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## Scarce Ground Beetle Project

Final Report on work 2000-2004

February 2004

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*This report has been produced under contract to English Nature, under the auspices  
of the Species Recovery Programme*

595.76(410)BOY



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## 1. Introduction

### 1.1. The Ground Beetles

Ground beetles all belong to the family Carabidae, and include some of our most familiar British beetles. As their name suggests, most carabids live on the ground, where they prey on a range of other invertebrates such as grubs and worms, though a number of species feed on seeds as larvae and/or adults. Many ground beetles can be found under stones or branches, but they are extremely diverse in their habitat requirements. For example, a number of species occur in the woodland canopy, whilst others are strictly montane in Britain. Wetlands have many species, as do lowland heaths and coastal habitats such as saltmarshes. Many carabids are extremely stenotopic, for example, the small, almost blind *Aepus robini* is confined to tiny rock crevices in the intertidal zone on the seashore.

There are about 350 species of ground beetles in Britain. Of these, half of the species are considered to be scarce in Britain. Many have shown considerable declines in their abundance this century, primarily as a result of the loss of their habitats to intensive agriculture and forestry, or to inappropriate development. Because of their diverse and exacting habitat requirements, the presence of populations of scarce ground beetles is a very good indication that habitat quality is still good. Carabids are one of the best-studied groups of British beetles, being relatively easy to identify, and including a number of extremely attractive species. Particularly effective in this respect, is the Carabid Recording Scheme (CRS), run by the Centre for Ecology and Hydrology at Monk's Wood. This provides a national database of British ground beetle records submitted by hundreds of volunteers across the country. The completion of the first phase of this project culminated in the publication of a provisional atlas, with Carabids records being mapped at a 10km square resolution throughout Britain (Luff, 1998). Such distributional information is a necessary prerequisite to the successful conservation of scarce ground beetles, and the CRS database has been an invaluable source of information for this Project.

Because of the threats to our carabid fauna, and the relatively good knowledge we have of their distribution, habitat and identification, they are well represented in the list of priority species in the UK Biodiversity Action Plan (BAP). In all, 32 ground beetles are included in the UK BAP, a full list of these is given in Table 1 below with notes on their status and main habitats in Britain. For each of the species, the UK BAP provides a series of actions that will need to be addressed by 2010 in order to maintain and enhance their populations.

Of these 32, 17 have a full Species Action Plan (SAP) in the UK BAP, whilst the remaining 15 have a much shorter species statement, which requires only monitoring of the species in question (UK Steering Group, 1995, UK Biodiversity Group 1999a & b). For the purposes of the current project, those species with a full SAP were considered to be the priority for further study, though its remit also covered those species that only have a Species Statement. In Table 1, those species with a Species Statement only are identified in the Status column.

Of the 17 species with a full SAP (see Table 1 below), *Bembidion testaceum*, *Lionychus quadrillum* and *Perileptus areolatus* have been the subject of work as part of a wider Environment Agency / Countryside Council for Wales project investigating

the invertebrate fauna of exposed riverine sediments. Two further species, *Amara famelica* and *Anisodactylus poeciloides* are being studied as part of a programme of work undertaken by the Biodiversity Challenge group. These species did not form part of the remit of the SGBP. *Lebia cyanocephala* is not a priority species in the UK BAP, but it has been included because it was on the original BAP long list of candidate priority species, and was only omitted from further consideration at that time because it was considered to be extinct.

This leaves 27 species, which have been the main focus of work during the current Project. Of these, two species, the Blue Ground Beetle *Carabus intricatus* (Turner 1995, 1996, 1997 & 1998 and Boyce & Walters 1999 & 2000) and Edmond's Ground Beetle *Tachys edmondsi* (Williams & Pinchen 1998, 1999 & 2000), are the subject of long-running studies that were already being funded by English Nature under the auspices of their Species Recovery Programme (SRP) prior to the beginning of the current project

### **1.2. The Scarce Ground Beetle Project (SGBP)**

These 27 species are the main focus of the Project. However, its remit also includes other nationally scarce or Red Data Book Carabids, where there is thought to be a need for conservation action. English Nature has been charged by government with the delivery of the actions laid out in the UK BAP. They have already initiated work on a number of the priority ground beetles in conjunction with voluntary conservation organisations in the Biodiversity Challenge partnership, and with Invertebrate Link. The SGBP was set up with funding from English Nature to complement and extend this work. The Project will only cover populations of scarce ground beetles occurring in England. The author was contracted by English Nature (EN) to co-ordinate work on ground beetles (Carabidae) included in the UK Biodiversity Action Plan (BAP) as priority species. It has run from 2000 till 2004 and has the following aims:

