespread.		E		W	123	231	57
Longitarsus fowleri	LC		Described as a new species in 1967, so no records (except for potential reidentification of older specimens) prior to this. Remains scattered in S England.	NS	E			7	39	2

Longitarsus ganglbaueri	LC		Widely scattered with some clusters e.g. along the R. Severn, but losses across parts of its range.	NS	E	S		64	42	8
Longitarsus gracilis	LC		Widespread.		E	S	W	138	263	55
Longitarsus holsaticus	LC		Widely scattered, possibly some decline in parts of its range.		E	S	W	72	65	9
Longitarsus jacobaeae	LC		Widespread.		E	S	W	199	201	46
Longitarsus kutscherae	LC		Widespread.		E	S	W	83	133	21
Longitarsus longiseta	CR	B2a, bii,	Rare in SE England. Although the Atlas (Cox, 2007) notes 'few sites', Booth (1994) records a single site which is threatened by birch scrub encroachment, and there are no records after 1994.	NR	E			1	1	0
Longitarsus luridus	LC		Widespread.		E	S	W	437	718	199
Longitarsus lycopi	LC		Widely scattered in S England, lost from more northerly locations.	NS	E	S	W	36	40	6
Longitarsus melanocephalus	LC		Widespread.		E	S	W	227	334	65
Longitarsus membranaceus	LC		Widespread.		E	S	W	77	75	17
Longitarsus minusculus	DD		Two specimens from Dorset in 2002 have been confirmed; other museum specimens from the UK are misidentified *L. membranaceus.*		E			0	2	0
Longitarsus nasturtii	LC		Widely scattered but uncommon following a long-term decline, easpecially losses from E England.	NS	E		W	38	26	3
Longitarsus nigerrimus	VU	D2	Restricted mainly to a few hectads in a small area of the New Forest, though no clear decline.	NR	E			5	4	3

Longitarsus nigrofasciatus	NT	B2bii, biv	Marked decline with loss from some locations; now scattered in SE England, also found on Lundy.	NR	E			24	11	1
Longitarsus obliteratoides	LC		First described in 1973, subsequently found as specimens attributed to L. obliteratus back to 1964; possibly other specimens needing reidentification but still likely to be restricted to coastal sites.	NR	E		W	1	5	0
Longitarsus obliteratus	LC		Widely scattered.	NS	E		W	33	58	14
Longitarsus ochroleucus	LC		Large historic decline, possibly due to changes in arable regimes.	NS	E		W	81	19	5
Longitarsus parvulus	LC		Widespread.		E		W	53	381	22
Longitarsus pellucidus	LC		Widely scattered.		E		W	57	53	6
Longitarsus plantagomaritimus	LC		Sparsely scattered around coasts on littoral habitats vulnerable to loss e.g. linked to climate change.	NS	E	S	W	16	23	3
Longitarsus pratensis	LC		Widespread.		E	S	W	177	346	79
Longitarsus quadriguttatus	LC		Localised in S & E England with a cluster in East Anglia.	NR	E			15	14	3
Longitarsus reichei	LC		Widely scattered.		E	S	W	36	64	6
Longitarsus rubiginosus	LC		Widespread.		E	S	W	96	170	33
Longitarsus rutilus	LC		Scattered in .S England	NS	E			21	20	3
Longitarsus succineus	LC		Widespread.		E	S	W	210	297	57
Longitarsus suturellus	LC		Widespread.		E	S	W	239	371	90
Longitarsus symphyti	DD		First recorded in 2009, with several specimens at a site in Berkshire - all that were investigated were wingless, suggesting dispersal may be slow.		E			0	1	0

Longitarsus tabidus	LC		Widespread but patchy with some apparent decline.	NS	E		W	43	31	7
Altica brevicollis	LC		Widely scattered in S England, possible decline following numerous records from Dorset in the 1980s.	NS	E		W	53	40	8
Altica carinthiaca	LC		Previously confused with *A. palustris* and *A. pusilla* var. *montana*, but now known to be fairly widespread in S England.		E			9	44	3
Altica helianthemi	LC		Widespread in England and Wales.		E	S	W	73	84	18
Altica longicollis	LC		Widely scattered; previously recorded as *A. britteni*, *A. ericeti* and *A. longicollis*.	NS	E	S	W	56	49	7
Altica lythri	LC		Widespread.		E	S	W	252	586	142
Altica oleracea	LC		Widespread.		E	S	W	257	264	72
Altica palustris	LC		Widespread.		E	S	W	186	398	78
Hermaeophaga mercurialis	LC		Widespread.		E	S	W	92	128	48
Batophila aerata	LC		Possible loss from some locations but still widely scattered in S England.		E		W	56	51	12
Batophila rubi	LC		Widespread.		E	S	W	149	102	34
Lythraria salicariae	LC		Widely scattered; possible loss from some locations.	NS	E		W	34	28	10
Ochrosis ventralis	VU	B2a, bii, biv	Large decline and loss across its range.	NR	E		W	40	9	1
Neocrepidodera ferruginea	LC		Widespread.		E	S	W	367	541	142
Neocrepidodera impressa	LC		Widely scattered and evidence of decline.	NR	E		W	24	15	7
Neocrepidodera transversa	LC		Widespread.		E	S	W	347	629	157
Derocrepis rufipes	LC		Widespread.		E	S	W	158	155	37