- To achieve a good understanding of the current distribution, ecology and conservation needs of the BAP priority ground beetles.
- To encourage the adoption of management regimes that will maintain and enhance populations of scarce ground beetles.
- To consider the conservation requirements of other nationally scarce or Red Data Book carabids, and to implement action where appropriate. Though the majority of work has been on BAP priority carabids, the Project was also charged with considering the conservation requirements of the ground beetle community more widely, with up to 10% of project resources to be used for furtherance of the conservation of carabid species not covered by SAPs or Species Statements under the UK BAP.
- To disseminate the results of the Project to conservation organisations and the general public, primarily through the establishment and servicing of a scarce carabid network.
- To assist in identifying links, overlaps and possible conflicts with appropriate Habitat Action Plans (HAPs) and, possibly in the longer term, with other SAPs, to

ensure that the needs of carabid species are fed into the implementation of these plans at the appropriate national or local level.

Species	Code	Notes
Carabus aeneus	BAF 01	Common in grassland
Carabus clivator	BAF 02	Common in grassland
Carabus convexus	BAF 03	Common in grassland
Carabus foveolatus	BAF 04	Common in grassland
Carabus haughtoni	BAF 05	Common in grassland
Carabus italicus	BAF 06	Common in grassland
Carabus lucicola	BAF 07	Common in grassland
Carabus melanocollis	BAF 08	Common in grassland
Carabus nemoralis	BAF 09	Common in grassland
Carabus notivittatus	BAF 10	Common in grassland
Carabus oratus	BAF 11	Common in grassland
Carabus pectoratorius	BAF 12	Common in grassland
Carabus pumilus	BAF 13	Common in grassland
Carabus ruficornis	BAF 14	Common in grassland
Carabus selysianus	BAF 15	Common in grassland
Carabus sp. 1	BAF 16	Common in grassland
Carabus sp. 2	BAF 17	Common in grassland
Carabus sp. 3	BAF 18	Common in grassland
Carabus sp. 4	BAF 19	Common in grassland
Carabus sp. 5	BAF 20	Common in grassland
Carabus sp. 6	BAF 21	Common in grassland
Carabus sp. 7	BAF 22	Common in grassland
Carabus sp. 8	BAF 23	Common in grassland
Carabus sp. 9	BAF 24	Common in grassland
Carabus sp. 10	BAF 25	Common in grassland
Carabus sp. 11	BAF 26	Common in grassland
Carabus sp. 12	BAF 27	Common in grassland
Carabus sp. 13	BAF 28	Common in grassland
Carabus sp. 14	BAF 29	Common in grassland
Carabus sp. 15	BAF 30	Common in grassland
Carabus sp. 16	BAF 31	Common in grassland
Carabus sp. 17	BAF 32	Common in grassland
Carabus sp. 18	BAF 33	Common in grassland
Carabus sp. 19	BAF 34	Common in grassland
Carabus sp. 20	BAF 35	Common in grassland
Carabus sp. 21	BAF 36	Common in grassland
Carabus sp. 22	BAF 37	Common in grassland
Carabus sp. 23	BAF 38	Common in grassland
Carabus sp. 24	BAF 39	Common in grassland
Carabus sp. 25	BAF 40	Common in grassland
Carabus sp. 26	BAF 41	Common in grassland
Carabus sp. 27	BAF 42	Common in grassland
Carabus sp. 28	BAF 43	Common in grassland
Carabus sp. 29	BAF 44	Common in grassland
Carabus sp. 30	BAF 45	Common in grassland
Carabus sp. 31	BAF 46	Common in grassland
Carabus sp. 32	BAF 47	Common in grassland
Carabus sp. 33	BAF 48	Common in grassland
Carabus sp. 34	BAF 49	Common in grassland
Carabus sp. 35	BAF 50	Common in grassland
Carabus sp. 36	BAF 51	Common in grassland
Carabus sp. 37	BAF 52	Common in grassland
Carabus sp. 38	BAF 53	Common in grassland
Carabus sp. 39	BAF 54	Common in grassland
Carabus sp. 40	BAF 55	Common in grassland
Carabus sp. 41	BAF 56	Common in grassland
Carabus sp. 42	BAF 57	Common in grassland
Carabus sp. 43	BAF 58	Common in grassland
Carabus sp. 44	BAF 59	Common in grassland
Carabus sp. 45	BAF 60	Common in grassland
Carabus sp. 46	BAF 61	Common in grassland
Carabus sp. 47	BAF 62	Common in grassland
Carabus sp. 48	BAF 63	Common in grassland
Carabus sp. 49	BAF 64	Common in grassland
Carabus sp. 50	BAF 65	Common in grassland
Carabus sp. 51	BAF 66	Common in grassland
Carabus sp. 52	BAF 67	Common in grassland
Carabus sp. 53	BAF 68	Common in grassland
Carabus sp. 54	BAF 69	Common in grassland
Carabus sp. 55	BAF 70	Common in grassland
Carabus sp. 56	BAF 71	Common in grassland
Carabus sp. 57	BAF 72	Common in grassland
Carabus sp. 58	BAF 73	Common in grassland
Carabus sp. 59	BAF 74	Common in grassland
Carabus sp. 60	BAF 75	Common in grassland
Carabus sp. 61	BAF 76	Common in grassland
Carabus sp. 62	BAF 77	Common in grassland
Carabus sp. 63	BAF 78	Common in grassland
Carabus sp. 64	BAF 79	Common in grassland
Carabus sp. 65	BAF 80	Common in grassland
Carabus sp. 66	BAF 81	Common in grassland
Carabus sp. 67	BAF 82	Common in grassland
Carabus sp. 68	BAF 83	Common in grassland
Carabus sp. 69	BAF 84	Common in grassland
Carabus sp. 70	BAF 85	Common in grassland
Carabus sp. 71	BAF 86	Common in grassland
Carabus sp. 72	BAF 87	Common in grassland
Carabus sp. 73	BAF 88	Common in grassland
Carabus sp. 74	BAF 89	Common in grassland
Carabus sp. 75	BAF 90	Common in grassland
Carabus sp. 76	BAF 91	Common in grassland
Carabus sp. 77	BAF 92	Common in grassland
Carabus sp. 78	BAF 93	Common in grassland
Carabus sp. 79	BAF 94	Common in grassland
Carabus sp. 80	BAF 95	Common in grassland
Carabus sp. 81	BAF 96	Common in grassland
Carabus sp. 82	BAF 97	Common in grassland
Carabus sp. 83	BAF 98	Common in grassland
Carabus sp. 84	BAF 99	Common in grassland
Carabus sp. 85	BAF 100	Common in grassland