Hippuriphila modeeri	LC		Widespread.		E	S	W	132	178	40
Crepidodera aurata	LC		Widespread.		E	S	W	237	330	104
Crepidodera aurea	LC		Widespread.		E		W	178	278	82
Crepidodera fulvicornis	LC		Widespread.		E	S	W	357	591	164
Crepidodera nitidula	LC		Widely scattered and evidence of decline in some areas.	NS	E			38	40	5
Crepidodera plutus	LC		Widespread.		E		W	107	174	48
Epitrix atropae	LC		Widely scattered and evidence of decline in some areas.	NS	E			42	41	18
Epitrix pubescens	LC		Widespread.		E		W	41	167	23
Podagrica fuscicornis	LC		Widely scattered and evidence of decline in some areas.	NS	E		W	54	51	16
Podagrica fuscipes	LC		Widely scattered, mainly in S England, and evidence of decline in some areas.	NS	E		W	31	21	9
Mantura chrysanthemi	LC		Widely scattered and evidence of decline in some areas.	NS	E	S	W	32	24	7
Mantura matthewsii	LC		Widely scattered.		E	S	W	53	66	15
Mantura obtusata	LC		Widely scattered and evidence of decline in some areas.	NS	E	S	W	60	26	8
Mantura rustica	LC		Widely scattered but evidence of a decline.	NS	E	S	W	162	40	11
Chaetocnema aerosa	CR	B2a, bii, biv	Possibly extinct (last recorded in the 1960s) but targeted surveys should be undertaken at prior sites where suitable habitat remains e.g. Wicken Fen.	NR	E			3	0	0
Chaetocnema arida	LC		Widely scattered.		E		W	37	78	9
Chaetocnema concinna	LC		Widespread.		E	S	W	99	295	39

Chaetocnema confusa	LC		Widely scattered.	NS	E			W	29	55	13
Chaetocnema hortensis	LC		Widespread.		E		S	W	274	520	134
Chaetocnema picipes	LC		Widely scattered.		E			W	35	62	7
Chaetocnema sahlbergii	VU	B2a, bii, biv	Widely scattered and a large decline to only a few locations.	NR	E			W	23	10	2
Chaetocnema subcoerulea	LC		Southern England, some evidence of declines in a few location.	NS	E				35	32	12
Sphaeroderma rubidum	LC		Widespread.		E		S	W	158	229	50
Sphaeroderma testaceum	LC		Widespread.		E		S	W	257	414	95
Apteropeda globosa	LC		Widely scattered and evidence of decline in some areas.	NS	E		S	W	46	33	7
Apteropeda orbiculata	LC		Widespread.		E		S	W	175	173	50
Apteropeda splendida	CR(PE)	B2a, bii, biv	Last confirmed record 1931, though recorded from the Burren, Ireland in 1987. An apparently more recent record on NBN is incorrect due to a lack of precise dating in the original (probably 19th century/early 20th century) record details.	NR	E				3	0	0
Mniophila muscorum	LC		Widely scattered and evidence of decline in some areas; probably under-recorded.	NS	E		S	W	44	17	1
Dibolia cynoglossi	EN	B2a, bii, biv	Only known recently from 2 sites (covering parts of 3 hectads)in SE England, including Dungeness; may be under-recorded.	NR	E				5	3	1
Psylliodes affinis	LC		Widespread.		E			W	229	387	103
Psylliodes attenuata	EN	B2a, bii, biv	Declined to a small number of scattered locations.	NR	E			W	14	3	0

Psylliodes chalcomera	LC		Widely scattered and evidence of decline in some areas.	NS	E	S	W	54	35	8
Psylliodes chrysocephala	LC		Widespread.		E	S	W	175	356	67
Psylliodes cucullata	NA		First recorded in 1991.				W	0	2	0
Psylliodes cuprea	LC		Evidence of large decline though still widely scattered.	NS	E	S	W	136	54	12
Psylliodes dulcamarae	LC		Widespread.		E		W	70	153	31
Psylliodes hyoscyami	CR(PE)	C1, C2a(i), D	Last recorded in 1930; declined along with commercial henbane crops.		E	S	W	17	0	0
Psylliodes laticollis	LC		Widespread.		E	S	W	76	104	18
Psylliodes luridipennis	CR	B2a, bii, biii	Endemic with a single population in one location (Lundy), reliant on its sole food-plant Lundy Cabbage which declined to low but stable abundance by 2001	NR	E			1	1	1
Psylliodes luteola	LC		Possible expansion since the 1980s, but the majority of records are from Oxfordshire.	NS	E			10	37	5
Psylliodes marcida	LC		Widely scattered around the coasts.		E	S	W	78	56	16
Psylliodes napi	LC		Widespread.		E	S	W	201	309	54
Psylliodes picina	LC		Widespread.		E	S	W	144	144	33
Psylliodes sophiae	EN	B2a, bii, biv	Declined to a small number of nearby locations in East Anglia.	NR	E			6	3	1
Pilemostoma fastuosa	NT		Scattered in S England and Wales.	NR	E		W	16	12	0
Hypocassida subferruginea	RE		Last recorded in the 19th century.			EXTINCT (E,W)		1	0	0
Cassida denticollis	EN	B2a, bii, biv	Declined to a small number of sites in S England.	NR	E	S		7	4	0
Cassida flaveola	LC		Widespread.		E	S	W	220	212	49

Cassida hemisphaerica	LC	Widely scattered and evidence of decline in some areas.	NS	E	S	W	63	34	2
Cassida murraea	LC	Some evidence of decline in east and central England due to reduced habitat quality, but remains widespread in S England and Wales.		E		W	54	62	18
Cassida nebulosa	LC	Some evidence of decline - now scattered in S & E England.	NS	E		W	30	21	1
Cassida nobilis	LC	Widely scattered and evidence of decline in some areas.	NS	E	S	W	91	43	13
Cassida prasina	LC	Widely scattered and evidence of decline in some areas.	NS	E	S	W	67	42	9
Cassida rubiginosa	LC	Widespread.		E	S	W	364	671	187
Cassida sanguinosa	DD	Most records post-1980 and may be expanding, but still known from only a small number of sites in S England.	NR	E			5	7	0
Cassida vibex	LC	Widespread.		E		W	114	182	36
Cassida viridis	LC	Widespread.		E	S	W	175	227	57
Cassida vittata	LC	Patchy, and possibly some decline, but still widespread.		E	S	W	80	53	15

Appendix 2. Summary of IUCN criteria

Table B. Summary of the five criteria (A–E) used to evaluate if a taxon belongs in a threatened category (Critically Endangered, Endangered or Vulnerable)

Use any of the criteria A–E	**Critically Endangered**	**Endangered**	**Vulnerable**
A. Population reduction			
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%

A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible **AND** understood **AND** have ceased, based on and specifying any of the following:

- **(a)** direct observation
- **(b)** an index of abundance appropriate to the taxon
- **(c)** a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality
- **(d)** actual or potential levels of exploitation
- **(e)** effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased **OR** may not be understood **OR** may not be reversible, based on (a) to (e) under A1.

A3. Population reduction projected or suspected to be met in the future (up to a maximum of 100 years) based on (b) to (e) under A1.

A4. An observed, estimated, inferred, projected or suspected population reduction (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased **OR** may not be understood **OR** may not be reversible, based on (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence (EOO)	< 100km²	< 5,000km²	< 20,000km²
B2. Area of occupancy (AOO)	< 10km²	< 500km²	< 2,000km²

AND at least 2 of the following:

(a) Severely fragmented, **OR**

Number of locations	= 1	≤ 5	≤ 10

(b) Continuing decline in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** area, extent and/or quality of habitat; **(iv)** number of locations or subpopulations; **(v)** number of mature individuals.

(c) Extreme fluctuations in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** number of locations or subpopulations; **(iv)** number of mature individuals.

C. Small population size and decline			
Number of mature individuals	< 250	< 2,500	< 10,000
AND either C1 or C2:			
C1. An estimated continuing decline of at least: (up to a max. of 100 years in future)	25% in 3 years or 1 generation	20% in 5 years or 2 generations	10% in 10 years or 3 generations
C2. A continuing decline **AND** (a) and/or (b):			
(a i) Number of mature individuals in each subpopulation: **or**	< 50	< 250	< 1,000
(a ii) % individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals.			