**TABLE 1: Ground Beetles included on the UK BAP priority species list**

Species	Status	Habitat
<i>Amara famelica</i> <sup>1</sup>	RDB3. SAP	Lowland heathland
<i>Amara strenua</i>	RDB3. SS.	Saltmarshes, floodplain fens and coastal grazing marshes
<i>Anisodactylus nemorivagus</i>	Na. SS.	Lowland heathland
<i>Anisodactylus poeciloides</i> <sup>1</sup>	RDB3. SAP.	Saltmarshes
<i>Badister collaris</i>	RDB1. SS.	Fens and marshes, especially near the coast
<i>Badister peltatus</i>	Na. SS.	Coastal fens and marshes
<i>Bembidion argenteolum</i>	RDBK. SAP.	Bare sand by fresh water (coastal and inland)
<i>Bembidion humerale</i>	RDB1. SAP.	Lowland raised bog
<b><i>Bembidion nigropiceum</i></b>	Na. SS.	Coastal shingle
<i>Bembidion testaceum</i> <sup>2</sup>	Nb. SAP.	Exposed riverine sediments
<b><i>Carabus intricatus</i></b>	RDB1. SAP.	Western oak woodland
<b><i>Cicindela germanica</i></b>	RDB3. SAP.	Coastal soft-rock cliffs
<b><i>Cicindela hybrida</i></b>	RDB2. SAP.	Sand dunes
<i>Cicindela maritima</i>	Nb. SS.	Sand dunes
<b><i>Cicindela sylvatica</i></b>	Na. SAP.	Lowland heath
<i>Dromius quadrisignatus</i>	RDB1. SS.	Broadleaved woodland and pasture woodland
<b><i>Dromius sigma</i></b>	Na. SS.	Floodplain fens and flooded gravel pits
<i>Dyschirius angustatus</i>	RDB3. SS.	Bare sand by fresh water
<i>Harpalus dimidiatus</i>	Na. SS.	Chalk and limestone grassland and arable field margins
<b><i>Harpalus froelichi</i></b>	RDB2. SAP.	Chalk grassland and arable field margins
<b><i>Lebia cyanocephala</i></b>	RDB1.	Chalk grassland
<i>Lionychus quadrillum</i> <sup>2</sup>	RDB3. SAP.	Exposed riverine sediments and coastal shingle
<i>Ophonus cordatus</i>	RDB3. SS.	Sand dunes and chalk grassland on the coast
<i>Ophonus parallelus</i>	RDB3. SS.	Chalk and limestone grassland and coastal shingle
<i>Ophonus punctatulus</i>	Na. SS.	Chalk grassland and arable field margins
<b><i>Ophonus stictus</i></b>	RDB1. . SS.	Chalk and limestone grassland in quarries
<b><i>Panagaeus crux-major</i></b>	RDB1. SAP.	Floodplain fen and sparsely vegetated dune slacks
<i>Perileptus areolatus</i> <sup>2</sup>	Na. SAP.	Exposed riverine sediments
<i>Pterostichus aterrimus</i>	RDB1. SAP.	Fens and bogs
<b><i>Pterostichus kugelanni</i></b>	RDB1. SAP.	Lowland heath
<b><i>Tachys edmondsi</i></b>	RDB1/RDB5. SAP.	Lowland heath ( <i>Sphagnum</i> bog)
<i>Tachys micros</i>	Na. SS.	Coastal soft-rock cliffs

**Notes:** For an explanation of the various status categories (taken from Hyman & Parsons (1992), see Appendix 1 at the end of this report. SAP = Carabids having a full Species Action Plan in the UK BAP. SS = Carabids only having a Species Statement in the UK BAP. Emboldened names refer to those species where research work has been carried out by the SGBP, 2000-2004.

<sup>1</sup> Species where research has been undertaken by the Biodiversity Challenge Partnership.

<sup>2</sup> Species of exposed riverine sediments where research has been undertaken by Birmingham University.

Section 2 below summarises the survey work carried out during the four field seasons over which this Project has run. A brief synopsis of the work carried out for each species, and the results produced is presented, and recommendations for future work on the species is given. In all, 12 of the priority species have been the subject of research during the last four years (emboldened names in Table 1 above). Note also that one additional priority species, *Tachys micros* has received some survey effort during the course of carrying out work on *Cicindela germanica*, with which it occurs on soft-rock coastal cliffs in southern England. There are also summaries for two non-BAP species, *Calosoma inquisitor* and *Lebia crux-minor*, in section 2, as these have been the subject of studies during the current Project. Copies of all of the full reports produced by the various contractors employed during the four years of the Scarce Ground Beetle Project are held by English Nature's Nominated Officer for this contract, Roger Key at Northminster House, Peterborough.

Section 3 includes Species Dossiers for the remaining 15 BAP priority carabids of the 28 considered by the SGBP. These include a brief summary of the distribution, ecology and any future action required to ensure the protection of populations of each of these species in Britain.

Section 4 considers the work carried out by the author in co-ordinating the Project, and in disseminating the results to both the wider nature conservation community and general public (meeting aims [b] and [d] above). A summary of the main areas of work is given, and again, recommendations for future work are also detailed.

## 2. Species studied by the Scarce Ground Beetle Project, 2000-2004

This section contains a summary of the various contracts carried out during the course of the Project. In all, 15 contracts have been undertaken on 14 species during the four years. This information is presented in tabular form in Table 2 below, which also shows the contractor who carried out the fieldwork, and the year(s) during which the work was undertaken.

During the 2001 field season, work was dramatically curtailed by the foot-and-mouth epidemic. In most cases, the work programme agreed had to be modified considerably, but it was nonetheless possible to complete a full programme of work during the year. Unfortunately, the peak of the outbreak coincided with the period of peak activity for many ground beetles from April-July, and in a number of cases fieldwork had to be held over until the late summer and autumn. In all instances, proper precautions were taken to ensure the risk of spreading foot-and-mouth was minimised.

Table 1 below lists the various projects carried out during the course of the Project, with notes on the contractor employed to carry out the work, and the years in which work was undertaken.

**Table 2: Details of contracts commissioned by the SGBP between 2000-2004**

<b>SPECIES:</b>	<b>CONTRACTOR:</b>	<b>YEAR:</b>
<i>Bembidion nigropiceum</i>	JM Walters	2001-2003
<i>Calosoma inquisitor</i>	DC Boyce	2002-2003
<i>Carabus intricatus</i>	DC Boyce & JM Walters	2000-2004
<i>Cicindela germanica</i>	DC Boyce	2001-2003
<i>Cicindela hybrida</i>	S Judd, Liverpool Museum	2001-2003
<i>Cicindela sylvatica</i>	AJW Allen	2001-2003
<i>Cicindela sylvatica</i>	RSPB, Lowland Heathland Project	2002-2003
<i>Dromius sigma</i>	M Hammond	2001-2002
<i>Harpalus froelichi</i>	MG Telfer	2001-2004
<i>Lebia crux-minor</i>	DC Boyce	2001-2003
<i>Lebia cyanocephala</i>	J Denton	2001-2003
<i>Ophonus stictus</i>	DC Boyce	2001-2003
<i>Panagaeus crux-major</i>	D Bell	2000-2003
<i>Pterostichus kugelanni</i>	JM Walters	2000-2004
<i>Tachys edmondsi</i>	BJ Pinchen	2001-2003



## 2.1 *Bembidion nigropiceum* (Marsham)

Formerly this species was known from scattered sites all along the south coast from Cornwall to Kent. There are numerous old records from shingle beaches at the base of slumping coastal cliffs in Dorset and the Isle of Wight, and this habitat was clearly the former stronghold of the species in Britain. More recently, most records are from Sussex and Kent, though there are still other sites further west on the Isle of Wight and in Dorset. There is a recent isolated record from Pembrokeshire in south west Wales.

This is a BAP priority species with a Species Statement. It had not originally been intended to carry out work on this species, but as foot-and-mouth prevented any work on *Dromius sigma* being carried out in 2001-2002, a small-scale study of this species was initiated by John Walters instead, which was continued in 2002-2003.

*B nigropiceum* is exclusively a species of the seashore, usually found under stones, on both sand and shingle. It is also found amongst rubble at the base of coastal cliffs. Most records of the adult beetle are for the spring and early summer, and like other members of the genus, it is probably a spring breeder. Both adults and larvae are thought to be predators, though the latter stage is currently unknown. John Walter's studies suggest that relatively fine-grade shingle/sand is the preferred habitat, with adults generally found at some depth in shingle beaches at around high tide mark, where the shingle abuts onto solid substrates.

*Bembidion nigropiceum* is part of a small but highly specialised community of Coleoptera that also includes the nationally scarce ground beetle *Trechus fulvus* found at Start Point, Devon and Durdle Door, Dorset and the RDB rove beetle *Medon pociferus* also found at the latter site.

During the two years, 4 colonies of the beetle have been located; at Great Mattiscombe, Beesands and Hallsands in Devon, and at Mousehole in Cornwall. The habitat in which the beetle occurs at these four sites is very similar, being fine-textured shingle at the base of clayey or sandy cliffs, usually where there is a relatively high degree of moisture. The beetle appears to be largely subterranean, and probably feeds on small invertebrates, such as mites and springtails, that are found in the shingle in association with patches of decaying organic matter, such as rotting seaweed. Larvae have not been recorded.

In addition to fieldwork, existing records of *B nigropiceum* have been collated, and a literature search has been carried out which aims to draw together information for inclusion in a Species Dossier.

**Future action:** Despite its small size, and cryptic habits, there are now ten post-1980 sites for the beetle, and the SGBP survey has been successful in establishing that *B nigropiceum* is still widespread within its limited British range and specialised habitat. No further action on this species is thought to be necessary currently.

## 2.2 *Calosoma inquisitor* (Linnaeus)

In 2002-03, an initial study of the distribution and ecology of the ground beetle *Calosoma inquisitor* was carried out. Further studies of the beetle were carried out at the single site in Devon where it is known to occur, and four sites in the New Forest were also visited in the hope of re-discovering populations of the beetle there.