D. Very small or restricted population			
Either:			
Number of mature individuals	< 50	< 250	**D1.** < 1,000
			AND/OR
VU D2. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.			**D2.** typically: AOO < 20km² or number of locations ≤ 5
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations (100 years max.)	≥ 20% in 20 years or 5 generations (100 years max.)	≥ 10% in 100 years

Appendix 3. Summary of insect-plant relationships

Table C.

Species	**Main host plant species in Britain**	**Occasional/possible host plant species in Britain**
Zeugophora flavicollis	*Populus tremula*	*Populus nigra, P.* x *canadensis, Salix alba, S. caprea*
Zeugophora turneri	*Populus tremula, Betula* spp.	
Macroplea mutica	*Potamogeton pectinatus*	*Ruppia maritime, Zostera marina, Zannichellia palustris*
Donacia aquatica	*Carex acutiformis, C. acuta, Glyceria fluitans, G. maxima, Sparganium erectum*	
Donacia dentata	*Sagittaria sagittifolia*	*Alisma* spp., *Nuphar lutea*
Donacia sparganii	*Sparganium emersum, S. erectum*	*Butomus umbellatus, Glyceria fluitans, Nuphar lutea*
Oulema erichsoni	*Glyceria fluitans*	
Smaragdina affinis	*Corylus* spp.	*Betula* spp.
Smaragdina salicina	Unknown	*Salix* spp., *Crataegus* spp., *Trifolium* spp.
Cryptocephalus biguttatus	*Erica tetralix*	
Cryptocephalus coryli	*Betula* spp.	Various tree species
Cryptocephalus decemmaculatus	*Salix aurita,* dwarf sallows *Salix* spp., *Betula pubescens*	*Salix cinerea, Alnus* spp.
Cryptocephalus exiguus	Unknown	*Rumex acetosa, Carduus* spp., *Cirsium* spp., *Betula* spp., *Salix cinerea*
Cryptocephalus frontalis	*Crataegus monogyna*	*Salix cinerea*
Cryptocephalus nitidulus	*Betula pubescens, B. pendula*	*Corylus* spp., *Crataegus monogyna, Ligustrum* spp.
Cryptocephalus primarius	*Helianthemum nummularium*	
Cryptocephalus punctiger	*Betula* spp.	*Quercus* spp., *Salix caprea, Corylus* spp., *Populus* spp.
Cryptocephalus querceti	*Quercus* spp.	*Crataegus* spp.
Cryptocephalus sexpunctatus	Various trees, *Cytisus scoparius*	*Euphorbia amygdaloides,* various yellow Asteraceae
Bromius obscurus	*Chamerion angustifolium, Epilobium* spp., *Vitis vinifera, Petasites japonicus*	
Chrysolina cerealis	*Thymus polytrichus*	
Chrysolina graminis	*Tanacetum vulgare, Mentha aquatica*	

Chrysolina latecincta	*Plantago maritima, P. coronopus*	Other *Plantago* spp., *Linaria* spp., *Cymbalaria muralis, Antirrhinum majus*
Chrysolina marginata	*Achillea millefolium*	
Chrysolina sanguinolenta	*Linaria vulgaris*	*Antirrhinum majus*
Hydrothassa hannoveriana	*Caltha palustris*	
Phratora polaris	Salix herbacea	Other alpine Salix spp.
Galeruca laticollis	*Cirsium* spp.	
Agelastica alni	*Alnus glutinosa, A. incana*	*Corylus avellana, P.* x *canadensis, Salix caprea*
Phyllotreta striolata	Various Brassicaceae	
Aphthona pallida	*Geranium pratense*	
Longitarsus absynthii	*Seriphidium maritimum, Artemisia* spp.	
Longitarsus ferrugineus	*Mentha* spp.	*Lycopus* spp., *Teucrium* spp.
Longitarsus longiseta	*Veronica officinalis*	
Longitarsus minusculus	Various Lamiaceae	
Longitarsus nigerrimus	*Utricularia minor*	*Utricularia vulgaris, U. intermedia, Molinia caerulea, Eriophorum* spp.
Longitarsus nigrofasciatus	Various Scrophulariaceae	
Longitarsus obliteratoides	*Thymus serpyllum*	
Longitarsus ochroleucus	*Senecio* spp.	*Matricaria* spp., *Tripleurospermum indodorum, Artemisia absinthium, tanacetum* spp., *Achillea millefolium, Alyssum* spp.
Longitarsus symphyti	*Symphytum officinale*	
Ochrosis ventralis	*Solanum* spp.	*Matricaria* spp., *Anagallis arvensis, Lythrum salicaria, Silene uniflora, Quercus ilex, Carpinus betulus*
Mantura rustica	*Rumex* spp.	*Polygonum aviculare, Rheum* x *hybridum*
Chaetocnema aerosa	*Eleocharis* spp.	
Chaetocnema sahlbergii	Unknown	*Carex* spp., *Juncus* spp., *Glaux maritima*
Apteropeda splendida	*Ajuga reptans, Veronica* spp., *Plantago* spp.	
Dibolia cynoglossi	Various Lamiaceae	
Psylliodes attenuata	*Humulus lupulus, Cannabis sativa*	*Urtica dioica*
Psylliodes luridipennis	*Coincya wrightii*	
Psylliodes sophiae	*Descurainia sophia*	
Pilemostoma fastuosa	Various Asteraceae	