The Devon site continues to hold a large population of the beetle, which can be readily surveyed by visiting at dusk with a torch and examining tree trunks. At this time, the adults can be seen emerging from the ground and climbing into the canopy where they feed on caterpillars, particularly some of the oak-defoliating moths that can be very abundant. The Devon site also hosts a large population of another BAP ground beetle, *Carabus intricatus*, and it was studies of this species that led to the initial discovery of *C inquisitor* here. Interestingly, despite night-searching of in excess of 50 ancient woodlands in Devon and Cornwall during the course of the *C intricatus* work, no other populations of *C inquisitor* have been found at any other sites, and it is clearly an extremely rare insect in south-west England.

A major part of this study has been the accumulation of existing information on the distribution and ecology of *C inquisitor*. In England, there are old records for a number of counties in the south and south-east, with the most recent being from the New Forest, Hampshire. However, except for this latter area, there are no post-1970 records from any where in these regions, and it seems probable that the beetle has undergone a catastrophic and un-remarked decline in its UK distribution. Only in the western part of its range does it still seem to be holding its own, with recent records from north-west England. Its stronghold appears to be in Wales, where there are a number of modern records, and there are also a handful of sites in western Scotland.

Four of the most recent sites for the beetle in the New Forest were visited in May 2003. Despite the habitat and weather conditions appearing good, and the visits coinciding with the peak emergence of the species (in Devon at least), none were recorded during the four nights. Further searching of historic sites in the New Forest is desirable, but it appears that it may have disappeared from at least some of its traditional haunts here.

**Future action:** The reasons for the apparent decline of *C inquisitor* are not understood, and further studies of both the ecology and distribution of the beetle are imperative in order to ensure its continued survival, at least in its English localities. The following actions are suggested:

- Carry out further night searches for the beetle between mid-May and mid-June in historic sites within the New Forest, and elsewhere in southern and eastern England.
- Initiate survey work at sites in north-west England.
- If the survey work suggested above suggests a real decrease in the English range of the beetle, begin detailed studies of its autecology that investigate the causes of its decline.
- Ensure the needs of this species are incorporated in the Upland Oak Woodland HAP.

### 2.3. Blue Ground Beetle *Carabus intricatus*

This ground beetle has been the subject of a long-running programme of research, which was begun under the auspices of English Nature's Species Recovery Programme in 1995, and was subsequently continued by the SGBP, with research concluding in 2002-03.

The study of this beetle has been very successful both in furthering our understanding of its distribution, and in elucidating its autecology and management requirements. It is now known from ten sites in south-west England, all lying on the southern fringes of Dartmoor and Bodmin Moor. Despite searching other areas within its limited historic range in Devon and Cornwall, the Blue Ground Beetle does not now seem to occur away from these two areas Britain. This suggests a substantial contraction in range

Survey techniques (night searching from March-June and winter searching in dead wood) have been developed that appear to be highly effective in locating populations of the beetle.

Adults are invariably found in ancient Beech and Sessile Oak woodlands, generally on warm, southerly or westerly aspects, and usually in humid situations near streams and other small watercourses. The adult requires well-rotted dead wood for overwintering, with drier, moss-covered dead branches and snags being especially favoured. Adults have been observed feeding and mating in the spring, with the Tree Slug *Limax marginatus* being the preferred food in the wild, though in captivity a very wide range of food was consumed. The larvae have been found on a few occasions in the wild, though larval ecology remains one area where further advances in our knowledge need to be made. In captivity, the Blue Ground Beetle has been successfully reared from the larval stage to the adult. Though adult females have laid eggs in captivity, these have never hatched.

**Future action:** The SAP for Blue Ground Beetle stipulates that five viable populations of the species should be established in Britain. Given that double this number of colonies have been now been found in Devon and Cornwall, the beetle could be considered to be "recovered". Caveats to this are 1) that the British range of the species is very small and appears to have declined considerably in the last century; 2) that it has been subject to considerable survey effort since 1995, and given the effectiveness of survey techniques in locating the species, it must still be considered to be a genuinely very rare species 3) that the beetle remains very vulnerable to changes in management, especially loss of grazing from ancient oak woodlands. In view of this, the following recommendations for management are made:

- Ensure managers of all sites with this species are aware of the presence of the beetle, and try to ensure a favourable management regime is adopted at all sites, with special emphasis on the maintenance of light grazing.
- Ensure the needs of this species are incorporated in the Upland Oak Woodland HAP.

#### 2.4 *Cicindela germanica*

As with *B nigropiceum*, it had not originally been intended to undertake work on this species in 2001-2002. However, given the difficulties of carrying out work on some of the other BAP priority species caused by the foot-and-mouth outbreak, it was decided that follow-up work should take place to that carried out by AJW Allen in 2000. 10 days fieldwork were undertaken by DC Boyce during 2001, and the monitoring plots set up this year will be re-visited in 2002, 2003 and 2004.

All of the main Dorset *C germanica* colonies have been re-visited on a number of occasions during the spring and summer. Abundant populations of this species have been found at most of these sites, with especially large colonies at Eype's Mouth, Charmouth and Seatown. Areas further to the west of these main population centres were also searched. The very wet and stormy weather in the winters of 1999-2000 and 2000-01 has caused considerable slumping of the wet cliffs, especially those immediately to the west of Lyme Regis, and there is still no evidence of *C germanica* here, though this area has been monitored annually between 2001-2003. However, a small colony has been found in an area of slumping cliff habitat at Branscombe, east Devon. This is the first modern record from Devon, though the colony here is very small, with most of the habitat having been lost to holiday development, or having become stabilised and overgrown with rank vegetation. Similarly, a new colony has been found on slumping cliffs near Bournemouth, well to the east of the existing colonies in Dorset. The large colonies on the Isle of Wight were not re-surveyed as part of this project.

The habitat in which larval burrows of *C germanica* were found has been characterised. The highest concentration of larval burrows is to be found in damp, but unsaturated sand, with a relatively low clay constituent, in areas with sparse vegetation cover. Clods of sand which have eroded out of the matrix, and which provide somewhat drier microhabitats appear to be especially favoured. As mentioned above, very recent landslips do not appear to be used, and this species appears to favour areas in which there was at least some degree of stability, with patches of well-established grassland habitat. Such areas provide much richer food resources for the larvae than do the recently eroded slips. Ten transects have been set up at Eype's Mouth that aim to monitor the abundance of larval burrows through the lifetime of the Project on a variety of cliff habitats. These range from very recently eroded sites, with little or no vegetation, through to sites with well-established grass and scrub vegetation. Numbers of larval burrows within these transects have been recorded, along with vegetation cover and composition. Photographic records of all transects have been made. During the three years that the transects have been monitored, there has been little change in the physical or botanical composition of the plots, and numbers of adult *C germanica* have remained consistently high.

Larvae have been taken home and reared in captivity through to the adult state. Larvae appear to be strictly nocturnal, and though a variety of invertebrate prey has been offered to them, feeding has not yet been observed. In the wild, there are clearly two larval age-cohorts, which supports the two-year life history already known for this species elsewhere in Europe.

Notes have also been made on the ecology and distribution of *Tachys micros*, which occurs at Eype's Mouth in company with *C germanica*. However, this is a more

elusive species, and has only been found on five occasions during the course of the Project. All records relate to much wetter, more clayey substrates, in the immediate vicinity of seepages, and with little or no other vegetation. *T micros* appears to be largely subterranean, being found in small cracks within the wet clay.

Though not a BAP priority species, *Drypta dentata* is also a specialist inhabitant of slumping cliffs, being known only from Eype's Mouth and the Isle of Wight. In the course of carrying out work at Eype's Mouth on *C germanica* and *T micros*, notes have also been made on this species. It has been found in three places at Eype, and at a number of other places on the slumping cliffs of Dorset's Jurassic coast, and it is clearly well-established in this area. In all cases the adults occur in wet "flats" on the cliffs. This seems to be a species that requires a relatively high degree of stability, with well-developed wetland vegetation of Common Reed *Phragmites australis* and Greater Horsetail *Equisetum telmateia*. Good numbers of adults were found by sifting wet litter. Once disturbed, adults frequently climb up reed stems, and it is possible that this species may be a predator in the vegetation "canopy".

**Future action:** Generally none required, this species is faring well within its very specialised habitat, and limited British range. The fortunes of the Cliff Tiger Beetle, and many of the other important invertebrates that occur on soft-rock cliffs are largely dictated by coastal processes, such as marine erosion of the cliffs. Sea defence works are likely to be the main detrimental influence on this beetle. The following future actions for Cliff Tiger Beetle are suggested:

- Ensure the requirements of this species are understood in drawing up coastal zone management plans for the Dorset and Isle of Wight coasts.
- Carry out a more detailed survey of the recently discovered population of the species in the Bournemouth area.