Cassida denticollis	*Achillea millefolium*	
Cassida sanguinosa	Various Asteraceae	

INDEX

Donacia cinerea	P27	P29				
Donacia crassipes	P27	P29				
Donacia dentata	P25	P26	P29	P33	P39	
Donacia impressa	P27	P29				
Donacia obscura	P27	P29				
Donacia sparganii	P25	P26	P29	P33	P40	
Donacia thalassina	P27	P29				
Epitrix atropae	P28	P31				
Galeruca laticollis	P24	P26	P30	P33	P67	
Gonioctena decemnotata	P27	P30				
Gonioctena viminalis	P27	P30				
Hydrothassa hannoveriana	P25	P26	P30	P33	P60	
Labidostomis tridentata	P24	P26	P29	P33	P53	
Longitarsus absynthii	P25	P26	P30	P33	P68	
Longitarsus aeneicollis	P27	P30				
Longitarsus aeruginosus	P24	P26	P30	P33	P68	
Longitarsus agilis	P27	P30				
Longitarsus anchusae	P27	P30				
Longitarsus ballotae	P27	P30				
Longitarsus brunneus	P27	P30				
Longitarsus curtus	P27	P30				
Longitarsus ferrugineus	P24	P26	P30	P33	P69	
Longitarsus fowleri	P27	P30				
Longitarsus ganglbaueri	P27	P31				
Longitarsus longiseta	P24	P26	P31	P33	P70	
Longitarsus lycopi	P27	P31				
Longitarsus nasturtii	P27	P31				
Longitarsus nigerrimus	P25	P26	P31	P33	P71	
Longitarsus nigrofasciatus	P25	P26	P31	P72		
Longitarsus obliteratoides	P25	P26	P31	P72		
Longitarsus obliteratus	P27					
Longitarsus ochroleucus	P27	P31				
Longitarsus plantagomaritimus	P27	P31				
Longitarsus quadriguttatus	P26	P31				
Longitarsus rutilus	P27	P31				
Longitarsus tabidus	P27	P31				
Luperus flavipes	P27	P30				
Lythraria salicariae	P28	P31				
Macroplea appendiculata	P27	P29				
Macroplea mutica	P24	P26	P29	P33	P41	
Mantura chrysanthemi	P28	P31				
Mantura obtusata	P28	P31				
Mantura rustica	P28	P31				
Mniophila muscorum	P28	P31				
Neocrepidodera impressa	P26	P31				
Ochrosis ventralis	P25	P26	P31	P33	P74	

Orsodacne cerasi	P27	P29				
Orsodacne humeralis	P27	P29				
Oulema erichsoni	P24	P26	P29	P33	P43	
Phaedon concinnus	P27	P30				
Phratora polaris	P25	P26	P30	P61		
Phyllotreta consobrina	P27	P30				
Phyllotreta cruciferae	P27	P30				
Phyllotreta punctulata	P27	P30				
Phyllotreta striolata	P25	P26	P30	P31	P33	P74
Pilemostoma fastuosa	P25	P26	P32	P81		
Plateumaris bracata	P27	P29				
Plateumaris rustica	P27	P29				
Podagrica fuscicornis	P28	P31				
Podagrica fuscipes	P28	P31				
Psylliodes attenuata	P24	P26	P31	P34	P75	
Psylliodes chalcomera	P28	P31				
Psylliodes cuprea	P28	P31				
Psylliodes hyoscyami	P24	P27	P31	P34	P76	
Psylliodes luridipennis	P24	P26	P31	P34	P77	
Psylliodes luteola	P28	P31				
Psylliodes sophiae	P24	P26	P32	P34	P77	
Smaragdina affinis	P24	P26	P29	P33	P54	
Zeugophora flavicollis	P24	P26	P29	P33	P37	
Zeugophora turneri	P25	P26	P29	P33	P38	