## 2.5 *Cicindela hybrida*

Survey and ecological studies of this species have been carried out by Steve Judd of Liverpool Museum. Main areas of work have been the study of the colonies of this species that occurs on the Sefton coast, Lancashire, and the drawing together of information on the beetle and its ecology, both in Britain and on the continent.

Studies of the colonies at Sefton have confirmed the continued presence of strong populations of the beetle in this area. The Northern Dune Tiger Beetle shows a preference for areas of relatively stabilised sand, with larval burrows being found only in such sites. Detailed characterisation of the habitat has been undertaken, and will be used to try and develop management prescriptions that aim to increase the population of *C. hybrida* at this and other UK sites. Visits have also been made to other sites in north-east England that formerly held populations of the species. No adults were seen at any of these sites. Given the growing knowledge of the habitat requirements of the species, it seems likely that it is now only known in Britain from Sefton and the two Cumbrian sites at which David Copestake has recently recorded it.

A major element of the work has been the collation of the considerable amount of information on this species in the scientific literature. Both UK and European sources have been consulted, and this information has been incorporated into the final report on this species.

Liverpool Museum are keen to use the Northern Dune Tiger Beetle to highlight conservation issues on the dune systems of the Sefton coast. They hope to be able to develop interpretative materials that aim to disseminate the work of the Project to a wider audience.

**Future action:** Though the Northern Dune Tiger Beetle remains common on the Sefton coast, the status of its Cumbrian colonies is less secure. Further work is required in this part of the country.

- Re-visit the Cumbrian sites at which David Copestake recorded the beetle in the 1990s.
- Develop interpretative materials that use the Northern Dune Tiger Beetle to highlight dune conservation issues on the Sefton coast.

## 2.6. Heath Tiger Beetle *Cicindela sylvatica*

Two separate projects have been initiated on this species during the course of the SGBP. Firstly, Tony Allen has undertaken surveys of the species throughout its British range, and secondly, the RSPB's Lowland Heathland Project has begun an ongoing experimental management programme on MoD-owned land at Great Ovens.

Tony Allen's work has yielded excellent results, with new colonies of *C sylvatica* being found at three sites. The beetle is now known from x sites on the lowland heaths of the Poole Basin in Dorset, and this is certainly the British stronghold of the Heath Tiger Beetle. These colonies are all on MoD land, being initially reported to Tony by RSPB's Lowland Heathland Project. In all cases the sites are used for vehicle training by the Army, and this has created large expanses of bare sandy ground. Such areas provide ideal habitat for this species, which is thought to have been lost from a number of its other heathland sites as a result of the withdrawal of management, and the consequent loss of bare ground. The newly discovered colony at Povington Heath is probably the largest colony now known in the UK. Both of the other BAP Priority ground beetles, *Anisodactylus nemorivagus* and *Pterostichus kugelanni* (see below) were also been found here for the first time in 2001, and this site is clearly of outstanding importance for the conservation of the ground beetle community of our southern lowland heaths.

Good numbers of adults have also been recorded from the colony occurring at Thursley Common, Surrey and adults were recorded from a new area here where they had not been seen for a number of years. On a less positive note, no colonies of the Heath Tiger Beetle have been found in the New Forest, despite repeated searching of its historic sites.

More detailed autecological studies of the colony of *C sylvatica* that is found on Sopley Common have also been carried out. A major problem in elucidating the ecology of this species is differentiating the larval burrows of *C sylvatica* from those of *C campestris*. Initial results suggest that *C sylvatica* burrows are restricted to areas of bare, consolidated sand, whilst those of *C campestris* are found in more humus-rich peaty substrates.

The RSPB have begun a large programme of scrub clearance at Great Ovens funded by the owners of the site, the MoD, and the Heritage Lottery Fund (HLF). A colony of *C sylvatica* occurs at this site, and the SGBP has helped the RSPB to begin a programme of monitoring work to be undertaken by RSPB staff annually. As part of the programme of management work, bare ground will be created, and the monitoring programme will attempt to assess the effectiveness of scrub clearance in creating suitable habitat for *C sylvatica* and other heathland ground beetles. It is hoped that this work will act as a template for management strategies that aim to increase the population of the species elsewhere within its limited English range.

### **Future action:**

- Continue to undertake monitoring of the results of experimental management at Great Ovens.